July 28, 2026
5:15 PM

CITY OF CHELAN
CITY COUNCIL AGENDA

1. CALL TO ORDER, PLEDGE OF ALLEGIANCE AND ROLL CALL

2. AGENDA CHANGES

3. CITIZEN COMMENTS

   Items not on the agenda. Time limited per the Mayor.

4. CONSENT AGENDA

   All items under the Consent Agenda are approved with one motion. Suggested Motion: I move to approve the Consent Agenda.

   A. Approve July 28, 2026 Accounts Payable Checks and EFT's & Payroll Checks and EFT' s (Councilmember Sanders)

   B. Approve the July 14, 2026 Regular Council Meeting Minutes (Deputy City Clerk Couch)

   C. City of Chelan Special Meeting on August 4, 2026 beginning at 5:15 p.m. (CIty Clerk Gallucci)

5. SPECIAL PRESENTATIONS, PROCLAMATIONS, AND AWARDS

   A. None

6. PUBLIC HEARINGS

   A. None

7. MOTION CONSIDERATIONS

   A. Resolution No. 2026-1485 Pilot Program for Outdoor Seating (Community Development Director Ajax)

   B. BOSS Construction Bid Award and Contract Documents for CC-1 Lift Station (Public Works Director Youngren)

   C. Shea, Carr & Jewell, Inc dba SCJ Alliance Amendment No. 6 to the Professional Services Agreement for the Lakeside Trail Project (Public Works Director Youngren)

8. ADMINISTRATIVE REPORTS

   A. Washington State Department of Transportation United States Highway 97A Chelan Multimodal Improvements (Public Works Director Youngren)

   B. Second Quarter Financial Report (Finance Director Evans)

   C. 2026 Comprehensive Plan Update: Chapter 3 Sub-Area Plans & Chapter 4 Housing and ESHB 2266 STEP Housing Code Amendments (Community

Development Director Ajax)

9. INFORMATIONAL ITEMS

   These items are for informational purposes only and are generally not discussed.

   A. Tentative Advanced Agenda (City Administrator McAloon)

   B. Council Liaison Report (Various Councilmembers)

   C. Contract Intake Report (City Clerk Gallucci)

   D. Lake Chelan Chamber of Commerce Financial Report (Finance Director Evans)

   E. Lake Chelan Airport Quarterly Report (Finance Director Evans)

10. CITY ADMINISTRATOR AND DEPARTMENT REPORTS

11. MAYOR AND COUNCIL COMMENTS

12. EXECUTIVE SESSION

    A. None

13. ADJOURNMENT

Our Vision

Chelan is a rural lakeside community surrounded by pristine natural beauty where generations of visitors and residents enjoy an exceptional quality of life.

Our Guiding Principles & Outcomes

Visionary & Strategic - A city that is forward-thinking, collaborative, and fiscally responsible.
Thriving & Connected - A vibrant, well-planned city where residents have a sense of home.
Healthy & Sustainable - A flourishing city that supports an active community.
Accessible & Welcoming - A safe city where everyone can find community.

The next meeting will be a Special City Council Meeting on August 4,2026 beginning at 5:15 p.m. in Council Chambers, 135 E. Johnson Avenue, Chelan, Washington.
A City Council meeting packet is available for review on the City's Website: cityofchelan.gov/meetings

City of Chelan

City Council Meeting
July 14, 2026

COUNCIL AND ADMINISTRATIVE PERSONNEL PRESENT

Mayor:
Erin McCardle

Councilmembers:
Agustin Benegas
Brad Chitty
Shane Collins
Jon Higgins
Tim Hollingsworth
Cesar Rivera-Vargas
Terry Sanders

Administrative Personnel:
City Administrator Laura McAloon
City Attorney Danielle Marchant
City Clerk Peri Gallucci
Deputy City Clerk Cailey Couch
Community Development Director John Ajax
Finance Director Heidi Evans
HR/Communication Director Chad Coltman
Parks & Recreation Director Audrey Cooper
Public Works Director Jake Youngren

1. CALL TO ORDER, PLEDGE OF ALLEGIANCE AND ROLL CALL

The meeting was called to order at 5:15 p.m.

2. AGENDA CHANGES

Add item 5E: Washington State Department of Transportation Highway 97A Multi-use Trail (Ted Snodgrass/Public Works Director Youngren)

Add item 7C: Clausen Settlement Agreement and General Release of All Claims (City Administrator McAloon)
Suggested Motion: I move to authorize the Mayor to finalize and execute the Clausen Settlement Agreement and General Release of All Claims, in the amount of $300,000.00.

3. CITIZEN COMMENTS

Items not on the agenda. Time limited per the Mayor.

Cathy Shinkoske, resident of Chelan, advocated for the installation of benches with backs at Lakeside Park.

Mary Sterling, resident of Chelan, inquired about the need for a referendum regarding the pathway on State Route 150.

Vicki Marz, resident of Chelan, expressed her concerns regarding a long-standing dispute over parking credits for Lakeside Lodge and Suites.

4. CONSENT AGENDA

   All items under the Consent Agenda are approved with one motion. Suggested Motion: I move to approve the Consent Agenda.

   A. June 09, 2026 Regular Council Meeting Minutes

   B. June 18, 2026, Joint Chelan City Council with the Parks and Recreation Advisory Board Special Meeting Minutes

   C. June 23, 2026 Accounts Payable Checks and EFT's & Payroll Checks and EFT' s

June 23, 2026 Payroll Checks No. 103279 - 103286, EFT' s & Direct Deposit totaling $334,401.42 and Accounts Payable Checks No. 213105 - 213184 & EFT's totaling $2,382,576.94. Void Check No. 212925 Transient Vendor (Forte Architects) check issued to wrong vendor totaling $(14,434.40) with an Accounts Payable Total of $2,368,142.54

   D. June 30, 2026 Strategic Retreat Council Meeting Minutes

   E. July 14, 2026 Accounts Payable Checks and EFT's & Payroll Checks and EFT' s

July 14, 2026 Payroll Checks No. 103287-103298, EFT' s and Direct Deposits totaling $654,142.01 and Accounts Payable Checks No. XX - XX & EFT's totaling $745,384.81.

   F. Excuse Councilmember Sanders from the June 30, 2026 Strategic Retreat

   G. 2026 Revised Council Committee Liaison Assignments

   H. Washington State Parks and Recreation Commission Subrecipient Grant Agreement for the Clean Vessel Act (CVA) Operations & Maintenance Agreement No. CVA 524-305

MOTION:	Move to approve the Consent Agenda.
MOVER:	Councilmember Terry Sanders
SECONDER:	Councilmember Cesar Rivera-Vargas
AYES:	Councilmember Terry Sanders, Councilmember Agustin Bengas, Councilmember Brad Chitty, Councilmember Jon Higgins, Councilmember Cesar Rivera-Vargas, Councilmember Tim Hollingsworth, Councilmember Shane Collins

NAYS:	None
RESULT:	Passed

5. SPECIAL PRESENTATIONS, PROCLAMATIONS, AND AWARDS

A. Chelan Valley Feral Cat Project Funding Report

The Chelan Valley Feral Cat Project presented their annual funding report to City Council. Founder April Leaf highlighted the program's success during the organization's third year, including fewer stray kitten calls, and shared that the project has inspired similar programs in neighboring communities. The organization receives $5,000 annually from the City under a 2025–2027 funding agreement.

B. Cascadia Conservation District Presentation

Ryan Williams, Executive Director of Cascadia Conservation District (CCD), provided a high-level overview of the organization's programs and services. In addition, the CCD requested a letter of support for the Washington State Conservation Commission's Washington Wildlife and Recreation Program (WWRP) Application No. 26-1569, which seeks funding to acquire Hinterlands Farm Phase 2 in Manson, Chelan County, as a permanent agricultural easement.

C. Parks & Recreation Professionals Month Proclamation

Mayor McCardle proclaimed July as Parks & Recreation Professionals Month in the City of Chelan.

D. Chelan County Regional Justice Center Presentation

Chris Sharp, Director of the Chelan County Regional Justice Center, presented a high-level overview of operations and recent improvements at the Chelan County Jail. He also introduced a proposed funding model for 2027 that would shift costs to a per-bed, per-night rate "pay as you go" structure rather than a lump sum. The proposal remains under review and will be presented to the City Council at a future date for consideration.

E. Washington State Department of Transportation United States Highway 97A Chelan Multimodal Improvements

Ted Snodgrass, Transportation Engineer 2 of Washington State Department of Transportation (WSDOT), presented an overview of the United States Highway 97A Chelan Multimodal Improvements project. He shared that WSDOT is seeking a $60,000.00 contribution towards the project, which will provide a multimodal pathway extending from Johnson Place to South Lakeshore Road. The pathway will be constructed within the existing roadway corridor, with an anticipated start date in September 2026. As part of the

project, the speed limit along this section of the highway would be reduced from 50 mph to 35 mph.

6. PUBLIC HEARINGS

   A. None.

7. MOTION CONSIDERATIONS

   A. Resolution No. 2026-1483 Washington State Department of Commerce Community Economic Revitalization Board (CERB) Grant Application

City Administrator McAloon shared staff has explored funding opportunities to support economic development and diversify Chelan's economy. Building on Douglas County's recent CERB funded economic diversification effort, staff developed a grant application to create a five-year economic development strategy for the City. The proposed CERB grant would provide up to $75,000 to support development of the strategy, with authorization for the Mayor to execute a grant agreement with the Department of Commerce if awarded. The effort is intended to diversify Chelan's economy beyond its traditional reliance on tourism and agriculture.

MOTION:	Motion to adopt Resolution No. 2026-1483 authorizing the application for and acceptance of a Washington State Department of Commerce Community Economic Revitalization Board (CERB) Grant.
MOVER:	Councilmember Tim Hollingsworth
SECONDER:	Councilmember Cesar Rivera-Vargas
AYES:	Councilmember Terry Sanders, Councilmember Agustin Bengas, Councilmember Brad Chitty, Councilmember Jon Higgins, Councilmember Cesar Rivera-Vargas, Councilmember Tim Hollingsworth, Councilmember Shane Collins
NAYS:	None
RESULT:	Passed

   B. Resolution No. 2026-1484 Washington State Military Department Public Assistance Grant Agreement

Parks and Recreation Director Cooper shared an update on woody debris deposited along Lake Chelan shorelines following the December 2025 atmospheric river event. City crews, with support from community volunteers, have removed nearly 100 cubic yards of debris

from public parks, beaches, and marina facilities, with additional debris expected throughout the summer. She also reported a FEMA Public Assistance reimbursement request has been submitted for eligible debris removal costs, and approval of a grant agreement with the Washington Military Department would position the City to receive reimbursement should federal funding be awarded. The effort is intended to support continued shoreline cleanup while maximizing available disaster recovery funding.

MOTION:	Move to adopt Resolution No. 2026-1484.
MOVER:	Councilmember Jon Higgins
SECONDER:	Councilmember Terry Sanders
AYES:	Councilmember Terry Sanders, Councilmember Agustin Bengas, Councilmember Brad Chitty, Councilmember Jon Higgins, Councilmember Cesar Rivera-Vargas, Councilmember Tim Hollingsworth, Councilmember Shane Collins
NAYS:	None
RESULT:	Passed

C. 2027 Budget Calendar Acceptance

Finance Director Evans presented the proposed 2027 budget calendar, highlighting key dates for public hearings and special meetings related to the operations, maintenance, and capital budgets. The proposed schedule was developed to meet all statutory requirements and deadlines for adoption of the 2027 budget.

MOTION:	Move to accept the 2027 Budget Calendar, as presented.
MOVER:	Councilmember Agustin Bengas
SECONDER:	Councilmember Jon Higgins
AYES:	Councilmember Terry Sanders, Councilmember Agustin Bengas, Councilmember Brad Chitty, Councilmember Jon Higgins, Councilmember Cesar Rivera-Vargas, Councilmember Tim Hollingsworth, Councilmember Shane Collins
NAYS:	None
RESULT:	Passed

D. Clausen Settlement Agreement and General Release of All Claims

City Administrator McAloon presented the Clausen Settlement Agreement and General Release of All Claims related to the resolution of a legal matter involving the City. The agreement is intended to provide a final resolution to the matter and conclude the associated claim.

MOTION:	Move to authorize the Mayor to finalize and execute the Clausen Settlement Agreement and General Release of All Claims, in the amount of $300,000.00.
MOVER:	Councilmember Tim Hollingsworth
SECONDER:	Councilmember Jon Higgins
AYES:	Councilmember Terry Sanders, Councilmember Agustin Bengas, Councilmember Brad Chitty, Councilmember Jon Higgins, Councilmember Cesar Rivera-Vargas, Councilmember Tim Hollingsworth, Councilmember Shane Collins
NAYS:	None
RESULT:	Passed

8. ADMINISTRATIVE REPORTS

A. Resolution No. 2026-14XX Council Rules of Procedure

City Administrator McAloon presented a redlined version of the proposed revisions to the City Council Rules of Procedure. The updates reflect previous Council direction and align with ongoing Chelan Municipal Code revisions. Several provisions were removed from the Rules of Procedure because they are addressed in the code updates, with applicable requirements now governed by state law and the Revised Code of Washington (RCW).

One written public comment was received from Brian Patterson, resident of Manson, who expressed concerns about allowing public comment on topics not listed on the City Council meeting agenda.

B. Resolution No. 2026-14XX Pilot Program for Outdoor Seating

Community Development Director Ajax presented a proposed pilot program that would allow certain downtown businesses to use sidewalk demarcation markers instead of railings for outdoor alcohol service areas. The pilot is intended to enhance pedestrian accessibility while maintaining regulatory compliance. Staff will return with a proposed resolution for Council consideration at a future meeting.

C. 2026 Comprehensive Plan Update: Chapter 1 Overview & Vision and Chapter 2 Land Use

Community Development Director Ajax shared an update on the 2026 – 2046 Comprehensive Plan periodic update process, including a summary of the first Planning Commission public hearing held on June 17, 2026. The hearing introduced the Comprehensive Plan update, reviewed the community vision established through the Lake Chelan Vision Project, and discussed the Overview & Vision and Land Use chapters. He noted the draft plan continues to emphasize protection of Lake Chelan, preservation of community character, housing affordability, and directing growth to areas with available public services.

9. INFORMATIONAL ITEMS

   These items are for informational purposes only and are generally not discussed.

   A. Tentative Advanced Agenda

   B. Contract Intake Report

10. CITY ADMINISTRATOR AND DEPARTMENT REPORTS

City Administrator McAloon
Reported the City received one (1) bid for the Library Moisture Mitigation project, which exceeded the engineer's estimate by approximately $100,000.

City Clerk Gallucci
None.

Community Development Director Ajax
Provided a recap of a recent meeting with Councilmember Chitty and Colville Tribe Elder Randy Lewis regarding proposed signage around Lake Chelan. He reported that a contract with Tegris, along with information related to short-term rental funding fees, will be brought forward for Council consideration in the near future.

Finance Director Evans
Reported she and her staff are preparing for the upcoming budget season.

HR/Communications Director Coltman
Recognized City staff anniversaries, including Public Works Director Jake Youngren's 9 years of service and Sanitation Driver Raul Blanco's 10 years of service. He also shared key takeaways from the Association of Washington Cities (AWC) conference, noting cybersecurity as a significant topic of discussion, and provided an update on efforts to improve the City's information technology services.

Parks and Recreation Director Cooper
Provided a recap of the Fourth of July weekend, including a review of parking data compared to previous years. She thanked City staff for their efforts and expressed

appreciation for the recent proclamation. Also reported that Recreation and Conservation Office (RCO) grant applications were submitted and that funding decisions are expected in fall of 2026.

Public Works Director Youngren
Reported bids for Phase two (2) of the sewer project will be opened on July 17, 2026, with a bid award anticipated on July 28 and construction expected to begin in September. He also provided an update on the State Route 150 sewer line project, noting that nighttime work continues and only one remaining issue near the marina parking lot remains to be addressed. Additional updates included upcoming roadway striping on Sanders Street and the near completion of related lighting improvements. He also discussed the recent fire near Willmorth, noting that prior infrastructure investments in the area provided adequate water service to support firefighting efforts,

Chelan County Sargent Huddleston
Provided a recap of Fourth of July activity data across Chelan County, including information specific to the City of Chelan.

11. MAYOR AND COUNCIL COMMENTS

Mayor McCardle
Provided a recap of a recent meeting with Commissioner Hawkins and local winery owners regarding county-related concerns. She also shared updates on recent lodging tax discussions and ongoing efforts to address bridge jumping issues and response efforts of first responders.

Councilmember Benegas
Shared the presentations and discussion tonight were informative.

Councilmember Chitty
Shared highlights from a recent facility tour of the Water and Wastewater Treatment Plant and expressed appreciation for City staff's dedication and responsible stewardship of public funds. He also provided a recap of a recent meeting with Community Development Director Ajax and Colville Tribes elder Randy Lewis regarding proposed signage around Lake Chelan. Lastly, he expressed enthusiasm for continued collaboration and thanked first responders for their service.

Councilmember Collins
Thanked members of the public for their comments and acknowledged April Leaf, and Ryan Williams for their presentations tonight. He also sought clarification from City Administrator McAloon regarding parking stalls associated with the Lakeside Lodge project.

Councilmember Higgins
Thanked those who provided public comment and presentations. He also discussed

concerns regarding litter accumulation near the bridge and noted the recent fire activity and response time.

Councilmember Hollingsworth
He commended first responders for their efforts and expressed concerns regarding parking impacts in the Lakeside neighborhood. He also expressed interest in park benches at Lakeside Park and along the new Lakeside Trail.

Councilmember Rivera-Vargas
Shared a personal goal of improving public speaking by pausing rather than relying on filler words during meetings.

Councilmember Sanders
Expressed appreciation for the evening's presentations and public comments. He thanked first responders for their service, acknowledged the work of the Chelan Valley Feral Cat Project, expressed appreciation for the library update, and inquired about the status of the Farnham project.

12. EXECUTIVE SESSION

    A. None

13. ADJOURNMENT

MOTION:	Move to adjourn the meeting.
MOVER:	Councilmember Jon Higgins
SECONDER:	Councilmember Cesar Rivera-Vargas
AYES:	Councilmember Terry Sanders, Councilmember Agustin Bengas, Councilmember Brad Chitty, Councilmember Jon Higgins, Councilmember Cesar Rivera-Vargas, Councilmember Tim Hollingsworth, Councilmember Shane Collins
NAYS:	None
RESULT:	Passed

The meeting was adjourned at 8:10 P.M.

Date Approved:

Cailey Couch
Deputy City Clerk

Erin McCardle
Mayor

City of Chelan

2026-001S

CITY COUNCIL July 28, 2026

Subject/Title:	City of Chelan Special Meeting on August 4, 2026 beginning at 5:15 p.m. (CIty Clerk Gallucci)
Department:	Administration
Staff Contact:	Peri Gallucci
Guiding Principles:	Thriving & Connected
Initiatives:	Increase Community Engagement
Reviewed By:	City Administrator
Number of Looks:	Look No. 1 of 1

PREVIOUS ACTION TAKEN

The 2027 budget calendar was adopted on July 14, 2026.

OVERVIEW

The City Council passed the 2027 budget calendar on July 14, 2026. It was then brought to our attention the Chelan Municipal Code section 2.04.10 C:
Legal holidays or election day. If any Tuesday on which a meeting is scheduled falls on a legal holiday or election day (for either general election or primary election), the meeting shall be held on the first business day following the holiday or election day, at 5:15 p.m. for workshops regular council meetings or on another day/time designated by a majority vote of the council.

With a majority vote we can hold the August 4, 2026 workshop beginning at 5:15 p.m.

FINANCIAL IMPLICATIONS

None.

ATTACHMENTS

None

SUGGESTED MOTION

I move to approve the special meeting on August 4, 2026 beginning at 5:15 p.m.

City of Chelan

2026-055A

CITY COUNCIL July 28, 2026

Subject/Title:	Resolution No. 2026-1485 Pilot Program for Outdoor Seating (Community Development Director Ajax)
Department:	Community Development
Staff Contact:	John Ajax
Guiding Principles:	Accessible & Welcoming
Initiatives:	Increase Community Engagement
Reviewed By:	City Administrator, Finance Director, and City Attorney
Number of Looks:	Look No. 2 of 2

PREVIOUS ACTION TAKEN

This topic was previously discussed during the July 14, 2026 meeting as an administrative report.

OVERVIEW

Consistent with the direction provided by Council at its July 14, 2026 study session, staff is proposing that the pilot program be implemented through the attached resolution for a period of eighteen (18) months, and staff is requesting Council's authorization for the Mayor to sign the resolution. This timeframe allows for evaluation through the remainder of this year and all of next summer, giving staff a full season of data before bringing a recommendation back to Council.

This program is authorized by state law and is already utilized by many jurisdictions throughout Washington. The intent is to create flexibility in the use of limited sidewalk space in the downtown core. The resolution does not authorize any additional land uses and does not promote alcohol consumption. It simply allows for an alternative to the 42-inch barrier otherwise required for alcohol consumption as part of a sidewalk cafe, consistent with all other regulations currently in place.

Currently, when a downtown restaurant or tavern wants to serve alcohol at its sidewalk seating, the City's code (Chapter 5.60 CMC) and the Washington State Liquor and Cannabis Board require the area to be fenced off with a permanently affixed railing at least forty-two (42) inches tall. Those railings work, but they also take up sidewalk space, add visual clutter, and create pinch points that push pedestrians closer to the curb.

This pilot program would let businesses mark that same alcohol-service boundary with

small, low-profile markers set into the sidewalk, often called demarcation "buttons," instead of a physical railing. These buttons sit flush with the sidewalk surface, so they do not create a tripping hazard and do not obstruct pedestrian travel the way a raised railing can. The State already recognizes these markers as an acceptable way to define the service area, so the alcohol stays properly contained; the City is simply trading a bulky fence for a flush marker.

The benefit is flexibility and better pedestrian flow. Removing railings opens up the walkway, keeps downtown sidewalks feeling open and accessible, and still gives businesses a clear, approved way to offer outdoor service. Because this is new to Chelan, staff propose an 18-month pilot rather than a permanent code change, so the City can see how it works across a full range of seasonal conditions, including next summer's peak tourist season, and bring a recommendation back to Council before committing long-term. Each participating business would continue to operate under its existing sidewalk permit and the required State approval, so the safeguards Council already relies on remain in place.

Staff will work with the HDCA and private property owners seeking to utilize the pilot program and report back to Council with updates as they develop.

FINANCIAL IMPLICATIONS

None.

ATTACHMENTS

1. Resolution No. 2026-1485

SUGGESTED MOTION

I move to adopt Resolution No. 2026-1485.

RESOLUTION NO. 2026-1485

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF CHELAN, WASHINGTON, ESTABLISHING AN EIGHTEEN-MONTH SIDEWALK CAFÉ DEMARCATION PILOT PROGRAM AUTHORIZING THE USE OF FENCE-FREE DEMARCATION MARKERS IN LIEU OF A 42-INCH BARRIER FOR OUTDOOR ALCOHOL SERVICE ON PUBLIC SIDEWALKS, AND DIRECTING STAFF TO ADMINISTER THE PROGRAM IN COORDINATION WITH THE WASHINGTON STATE LIQUOR AND CANNABIS BOARD.

WHEREAS, the City of Chelan (the "City") has a distinctive and historic downtown core, and outdoor dining along its sidewalks contributes to a vibrant, walkable, and economically active downtown that supports local restaurants and small businesses; and

WHEREAS, outdoor alcohol service associated with a sidewalk café is regulated by the Washington State Liquor and Cannabis Board (the "LCB"), and the LCB generally requires an outdoor alcohol service area to be enclosed by a permanent or movable barrier at least 42 inches in height; and

WHEREAS, Chapter 5.60 of the Chelan Municipal Code ("CMC") establishes a sidewalk business license authorizing sidewalk cafés and the service of alcohol on commercial sidewalks within the City's downtown, and CMC 5.60.040(E) currently requires the alcohol service area to be enclosed by a permanently affixed barrier at least 42 inches in height, while also providing that those barrier standards are minimum requirements subject to modification by LCB and health district approvals; and

WHEREAS, WAC 314-03-200 allows a local jurisdiction, in conjunction with a local sidewalk café permit, to authorize a permanent fence-free demarcation of the designated alcohol service area in place of a 42-inch barrier, subject to LCB approval; and

WHEREAS, the City wishes to evaluate the use of sidewalk demarcation markers in lieu of physical railings as a means of preserving pedestrian flow, accessibility, and downtown character while maintaining public safety and clear delineation of the alcohol service area; and

WHEREAS, the City Council finds that a time-limited pilot program is an appropriate and low-risk means to evaluate demand, operational requirements, and public safety outcomes before considering permanent amendments to the Chelan Municipal Code; and

WHEREAS, the private use of the public right-of-way authorized under this pilot constitutes a revocable license and not a vested or property right, and the City retains full authority to condition, suspend, or terminate any permit issued hereunder;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF CHELAN, WASHINGTON HEREBY RESOLVES AS FOLLOWS:

Section 1. Pilot Program Established. An eighteen-month Sidewalk Café Demarcation Pilot Program (the "Pilot") is hereby established, commencing on the effective date of this Resolution and expiring eighteen (18) months thereafter, unless extended, modified, or made permanent by subsequent action of the City Council.

Section 2. Scope and Eligibility. The Pilot applies within the area where sidewalk business activities are permitted under Chapter 5.60 CMC. An establishment that holds a valid sidewalk business license under Chapter 5.60 CMC and the requisite LCB authorization may define the boundaries of its outdoor alcohol service area using permanent fence-free demarcation markers approved by the LCB, in lieu of the permanently affixed 42-inch barrier otherwise required by CMC 5.60.040(E). All other requirements of Chapter 5.60 CMC continue to apply.

Section 3. Administration and State Coordination. The Community Development Director (the "Director" as defined in Chapter 5.60 CMC), in coordination with the Public Works Director and the City Attorney, is authorized to administer the Pilot under Chapter 5.60 CMC; to establish written operating standards and conditions consistent with this Resolution and that chapter; and to coordinate with the LCB regarding barrier-exception approvals under WAC 314-03-200.

Section 4. Conditions of Participation. Participation in the Pilot is subject to all requirements of Chapter 5.60 CMC, including the insurance, indemnification, pedestrian clearance, and maintenance requirements of that chapter, except that the permanently affixed 42-inch barrier required by CMC 5.60.040(E) may be replaced with permanent fence-free demarcation markers approved by the LCB. In addition: (a) the establishment shall obtain LCB authorization for the demarcated alcohol service area; (b) the Director may authorize the affixing of approved demarcation markers to the sidewalk surface notwithstanding CMC 5.60.040(D); and (c) the demarcation markers shall satisfy any specifications required by the LCB, including placement at all boundaries of the service area and visibility at night.

Section 5. No Vested Right; Revocation. A permit issued under the Pilot is a temporary, revocable license and does not constitute a property or vested right in the public right-of-way. The City may terminate any permit upon thirty (30) days written notice, or immediately upon a finding that continued operation poses a risk to public health, safety, or welfare, or upon breach of any condition of the permit or LCB authorization.

Section 6. Reporting and Recommendation. Prior to expiration of the Pilot, City staff shall report to the City Council on program participation, operational experience, public safety outcomes, and a recommendation as to whether the City should adopt a permanent sidewalk café program by ordinance.

Section 7. Effective Date and Sunset. This Resolution shall take effect immediately upon its passage. The authority granted under the Pilot expires automatically eighteen (18) months after the effective date unless extended by resolution or superseded by ordinance, after which no new authorizations shall be issued under the Pilot and any authorization issued hereunder shall terminate.

ADOPTED by the City Council of the City of Chelan and approved by its Mayor this 28th Day of July, 2026.

APPROVED:

By:_____
Erin McCardle, Mayor

AUTHENTICATED:

By:_____
Peri Gallucci, City Clerk

APPROVED AS TO FORM:

By:_____
Quentin Batjer, City Attorney

City of Chelan

2026-060

CITY COUNCIL July 28, 2026

Subject/Title:	BOSS Construction Bid Award and Contract Documents for CC-1 Lift Station (Public Works Director Youngren)
Department:	Public Works
Staff Contact:	Jake Youngren
Guiding Principles:	Visionary & Strategic
Initiatives:	Modernize Resource
Reviewed By:	City Administrator and Finance Director
Number of Looks:	Look No. 1 of 1

PREVIOUS ACTION TAKEN

None.

OVERVIEW

The City of Chelan solicited bids for the CC-1 Lift Station Upgrade Project (Project No. 10231239). The bid opening was held on July 15, 2026, at 3:00 PM PDT, with three (3) bids received. Ardurra Group Inc., the City's engineering consultant on this project, reviewed the bids and the bid tabulation and found no irregularities or anomalies in the apparent low bid. BOSS Construction, Inc. submitted the low base bid of $3,555,083.52 and subsequently provided satisfactory qualification information as required under Section 002113, Article 3, of the Contract Documents. Based on this review, Ardurra Group Inc. recommends the City award the contract to BOSS Construction, Inc.

Bid Summary:

Contractor: BOSS Construction, Inc., Base Bid: $3,555,083.52
Contractor: SCI Industrial Services, LLC, Base Bid: $3,598,451.20
Contractor: J&K Earthworks, LLC, Base Bid: $5,145,152.00
Engineer's Estimate: $3,578,022.00

The BOSS Construction, Inc. bid came in slightly below the Engineer's Estimate.

FINANCIAL IMPLICATIONS

$3,555,083.52 Adequate funds are budgeted for this project.

As background, the City issued approximately $5 million in debt service through the

Washington State Department of Ecology to fund a sewer project that was split into two phases: the SR150 Sewer Main Replacement (Phase 1), which was recently completed, and the CC-1 Lift Station Upgrade (Phase 2), which is the subject of this recommendation. Total cost projections for these combined phases will likely exceed the original assumptions. As a result, a portion of the planned 2027 sewer capital projects will be slightly postponed to accommodate the adjustment. Staff has identified this and it is being managed accordingly within the overall capital planning schedule.

ATTACHMENTS

1. Ardurra Group Inc. CC-1 Lift Station Recommendation of Award Letter
2. Bid Set Plans CC-1 Lift Station
3. Bid Set Specifications CC-1 Lift Station

SUGGESTED MOTION

I move to award the contract for the CC-1 Lift Station Upgrade Project to BOSS Construction, Inc. in the amount of $3,555,083.52, and authorize the Mayor to finalize and execute the contract documents.

ARDURRA

TO: City of Chelan
FROM: Ardurra
DATE: July 22, 2026
SUBJECT: CC-1 Lift Station Upgrade Project

Dear Mr. Denham,

We have reviewed the bids submitted for the above-referenced project with a bid opening date of July 15, 2026, and offer the following comments and recommendations.

Three (3) bids were received and are summarized below.

Contractor	Base Bid
BOSS Construction Inc.	$3,555,083.52
SCI Industrial Services LLC	$3,598,451.20
J&K Earthworks LLC	$5,145,152.00

A copy of the Bid Tabulation is enclosed for your review and records. BOSS Construction, Inc. submitted the apparent low bid. Our review of their bid identified no irregularities or anomalies.

Following the bid opening, BOSS Construction, Inc. provided satisfactory bidder qualification information in accordance with Section 002113, Article 3, of the Contract Documents.

Based on our review of the bid and qualifications submitted, Ardurra recommends awarding the contract to BOSS Construction, Inc.

Sincerely,

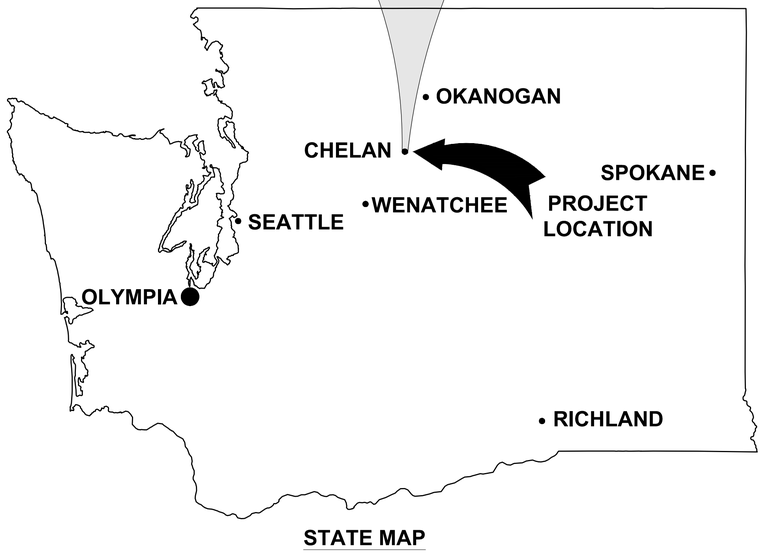
Jake Bender, P.E.
Project Manager

CC-1 Lift Station Upgrade (#10231239)
Owner: City of Chelan
Solicitor: Ardurra - Northwest
07/15/2026 03:00 PM PDT

						Engineer Estimate		BOSS Construction, Inc.		SCI Industrial Services, LLC		J&K Earthworks.com	
Section Title	Line Item	Item Code	Item Description	UofM	Quantity	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension	Unit Price	Extension
Base Bid							$3,288,623.00		$3,267,540.00		$3,307,400.00		$4,729,000.00
	1	1	Mobilization	LS	1	$357,148.00	$357,148.00	$291,197.00	$291,197.00	$45,000.00	$45,000.00	$285,000.00	$285,000.00
	2	2	Earthwork	LS	1	$200,750.00	$200,750.00	$110,035.00	$110,035.00	$97,500.00	$97,500.00	$192,500.00	$192,500.00
	3	3	Demolition	LS	1	$255,765.00	$255,765.00	$91,449.00	$91,449.00	$170,000.00	$170,000.00	$229,500.00	$229,500.00
	4	4	CC-1 Plaza and North Alley Surfacing and Site Improvements	LS	1	$568,850.00	$568,850.00	$436,428.00	$436,428.00	$479,000.00	$479,000.00	$547,000.00	$547,000.00
	5	5	Roadway Surface Restoration	LS	1	$107,775.00	$107,775.00	$139,692.00	$139,692.00	$140,900.00	$140,900.00	$335,000.00	$335,000.00
	6	6	Gravity Sanitary Sewer	LS	1	$289,200.00	$289,200.00	$410,971.00	$410,971.00	$515,000.00	$515,000.00	$589,000.00	$589,000.00
	7	7	Storm Drainage	LS	1	$108,450.00	$108,450.00	$84,862.00	$84,862.00	$115,000.00	$115,000.00	$129,000.00	$129,000.00
	8	8	Site Utilities	LS	1	$31,350.00	$31,350.00	$130,761.00	$130,761.00	$135,000.00	$135,000.00	$98,000.00	$98,000.00
	9	9	Lift Station	LS	1	$866,740.00	$866,740.00	$730,218.00	$730,218.00	$615,000.00	$615,000.00	$1,205,000.00	$1,205,000.00
	10	10	Landscaping	LS	1	$58,295.00	$58,295.00	$99,857.00	$99,857.00	$170,000.00	$170,000.00	$228,000.00	$228,000.00
	11	11	Electrical	LS	1	$309,600.00	$309,600.00	$581,070.00	$581,070.00	$650,000.00	$650,000.00	$676,000.00	$676,000.00
	12	12	Instrumentation and Control	LS	1	$134,700.00	$134,700.00	$161,000.00	$161,000.00	$175,000.00	$175,000.00	$215,000.00	$215,000.00
Washington Sales Tax							$289,399.00		$287,543.52		$291,051.20		$416,152.00
	WSST	WSST	Sales Tax (8.8%)	LS	1	$289,399.00	$289,399.00	$287,543.52	$287,543.52	$291,051.20	$291,051.20	$416,152.00	$416,152.00
Alternative 1							$0.00		$88,000.00		$117,000.00		$95,000.00
	Alternative 1	Alternative 1	Full Alley Concrete Replacement	LS	1			$88,000.00	$88,000.00	$117,000.00	$117,000.00	$95,000.00	$95,000.00
Allowance A							$0.00		$26,900.00		$11,100.00		$19,500.00
	Allowance A	Allowance A	Unsuitable/Contaminated Material Removal	Cu Yd	100			$269.00	$26,900.00	$111.00	$11,100.00	$195.00	$19,500.00
Base Bid Total:							**$3,578,022.00**		**$3,555,083.52**		**$3,598,451.20**		**$5,145,152.00**



VICINITY MAP



STATE MAP

CITY OF CHELAN

CHELAN, WASHINGTON

BID SET PLANS FOR:

LIFT STATION CC-1 UPGRADE

JUNE 2026



SHEET INDEX	
Sheet Number	Sheet Title
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G005	CONTRACTORS STAGING AREA
G006	PROJECT PHASING PLAN
G007	BYPASS PUMPING PLAN
G008	EROSION AND SEDIMENT CONTROL PLAN
G009	EROSION AND SEDIMENT CONTROL DETAILS
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D101	SITE DEMOLITION PLAN - 02
D400	UTILITY DEMOLITION PLAN - 01
D401	UTILITY DEMOLITION PLAN - 02
D500	GRAVITY SEWER DEMOLITION PLAN
D600	LIFTSTATION DEMOLITION PLAN
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C101	SITE PLAN - 02
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C400	UTILITY PLAN - 01
C401	UTILITY PLAN - 02
C500	GRAVITY SEWER PLAN OVERALL
C501	GRAVITY SEWER PLAN AND PROFILE - 01
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C600	ROADWAY SURFACE RESTORATION PLAN
C700	CIVIL DETAILS - SITE
C701	CIVIL DETAILS - SITE
C702	CIVIL DETAILS - SITE
C703	CIVIL DETAILS - DRAINAGE
C704	CIVIL DETAILS - SEWER
C705	CIVIL DETAILS - SEWER
C706	CIVIL DETAILS - WATER
S001	GENERAL STRUCTURAL NOTES
S100	WET WELL CONVERSION DETAILS
S200	RETAINING WALL DETAILS
S300	STRUCTURAL DETAILS
M001	LIFT STATION MECHANICAL PLAN
M002	LIFT STATION MECHANICAL PLAN SECTIONS
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L301	PLANTING DETAILS
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E002	ELECTRICAL NOTES & ABBREVIATIONS
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E006	ELECTRICAL PROPOSED SITE PLAN II
E007	PROPOSED LIGHTING PLAN
E008	ELECTRICAL DETAILS
I001	INSTRUMENTATION SYMBOLS, LEGENDS, AND ABBREVIATIONS
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I004	P&ID - BACKUP GENERATOR
I005	PROPOSED TELEMETRY PANEL LAYOUT
I006	INSTALLATION DETAILS
T100	SITE TRAFFIC CONTROL
T101	TRAFFIC CONTROL OVERVIEW

ARDURRA
COLLABORATE. INNOVATE. CREATE.
1717 S. RUSTLE STREET, STE. 201
SPOKANE, WASHINGTON 99224
509-319-2580 | WWW.ARDURRA.COM

NO.	DATE	REVISION	BY

JOB NO:	A-240217
DATE:	JUNE 2026

G001

BID SET
NOT FOR CONSTRUCTION

July 3, 2024 Y:\SPO\240217\03-Prod\03-Dwgs\E006.dwg
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GENERAL SITE NOTES:

1. CONSTRUCTION OF IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE CITY OF CHELAN DEVELOPMENT STANDARDS MANUAL (AS APPLICABLE), CHELAN MUNICIPAL CODE, PROJECT PLANS AND SPECIFICATIONS, AND THE CURRENT EDITION OF THE WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, AS ISSUED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND THE AMERICAN PUBLIC WORKS ASSOCIATION.
2. THE CONTRACTOR SHALL CALL THE UNDERGROUND SERVICE ALERT ONE-CALL NUMBER 811 TWO BUSINESS DAYS PRIOR TO EXCAVATION.
3. EXISTING CONDITION INFORMATION SHOWN ON THE CONTRACT PLANS (HORIZONTAL OR VERTICAL) WAS OBTAINED FROM REFERENCE DRAWINGS, CITY AND COUNTY GIS MAPPING, AND FIELD SURVEY BASED ON CONTROL INFORMATION PROVIDED. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND REQUIRED ELEVATIONS. THIS WORK SHALL INCLUDE VERIFYING THE LOCATION AND SIZE OF EXISTING UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION ACTIVITIES, INCLUDING UNDERGROUND AND OVERHEAD UTILITIES, UTILITY STRUCTURES, POINTS OF CONNECTION, AND UTILITY CROSSINGS. NOTIFY THE ENGINEER AND CITY IMMEDIATELY IF ANY DISCREPANCIES OR EXCEPTIONS ENCOUNTERED.
4. EXISTING PROPERTY CORNERS AND SURVEY MONUMENTS SHALL BE PROTECTED DURING CONSTRUCTION. ANY DAMAGED OR OBLITERATED CORNERS OR MONUMENTS SHALL BE RE-ESTABLISHED BY A PROFESSIONAL SURVEYOR LICENSED IN THE STATE OF WASHINGTON AT THE CONTRACTOR'S EXPENSE.
5. THE CONTRACTOR SHALL HAVE A COMPLETE SET OF APPROVED PLANS ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
6. THE CONTRACTOR SHALL PROTECT BUILDINGS, FENCES, APPURTENANCES, ABOVE GROUND UTILITIES, AND OTHER PROPERTY ADJACENT TO ALL CONSTRUCTION AREAS. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR REPAIRING ALL DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES.
7. IN ACCORDANCE WITH THE DEPARTMENT OF ECOLOGY AIR QUALITY STANDARDS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTROLLING ALL FUGITIVE DUST THAT MAY BE GENERATED BY THE CONSTRUCTION PROJECT.
8. THE CONTRACTOR SHALL CONTAIN WORK TO WITHIN RIGHT-OF-WAY OR THE CONSTRUCTION LIMITS AS ILLUSTRATED IN THE PLANS.
9. THE CONTRACTOR SHALL SECURE NECESSARY PERMITS PRIOR TO STARTING CONSTRUCTION.
10. ANY REVISIONS TO PLANS MUST BE MADE BY THE ENGINEER AND APPROVED BY THE CITY OF CHELAN PRIOR TO ANY IMPLEMENTATION IN THE FIELD.
11. ALL PAVEMENT MARKINGS AND SIGNS SHALL CONFORM TO THE REQUIREMENTS OF THE MUTCD.
12. THE CITY WILL RETAIN AN INDEPENDENT TESTING LABORATORY FOR FIELD QUALITY CONTROL OF ALL BACKFILL AND PAVEMENT. FIELD QUALITY CONTROL SHALL BE IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND DIVISION 9 OF THE WSDOT STANDARD SPECIFICATIONS, COPIES OF ALL TEST RESULTS SHALL BE PROVIDED TO THE CITY OF CHELAN FOR REVIEW AND APPROVAL.
13. RECORD DRAWINGS IDENTIFYING AND ACCURATELY LOCATING SUBSURFACE UTILITIES AND IMPROVEMENTS, NOTING AS-CONSTRUCTED CONDITION SHALL BE PROVIDED BY THE CONTRACTOR AT THE END OF CONSTRUCTION.

EROSION AND SEDIMENT CONTROL NOTES:

1. THE EROSION CONTROL PLAN IS NOT TO BE USED AS A GRADING PLAN BUT IS INTENDED FOR USE AS AN EROSION AND SEDIMENT CONTROL PLAN ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ALL APPLICABLE SAFETY LAWS OF ANY JURISDICTIONAL BODY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL BARRICADES, SAFETY DEVICES, AND TRAFFIC CONTROL WITHIN AND AROUND THE CONSTRUCTION AREA.
2. ALL PROJECTS HAVING THE POTENTIAL FOR RUNOFF DISCHARGE TO ANY SURFACE WATER BODY; SHALL FILE A NOTICE OF INTENT (NOI), AND OBTAIN A CONSTRUCTION STORM WATER GENERAL PERMIT (CSWGP) WITH THE WASHINGTON STATE DEPARTMENT OF ECOLOGY. COPIES OF ANY REQUIRED STORM WATER POLLUTION PREVENTION PLANS (SWPPP) OR NOI SHALL BE PROVIDED TO THE PROJECT ENGINEER ON RECORD PRIOR TO START OF CONSTRUCTION.
3. SITE SHALL BE GRADED AFTER DISTURBANCE TO ENSURE STORMWATER RUNOFF DOES NOT LEAVE THE SITE WHERE POSSIBLE.
4. NOTIFY THE ENGINEER A MINIMUM OF 48-HOURS PRIOR TO COMMENCEMENT OF INSTALLATION OF EROSION CONTROL DEVICES.
5. ALL NECESSARY ACTION SHALL BE TAKEN TO MINIMIZE DEPOSITING AND TRACKING OF MUD, DIRT, SAND, GRAVEL ROCK OR DEBRIS ON TO THE PUBLIC RIGHT OF WAY.
6. DUST CONTROL SHALL BE CONTINUOUSLY MONITORED AND ABATED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY CLEAN-UP OF THE PUBLIC RIGHTS OF WAY OR ADJACENT PRIVATE PROPERTY FROM ANY TRACKING OR DEPOSITING OF MUD, DIRT, SAND, GRAVEL, ROCK OR DEBRIS.
7. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES ARE TO REMAIN IN PLACE AFTER FINAL INSPECTION. CONTRACTOR TO ENSURE ALL EROSION AND SEDIMENT CONTROL MEASURES ARE PROPERLY MAINTAINED AND LEFT IN GOOD WORKING ORDER. ALL TRAPPED SEDIMENT BEHIND STRAW WATTLES IS TO BE REMOVED BEFORE FINAL INSPECTION.
8. ALL DISTURBED AREAS ARE TO BE COVERED IN STRAW MULCH, EROSION CONTROL BLANKET OR HYDROMULCH AS SPECIFIED AFTER BACKFILL AND COMPACTION ARE COMPLETED.
9. CONTRACTOR SHALL NOT SWEEP OR FLUSH SEDIMENT OR DEBRIS INTO ANY EXISTING STORM DRAIN FACILITIES.
10. AT A MINIMUM, THE CONTRACTOR SHALL INSPECT THE SITE BEFORE AND AFTER STORM EVENTS AND AT 24 HOUR INTERVALS DURING EXTENDED STORMS. THE EROSION AND SEDIMENT CONTROL PLAN PERMIT MAY REQUIRE ADDITIONAL INSPECTIONS.
11. CONTRACTOR SHALL CONFORM TO ALL GUIDELINES SET FORTH IN THE CONSTRUCTION SWPPP DOCUMENT AS PREPARED BY THE CONTRACTOR THROUGH THE CSWGP.

DEMOLITION NOTES:

1. ALL DEMOLITION WORK TO BE PERFORMED WITH NO DAMAGE TO REMAINING BUILDING, PIPING AND STRUCTURE.
2. ALL REMOVED MATERIAL AND DEBRIS SHALL BE DISPOSED OF IN A LEGAL MANNER AT NO COST TO THE OWNER.
3. WHERE ELECTRICAL IS TO BE ABANDONED, REMOVE WIRE AT PANEL/SOURCE.
4. CONTRACTOR TO COORDINATE WITH OWNER TO DETERMINE WHAT MATERIAL TO SALVAGE.
5. PROVIDE SIMILAR PRODUCT AND TYPE OF FINISH AS SPECIFIED TO PATCH, EXTEND OR MATCH EXISTING STRUCTURES AFFECTED BY DEMOLITION PROCESS.

SANITARY SEWER NOTES:

1. CONSTRUCTION OF IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE CITY OF CHELAN DEVELOPMENT STANDARDS MANUAL (AS APPLICABLE), CHELAN MUNICIPAL CODE, PROJECT PLANS AND SPECIFICATIONS, AND THE CURRENT EDITION OF THE WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, AS ISSUED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND THE AMERICAN PUBLIC WORKS ASSOCIATION.
2. A PRECONSTRUCTION CONFERENCE IS REQUIRED PRIOR TO CONSTRUCTION AND 48 HOURS ADVANCE NOTIFICATION TO THE CITY AND ALL AFFECTED UTILITY COMPANIES PRIOR TO THE ACTUAL START OF WORK.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH THE PROVISIONS OF THE RIGHT-OF-WAY /STREET CONSTRUCTION PERMIT AS ISSUED BY CITY FOR THIS PROJECT.
4. LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLANS ARE ESTIMATED UNLESS STATED OTHERWISE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY, LOCATE AND PROTECT ALL UTILITIES WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL BE RETPONSIBLE FOR REPLACING OR REPAIRING ANY UTILITIES DAMAGED DURING CONSTRUCTION. SHOW ENCOUNTERED UTILITIES ON THE AS-BUILTS.
5. SEWER TRENCH SECTION AND ALL EXCAVATED AREAS SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH THE STANDARD DETAILS AND WITH WSDOT 7-08.3(3). IF TRENCH BACKFILL DOES NOT MEET COMPACTION REQUIREMENTS, CONTRACTOR SHALL EXCAVATE, RECOMPACT AND RETEST MATERIAL AT CONTRACTOR'S EXPENSE.
6. RESTORATION OF DAMAGED ROAD SURFACING SHALL BE IN ACCORDANCE WITH THE CITY REQUIREMENTS. ALL OTHER AREAS SHALL BE RESTORED TO ORIGINAL CONDITION OR AS DIRECTED BY THE CITY. THIS INCLUDES SHOULDERS, LANDSCAPING, WALLS, FENCES AND OTHER IMPROVEMENTS.
7. GRAVITY SEWER SHALL BE INSTALLED WITH A MINIMUM OF 6 FEET OF COVER, FORCE MAIN SEWER SHALL BE INSTALLED WITH A MINIMUM OF 5 FEET OF COVER. ALL SERVICES SHALL BE INSPECTED BY THE CITY BEFORE BURY.
8. CLEANING, FLUSHING, AND TESTING OF THE INSTALLED SEWER LINES SHALL BE PERFORMED ACCORDING TO SECTION 330505.41 AND 330505.20 RESPECTIVELY.
9. NO OTHER UTILITIES SHALL BE INSTALLED WITHIN 36" HORIZONTALLY OF ANY ACTIVE SEWER LINE UNLESS OTHERWISE PRE-APPROVED BY THE CITY.
10. CONTRACTOR SHALL POTHOLE A SUFFICIENT DISTANCE AHEAD OF PIPE LAYING TO VERIFY DEPTH OF EXISTING UTILITIES AND CROSSING UTILITIES AND TO ANTICIPATE ANY NECESSARY CHANGES IN FITTINGS OR ALIGNMENT.
11. CONTRACTOR SHALL ONLY DISPOSE OF WASTE MATERIAL AT APPROVED SITES. STOCKPILE MATERIALS ONLY ON CITY APPROVED SITES.
12. CASINGS SHALL BE NEW STEEL, DUCTILE IRON OR C900 PVC; MATERIAL AND WALL THICKNESS AT THE DISCRETION OF THE CITY, PIPE THROUGH CASINGS SHALL BE SUPPORTED WITH RUNNERS SPACED NO FARTHER THAN 6 FEET APART, RUNNERS SHALL BE MANUFACTURED PRODUCTS (PSI, CALPICO, OR APPROVED EQUAL), NO BLOCKS AND STRAPS. PIPELINE AND GRADE SHALL BE MAINTAINED THROUGH THE CASING, RESTRAIN PIPE AS REQUIRED. CASING ENDS SHALL BE CAPPED WITH MANUFACTURED CASING END SEALS.
13. REPAIR OF EXISTING IRRIGATION SYSTEMS DAMAGED DURING CONSTRUCTION MUST USE PRODUCTS OF NO LESSER QUALITY THAN SCHEDULE 40 PVC.
14. THE EXISTING WATER AND SEWER LINES SHALL REMAIN OPERATIONAL AT ALL TIMES DURING CONSTRUCTION EXCEPT FOR THE CONTRACTORS IMMEDIATE WORK AREA WHEN APPROVED IN WRITING. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF CHELAN AND ENGINEER AT LEAST 14 DAYS IN ADVANCE IN ORDER TO ALLOW FOR COORDINATION. ANY SHUTDOWN OR DISRUPTION TO SERVICE SHALL BE COORDINATED WITH THE CITY OF CHELAN AND SHALL NOT EXCEED 4 HOURS FOR RESIDENTIAL, AND 1 HOUR FOR COMMERCIAL WHEN APPROVED DURING BUSINESS AND DAYTIME HOURS. SERVICES MAY BE ALLOWED TO EXCEED DAYTIME LIMITS WHEN OPERATING AT NIGHT. ALL SHUTDOWNS MUST HAVE WRITTEN AUTHORIZATION OF APPROVAL FROM THE CITY. CONTRACTOR IS RESPONSIBLE FOR ALL WORK ASSOCIATED WITH TEMPORARY AND BYPASS PUMPING REGARDLESS OF TIME COMPLETED AND SHALL INCLUDE ALL PROVISIONS FOR NIGHT TIME SHUTDOWNS, NIGHTTIME WORK WILL BE CONSIDERED INCIDENTAL TO THE PROJECT FOR UTILITY CONNECTIONS.
15. NO RESTRAINTS, GASKETS, OR PIPES (PORTIONS AFFECTED) MAY BE REUSED ONCE ASSEMBLED.
16. NEW GRAVITY SEWER MAIN MATERIAL SHALL BE PVC (SDR 35, ASTM D3034), INTEGRAL WALL BELL AND SPIGOT, RUBBER GASKET JOINT, UNPLASTICIZED POLYVINYL CHLORIDE (PVC) PIPE. ALL PIPES SHALL BE MARKED BY MANUFACTURE WITH MANUFACTURES IDENTIFICATION, YEAR AND CLASS OF PIPE. PIPE JOINTS SHALL USE FLEXIBLE ELASTOMERIC GASKETS CONFORMING TO ASTM D3212. ALL FITTINGS AND ACCESSORIES SHALL BE MANUFACTURED AND FURNISHED BY THE PIPE SUPPLIER OR SHALL BE CITY APPROVED EQUAL. NEW FORCE MAIN SEWERS SHALL BE HDPE. THE CITY MAY AUTHORIZE OTHER PIPE MATERIALS UPON REQUEST.

WATER NOTES:

1. CONSTRUCTION OF IMPROVEMENTS SHALL BE IN ACCORDANCE WITH THE CITY OF CHELAN DEVELOPMENT STANDARDS MANUAL (AS APPLICABLE), CHELAN MUNICIPAL CODE, PROJECT PLANS AND SPECIFICATIONS, AND THE CURRENT EDITION OF THE WSDOT STANDARD SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, AS ISSUED BY THE WASHINGTON STATE DEPARTMENT OF TRANSPORTATION AND THE AMERICAN PUBLIC WORKS ASSOCIATION.
2. A PRECONSTRUCTION CONFERENCE IS REQUIRED PRIOR TO CONSTRUCTION AND 48 HOURS ADVANCE NOTIFICATION OF THE CITY AND ALL AFFECTED UTILITY COMPANIES PRIOR TO THE ACTUAL START OF WORK.
3. LOCATIONS OF EXISTING UTILITIES SHOWN ON THE PLANS ARE ESTIMATED UNLESS STATED OTHERWISE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY, LOCATE AND PROTECT ALL UTILITIES WITHIN THE PROJECT AREA. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING OR REPAIRING ANY UTILITIES DAMAGED DURING CONSTRUCTION. SHOW ENCOUNTERED UTILITIES ON THE AS-BUILTS.
4. ALL SERVICES SHALL BE INSPECTED BY THE CITY BEFORE BURYING.
5. WATER LINES SHALL BE INSTALLED WITH A MINIMUM 48" OF COVER, PROVIDE MECHANICAL PIPE RESTRAINT. THE CITY MAY ALLOW THRUST BLOCKING AT CITY APPROVED LOCATIONS.
6. PROVIDE A SANITARY GAP BETWEEN THE EXISTING AND NEW WATER SYSTEMS. CONNECTION TO THE EXISTING WATER SYSTEM SHALL BE PERFORMED BY THE CONTRACTOR ONLY AFTER COMPLETING AN ACCEPTABLE HYDROSTATIC PRESSURE TEST AND THE PIPELINE IS DISINFECTED, FLUSHED, AND THE RECEIPT OF APPROVAL OF WATER QUALITY TEST RESULTS FROM THE HEALTH DISTRICT OR LAB.
7. PRESSURE TESTING AND DISINFECTION REQUIREMENTS SHALL BE PER SECTION 330505.31 AND 330110.58, RESPECTIVELY.
8. AN INFLATABLE PIPE PLUG SHALL BE USED ON EACH JOINT DURING INSTALLATION TO PROTECT AGAINST SOIL INTRUSION AND FLOODING OF THE PIPE. OPEN ENDS OF VALVES SHALL BE PLUGGED OR BAGGED UNTIL EXTENDED WITH PIPE.
9. HDPE SERVICE PIPE SHALL BE 200 PSI RATED (DR9) CTS (COPPER TUBE SIZE), ONLY "QUICK-JOINT" OR EQUAL FITTINGS ALLOWED FOR HDPE OR COPPER PIPE CONNECTIONS, NO PACK JOINTS.
10. DEFLECTION AT PIPE JOINTS SHALL NOT EXCEED 75% OF MAXIMUM ALLOWED, PER MANUFACTURER'S RECOMMENDATIONS.
11. ALL WATER MAIN PIPES SHALL BE PVC AWWA C900, DR18 PIPE UNLESS SPECIFIED OTHERWISE. ALL PIPE, VALVES, FITTINGS AND APPURTENANCES SHALL BE AWWA OR NSF 61 CERTIFIED.
12. THE EXISTING WATER LINES SHALL REMAIN OPERATIONAL AT ALL TIMES DURING CONSTRUCTION EXCEPT FOR THE CONTRACTORS IMMEDIATE WORK AREA WHEN APPROVED IN WRITING. THE CONTRACTOR SHALL COORDINATE WITH THE CITY OF CHELAN AND ENGINEER AT LEAST 14 DAYS IN ADVANCE IN ORDER TO ALLOW FOR COORDINATION. ANY SHUTDOWN OR DISRUPTION TO SERVICE SHALL BE COORDINATED WITH THE CITY OF CHELAN AND SHALL NOT EXCEED 4 HOURS FOR RESIDENTIAL, AND 1 HOUR FOR COMMERCIAL WHEN APPROVED DURING BUSINESS AND DAYTIME HOURS. SERVICES MAY BE ALLOWED TO EXCEED DAYTIME LIMITS WHEN OPERATING AT NIGHT. ALL SHUTDOWNS MUST HAVE WRITTEN AUTHORIZATION OF APPROVAL FROM THE CITY. CONTRACTOR IS RESPONSIBLE FOR ALL WORK ASSOCIATED WITH TEMPORARY WATER SERVICES REGARDLESS OF TIME COMPLETED AND SHALL INCLUDE ALL PROVISIONS FOR NIGHT TIME SHUTDOWNS, NIGHTTIME WORK WILL BE CONSIDERED INCIDENTAL TO THE PROJECT FOR UTILITY CONNECTIONS.
13. NO RESTRAINTS, GASKETS, OR PIPES (PORTIONS AFFECTED) MAY BE REUSED ONCE ASSEMBLED.
14. FLANGE GASKETS MUST BE RING TYPE (NOT FULL FACE) AND MINIMUM 1/8" THICK. FLANGE BOLTS ASTM A307 GRADE A OR B, STEEL BOLTS, NUTS AND WASHERS TO BE ZINC PLATED.
15. BURIED VALVES SMALLER THAN 4" DIAMETER TO BE CURB STOP OR CORP STOP PER DETAILS, OR STYLE AT THE DISCRETION OF THE CITY. BURIED VALVES SMALLER THAN 4" SHALL NOT BE GATE VALVES.
16. CONTRACTOR SHALL MAINTAIN AND RETURN ANY TEMPORARY EQUIPMENT PROVIDED BY THE CITY. CONTRACTOR SHALL REIMBURSE THE CITY FOR ANY DAMAGE OR LOSS OF EQUIPMENT.

SECTION AND DETAIL DESIGNATIONS:

V-201 EQUIPMENT TAG NUMBER

NORTH ARROW

A — SECTION OR DETAIL TITLE
SCALE: NTS

S501 — DRAWING NUMBER(S) WHERE CALLED OUT

1 / Y010 — DETAIL OR SECTION VIEW NUMERAL DESIGNATION

1 / Y010 — SHEET WHERE DETAIL OR SECTION VIEW ARE SHOWN

DRAWING NUMBERING LEGEND:

DISCIPLINE DESIGNATORS

C	CIVIL
D	DEMOLITION
E	ELECTRICAL
G	GENERAL
L	LANDSCAPE
M	MECHANICAL
N	INSTRUMENTATION AND CONTROLS
S	STRUCTURAL
T	TRAFFIC CONTROL

UTILITY REPRESENTATIVES

UTILITY	AGENCY	REPRESENTATIVE	PHONE
ELECTRIC	CHELAN COUNTY PUD		509-661-8121
SEWER	CITY OF CHELAN	DARRICK STEELE	509-881-4177
WATER	CITY OF CHELAN	DARRICK STEELE	509-881-4177
ROADS	CITY OF CHELAN	DARRICK STEELE	509-881-4177
STORM WATER	CITY OF CHELAN	DARRICK STEELE	509-881-4177
TELECOM	ZIPLY		866-699-4759

GENERAL INFORMATION:

1. LIFT STATION ID: CC-1 LIFT STATION
2. REFERENCE DOCUMENTS (AVAILABLE FROM THE CITY OF CHELAN):
   - 2.1. SEWER PROJECT WYE RECORDS, G.D. HALL AND ASSOCIATES, DECEMBER 1948
   - 2.2. WASTEWATER TREATMENT PLANT IMPROVEMENT (SCHEDULE IC), GRAY & OSBOURN CONSULTING ENGINEERS, SEPTEMBER 1985
   - 2.3. LIFT STATION NO.2 RECORD DRAWINGS, GREY & OSBORN CONSULTING ENGINEERS, JULY 2014

HYDRAULIC DESIGN PARAMETERS:

1. EXISTING DESIGN FLOW RATE
   - 1.1. AVERAGE DAY: 460 GPM
   - 1.2. PEAK HOUR: 678 GPM
2. BUILD OUT DESIGN FLOW RATE
   - 2.1. AVERAGE DAY: 850 GPM
   - 2.2. PEAK HOUR : 1,000 GPM
3. PUMPS: FLYGT MODEL NP 3153 MT 3~ 433 SUBMERSIBLE PUMPS 20 HP, 60 HZ, 460 V, 3-PH PUMP
   - 3.1. INDIVIDUAL PUMPS CAPABLE OF DELIVERING 1209 GPM AT 47.97' OF TDH.
4. FORCE MAIN 850 LF, 16"Ø
5. 850 LF OF C900 PRESSURE SEWER PIPE. TERMINATES AT MANHOLE C-115 AT THE INTERSECTION OF EAST WAPATO AVENUE AND S EMERSON STREET. APPROXIMATE DISCHARGE ELEVATION: 1,115.40'
6. APPROXIMATE WET WELL VOLUME: 17,226 GALLONS

ELECTRICAL DESIGN PARAMETERS:

1. ELECTRICAL EQUIPMENT: 480/277V, 3-PHASE, 200A SERVICE.
2. GENERATOR: 100KW WITH A UL2085 STATE CODE RATED BELLY TANK, DOUBLE-WALLED.
3. NEMA 4X RATING FOR ALL OUTDOOR EQUIPMENT.

LEGEND:

EXISTING	THIS CONTRACT	
		RIGHT-OF-WAY
		PROPERTY LINE
		EDGE OF PAVEMENT
EG	EG	EDGE OF GRAVEL
X X X	X X X	FENCING
2580	2580	MAJOR CONTOUR
2578	2578	MINOR CONTOUR
TOE	TOE	TOE OF BANK
TOP	TOP	TOP OF BANK
W	W	POTABLE WATER LINE
SRVC	SRVC	SERVICE LINE
PS	PS	PRESSURE SEWER LINE
SEW	SEW	GRAVITY SEWER LINE
S	S	SEWER MANHOLE
S CO	S CO	SEWER CLEANOUT
		FIRE HYDRANT
WM	WM	WATER METER
		VALVE
B.O.	B.O.	WATER FITTING/PS FITTING
B.O.	B.O.	BLOW-OFF
		MONITORING WELL
		FLOODWAY LIMIT
	XXXXXXXXXXXXXXXXXXXXXX	UTILITY DEMOLITION
		UTILITY TO BE ABANDONED IN PLACE
		FACILITY/STRUCTURE DEMOLITION
		STRUCTURE, BUILDING OR FACILITY
		CONCRETE
		TRAFFIC-RATED CONCRETE
		PEDESTRIAN CONCRETE
		ASPHALT
		GRAVEL
SD	SD	STORM DRAIN LINE
		STORM DRAIN CATCH BASIN
		SIGN
		BOLLARD
		LIGHT POLE
		POWER POLE
		GUY WIRE
UP	UP	UNDERGROUND POWER
OHP	OHP	OVERHEAD POWER
		ELECTRICAL JUNCTION BOX
TX	TX	ELECTRICAL TRANSFORMER
F/O	F/O	FIBER OPTIC
G	G	GAS LINE
		TREE

GENERAL ABBREVIATIONS

A
- ASME -AMERICAN SOCIETY OF MECHANICAL ENGINEERS
- ASTM -AMERICAN SOCIETY OF TESTING MATERIALS
- AVE -AVENUE

B
- BP -BASE POINT

C
- CDF -CONTROLLED DENSITY FILL
- CF -CUBIC FOOT
- CLSM -CONTROLLED LOW STRENGTH MATERIAL
- CO -CLEANOUT
- CONC -CONCRETE
- CU -CUBIC
- CV -CHECK VALVE
- CY -CUBIC YARD
- CSBC -CRUSHED SURFACING BASE COURSE

D
- DET -DETAIL
- DIM -DIMENSION
- DWG -DRAWING
- DI -DUCTILE IRON

E
- EG -EXISTING GRADE
- EL -ELEVATION
- EP -END POINT
- EX -EXISTING
- ESC -EROSION AND SEDIMENT CONTROL

F
- FT -FEET
- -FOOT
- FL -FLANGE

G
- GAL -GALLON
- GPM -GALLONS PER MINUTE

H
- HDPE -HIGH DENSITY POLYETHYLENE
- HWY -HIGHWAY
- HMA -HOT MIX ASPHALT

I
- ID -INSIDE DIAMETER
- IE -INVERT ELEVATION
- IN -INCH

L
- L -LEFT OF ALIGNMENT
- LF -LINEAL FOOT

M
- M -METER
- MAX -MAXIMUM
- MH -MANHOLE
- MIN -MINIMUM
- MUTCD -MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES
- MJ -MECHANICAL JOINT
- MRJ -MECHANICALLY RESTRAINED JOINT

N
- (N) -NEW
- N -NORTH
- NE -NORTHEAST
- NPW -NON-POTABLE WATER
- NTS -NOT TO SCALE
- NW -NORTHWEST

O
- OSHA -OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION

P
- PI -POINT OF INTEREST
- PROP -PROPOSED
- PVC -POLYVINYL CHLORIDE

Q
- QTY -QUANTITY

R
- R -RIGHT OF ALIGNMENT
- RD -ROAD
- RJ -RESTRAINED JOINT

S
- S -SOUTH
- SD -STORM DRAIN
- SE -SOUTHEAST
- SEW -SEWAGE
- SHT -SHEET
- SPEC -SPECIFICATIONS
- SS -SANITARY SEWER
- -STAINLESS STEEL
- SSMH -SANITARY SEWER MANHOLE
- ST -STREET
- STD -STANDARD
- STA -STATION
- SW -SOUTHWEST
- SY -SQUARE YARDS

T
- TC -TOP OF CURB
- TYP -TYPICAL

W
- W -POTABLE WATER
- -WEST
- WSDOT -WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

Y
- YD -YARD
- YP -YARD PIPING
- YR -YEAR

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

GENERAL LEGEND, SYMBOLS & NOTES

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G002

BID SET







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SITE RENDERINGS

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VERTICAL DATUM STATEMENT AND BASIS OF BEARING:

1. THE ELEVATIONS SHOWN ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88) DERIVED USING A STATIC GPS MEASUREMENT PROCESSED THROUGH THE ONLINE POSITIONING SERVICE (OPUS) PROVIDED BY THE NATIONAL GEODETIC SURVEY (NGS).
2. THE BASIS OF COORDINATES FOR THIS SURVEY IS THE NORTH AMERICAN DATUM OF 1983 (NAD83) 2011 ADJUSTMENT (EPOCH 2010) WASHINGTON PLANE COORDINATE SYSTEM, NORTH ZONE, DERIVED USING A STATIC GPS MEASUREMENT PROCESSED THROUGH THE ONLINE POSITIONING USER SERVICE (OPUS) PROVIDED BY THE NATIONAL GEODETIC SURVEY (NGS) AND REAL TIME KINEMATIC (RTK) GPS MEASUREMENTS. ALL BEARINGS ARE GRID USING A CONVERGENCE ANGLE OF (+) 0°36'22" CALCULATED AT GRID COORDINATES N: 308480.558 E: 1840295.863. A COMBINED ADJUSTMENT FACTOR OF 1.000097299 WAS USED TO CONVERT GRID COORDINATES TO GROUND COORDINATES AND APPLIED AT THE 0,0 ORIGN.

EXISTING CONDITION NOTES:

1. RIGHT-OF-WAY AND PARCEL LINES SHOWN IN THESE CONTRACT PLANS ARE DERIVED FROM CHELAN COUNTY GIS PARCEL MAPS AND ARE PROVIDED FOR REFERENCE ONLY. THIS INFORMATION IS PRESUMED TO BE REASONABLY ACCURATE; HOWEVER, THEY SHOULD NOT BE INTERPRETED AS SURVEYED BOUNDARY LINES. ARDURRA DOES NOT ASSUME RESPONSIBILITY FOR THE ACCURACY OF ANY INFORMATION OBTAINED FROM CITY OR COUNTY GIS.
2. EXISTING CONDITION INFORMATION FOR UTILITIES AND OTHER EXISTING FEATURES SHOWN ON THE CONTRACT PLANS WAS OBTAINED FROM REFERENCE DRAWINGS, RECORD DRAWINGS, CITY AND COUNTY GIS MAPPING, AND FIELD SURVEY. NO GUARANTEE IS MADE FOR THE ACCURACY OR COMPLETENESS OF ALL INFORMATION SHOWN.
3. THE CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND ELEVATIONS IN ACCORDANCE WITH THE SPECIAL PROVISIONS. THIS WORK SHALL INCLUDE VERIFYING THE LOCATION AND SIZE OF EXISTING UTILITIES BEFORE PROCEEDING WITH CONSTRUCTION ACTIVITIES. NOTIFY THE ENGINEER AND CONTRACTING AGENCY IMMEDIATELY IF ANY DISCREPANCIES OR EXCEPTIONS ARE ENCOUNTERED.

FIELD SURVEY NOTES:

1. CONTOURS WERE DERIVED FROM DIRECT FIELD OBSERVATIONS AND SHOWN AT A 1 FOOT CONTOUR INTERVAL.
2. THIS MAP CONFORMS TO THE NATIONAL MAPPING STANDARD ACCURACY OF 1/2 THE CONTOUR INTERVAL AT THE 95% CONFIDENCE LEVEL.
3. THIS MAP IS NOT A BOUNDARY SURVEY.
4. SOME UNDERGROUND UTILITY PIPE SIZES (SHOWN WITH ±) AND TYPE WERE HARD TO DETERMINE WITH 100 PERCENT ACCURACY AND MAY VARY SLIGHTLY FROM WHAT IS SHOWN HEREON.

SURVEY CONTROL TABLE

POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	308510.57	1840474.92	1130.93'	3/8" REBAR WITH RED CAP
2	307454.10	1840449.69	1114.57'	PKS
100	307310.75	1840424.39	1109.95'	GPSF PKF MAG CDL CONTROL
101	307307.78	1840676.52	1118.50'	GPSS PKS MAG
102	307278.04	1840400.82	1105.89'	GPSS PKS MAG
103	307273.49	1840377.80	1105.52'	GPSS 60D
104	307291.29	1841649.22	1126.77'	GPSS PKS MAG

NOTE:
CONTROL POINTS 1 AND 104 ARE NOT SHOWN ON PLAN AS THEY ARE BEYOND THE LIMITS OF DRAWING.

MONUMENT LEGEND

△ CONTROL POINT

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

SURVEY CONTROL AND EXISTING CONDITIONS

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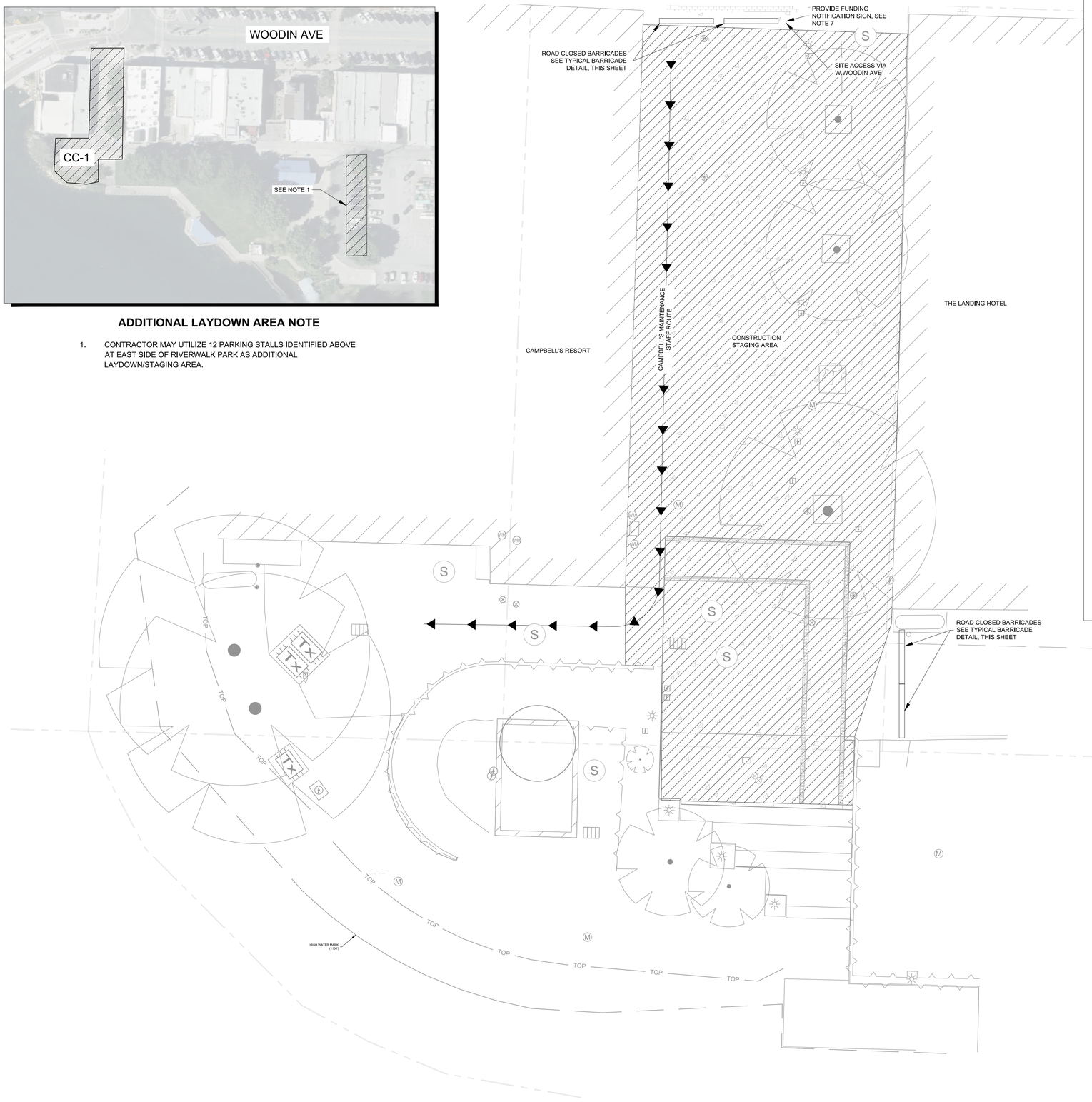
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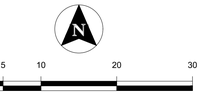
G004

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ADDITIONAL LAYDOWN AREA NOTE

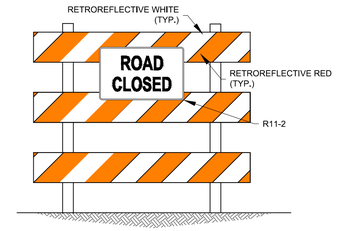
1. CONTRACTOR MAY UTILIZE 12 PARKING STALLS IDENTIFIED ABOVE AT EAST SIDE OF RIVERWALK PARK AS ADDITIONAL LAYDOWN/STAGING AREA.



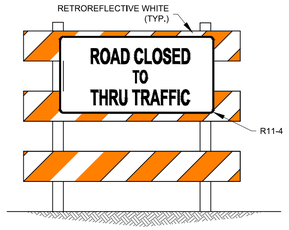


GENERAL STAGING NOTES

1. ALL STAGING AREAS SHALL BE FENCED OFF TO THE PUBLIC. BARRICADES SHALL BE IN PLACE AT STAGING AREA ENTRANCE UNLESS CONTRACTOR IS ACTIVELY ENTERING OR EXITING THE SITE.
2. ALL SIGNAGE SHALL MEET THEM MANUAL OF UNFORM TRAFFIC CONTROL DEVICES (MUTCD) REQUIREMENTS.
3. STAGING AREA AND SITE ACCESS ARE SHOWN HEREIN AS OPTIONS. CONTRACTOR TO SUBMIT PLAN TO BE APPROVED BY THE CITY PRIOR TO CONSTRUCTION START.
4. PEDESTRIAN ACCESS TO RIVERWALK PARK SHALL BE MAINTAINED AT THE INTERSECTION OF EAST WOODIN AVENUE AND SOUTH EMERSON STREET.
5. PROTECT ALL EXISTING FEATURES TO REMAIN WITHIN THE STAGING AREA (INCLUDING, BUT NOT LIMITED TO, EXISTING BUILDINGS, VEGETATION, UTILITIES, SIGNAGE, LIGHT POLES, AND FACILITIES).
6. CONTRACTOR TO ALLOW ACCESS FOR CAMPBELL'S RESORT STAFF TO LAUNDRY FACILITY THROUGHOUT DURATION OF CONSTRUCTION. ROUTING IS SHOWN HEREIN AS AN OPTION. CONTRACTOR TO COORDINATE WITH CITY AND CAMPBELL'S RESORT FOR ACCESS ACCOMMODATIONS.
7. THE CONTRACTOR SHALL PROVIDE NOTIFICATION SIGNAGE IN ACCORDANCE WITH THE WASHINGTON STATE DEPARTMENT OF ECOLOGY CWSRF FUNDING REQUIREMENTS, CLEARLY INDICATING THAT THE PROJECT IS FUNDED THROUGH THE CWSRF PROGRAM. ALL SIGNS SHALL BE INSTALLED IN LOCATIONS THAT CAN BE DIRECTLY ASSOCIATED WITH THE WORK BEING PERFORMED AND SHALL BE MAINTAINED IN GOOD, LEGIBLE CONDITION FOR THE DURATION OF THE CONSTRUCTION PERIOD. SEE DETAIL 4, SHEET 706 FOR AGENCY FUNDING SIGNAGE DETAIL.



TYPE III BARRICADE



TYPE III BARRICADE

TYPICAL BARRICADE DETAILS

N.T.S.

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

CONTRACTORS STAGING AREA

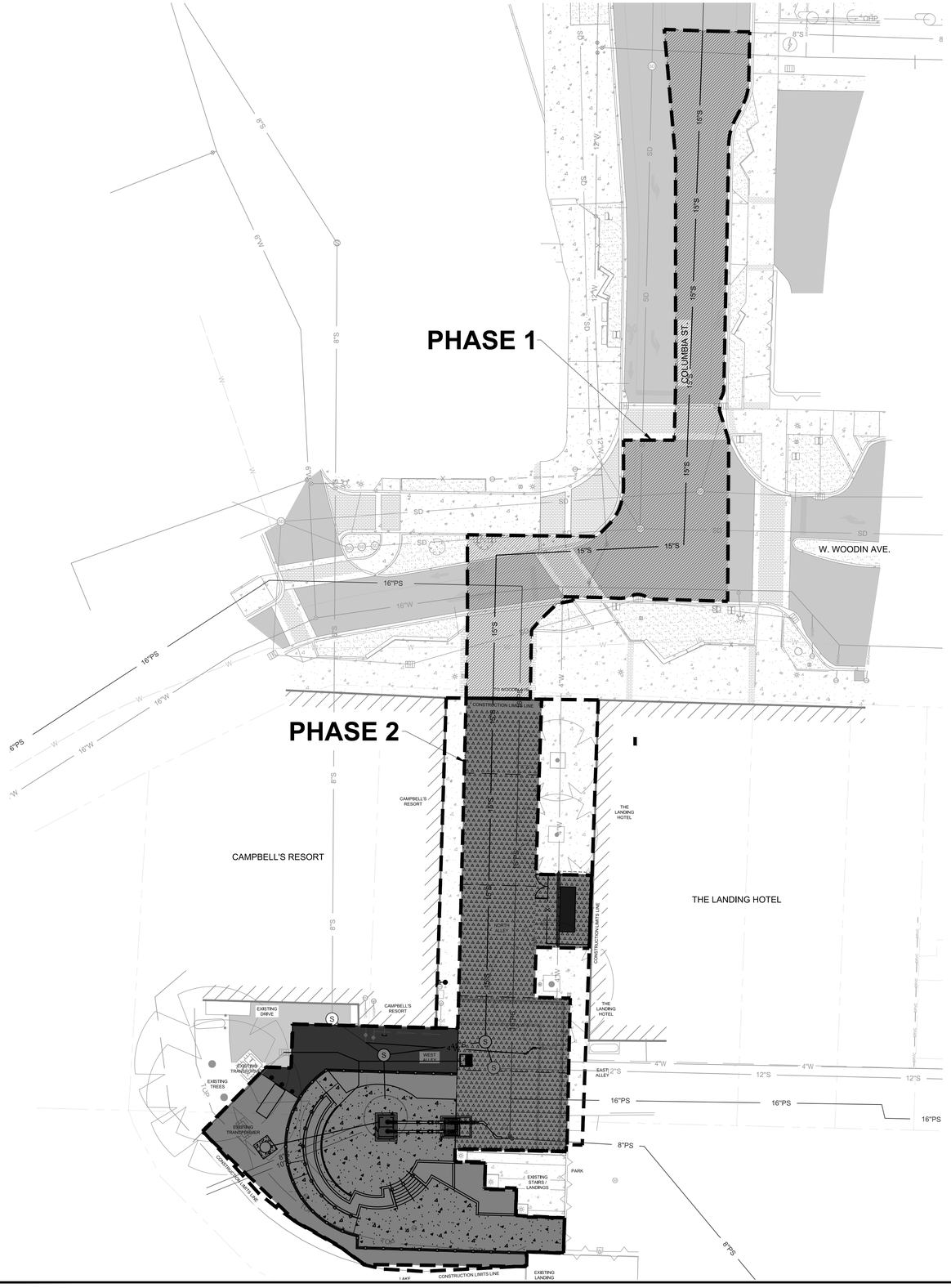
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0 10 20 40 60

LEGEND:

	CONSTRUCTION LIMITS/PHASE LIMITS

PHASE 1:

CONSTRUCTION LIMITS:
•CONSTRUCTION LIMITS SHALL INCLUDE THE OUTLINED WORK AREA IN THE COLUMBIA STREET AND WOODIN AVENUE RIGHT OF WAY AS SHOWN.
•WORK LIMITS SHALL LIMIT IMPACTS TO SIDEWALKS, PEDESTRIAN RAMPS, LANDSCAPED AREAS, DRIVEWAYS, TRAFFIC SIGNAGE, AND BUSINESS SIGNAGE LOCATED ADJACENT TO THE WORK AREA WITHIN THE PUBLIC RIGHT-OF-WAY.

TIME OF WORK:
•UTILITY IMPROVEMENTS FOR THIS PHASE SHALL BE PERFORMED DURING NIGHTTIME HOURS (8:00 PM – 7:00 AM) TO REDUCE IMPACTS TO TRAFFIC AND BUSINESS OPERATIONS.
•FINAL ROADWAY PAVING SHALL OCCUR DURING DAYTIME WORKING HOURS.
• A PAVING PLAN SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL AT LEAST FIVE (5) WORKING DAYS PRIOR TO PAVING.

DATES OF WORK:
•PHASE 1 FINAL PAVING AND STRIPING SHALL BE SUBSTANTIALLY COMPLETE BY OCTOBER 16, 2026.

EXCAVATION ACTIVITIES:
•ALL EXCAVATION SHALL BE PERFORMED EXCLUSIVELY DURING NIGHTTIME HOURS.
•UPON COMPLETION OF EACH NIGHT'S EXCAVATION, ALL OPEN TRENCHES AND DISTURBED AREAS SHALL BE SECURELY COVERED USING STEEL PLATES OR OTHER APPROVED METHODS TO ENSURE SAFETY AND STABILITY.

ROADWAY RESTORATION:
•PRIOR TO 7:00 AM EACH DAY, THE WORK ZONE SHALL BE RESTORED TO A CONDITION THAT SUPPORTS NORMAL TRAFFIC OPERATIONS. THIS INCLUDES CRUSHED SURFACING BASE COURSE (CSBC) PATCHING OR PROVIDING STEEL PLATES TO RESTORE THE ROADWAY SURFACE TO A SMOOTH, DRIVABLE STATE AS APPROVED BY ENGINEER AND CITY OF CHELAN. TEMPORARY CHANNELIZATION OR TEMPORARY STRIPING SHALL BE PROVIDE AS REQUIRED.
•PEDESTRIAN ROUTES SHALL BE MAINTAINED. ANY CHANGES IN SURFACING OR OBSTRUCTIONS SHALL BE CLEARLY DELINEATED TO PROTECT THE TRAVELING PUBLIC.

TEMPORARY BYPASS PUMPING:
•THE CONTRACTOR SHALL PROVIDE TEMPORARY BYPASS PUMPING TO MAINTAIN UNINTERRUPTED SEWER SERVICE DURING CONSTRUCTION. ALL BYPASS SYSTEMS SHALL BE INSTALLED AND OPERATED IN ACCORDANCE WITH SHEET G007 AND SECTION 0111217, INCLUDING PROVISIONS FOR CONTAINMENT, MONITORING, AND EMERGENCY RESPONSE.

TRAFFIC MANAGEMENT:
•APPROPRIATE SIGNAGE, BARRIERS, AND TRAFFIC CONTROL DEVICES SHALL BE DEPLOYED DURING ACTIVE WORK HOURS. ALL SUCH MEASURES SHALL BE IN PLACE DURING NIGHTTIME OPERATIONS, ALL SUCH MEASURES SHALL BE REMOVED OR ADJUSTED BY 7:00 AM TO ALLOW FOR UNRESTRICTED DAYTIME TRAFFIC FLOW.
•SEE TRAFFIC CONTROL PLANS (T100 AND T101) FOR DETOUR AND TEMPORARY TRAFFIC CONTROL REQUIREMENTS.

COMPLIANCE AND SAFETY:
•DAILY INSPECTIONS SHALL BE CONDUCTED TO VERIFY THAT THE SITE IS SAFE AND TRAFFIC-READY BEFORE THE START OF DAYTIME OPERATIONS.

IMPROVEMENTS INCLUDE:
•GRAVITY SANITARY SEWER REPLACEMENT; SEE GRAVITY SEWER PLAN AND PROFILE SHEETS D500, C500, C501, AND C502.
•ROADWAY SURFACE RESTORATION; SEE ROADWAY SURFACE RESTORATION PLAN C600,

PHASE 2:

CONSTRUCTION LIMITS:
•CONSTRUCTION LIMITS SHALL INCLUDE THE OUTLINED WORK AREA IN THE NORTH ALLEY AND CC-1 PLAZA AREA AS SHOWN.
•WORK LIMITS SHALL LIMIT IMPACTS TO ADJACENT BUILDINGS.

TIME OF WORK:
•IMPROVEMENTS FOR THIS PHASE SHALL BE PERFORMED DURING DAYTIME HOURS (7:30AM – 5:00 PM).

DATES OF WORK:
•PHASE 2 SHALL BE SUBSTANTIALLY COMPLETE BY APRIL 30, 2027.

TEMPORARY BYPASS PUMPING:
•THE CONTRACTOR SHALL PROVIDE TEMPORARY BYPASS PUMPING TO MAINTAIN UNINTERRUPTED SEWER SERVICE DURING CONSTRUCTION. ALL BYPASS SYSTEMS SHALL BE INSTALLED AND OPERATED IN ACCORDANCE WITH SHEET G007 AND SECTION 0111217, INCLUDING PROVISIONS FOR CONTAINMENT, MONITORING, AND EMERGENCY RESPONSE.

TRAFFIC MANAGEMENT:
•PHASE 2 WORK SHALL NOT IMPACT TRAFFIC ON PUBLIC ROADWAYS. PUBLIC ROADS SHALL REMAIN FULLY OPEN AND UNINTERRUPTED THROUGHOUT CONSTRUCTION ACTIVITIES.

IMPROVEMENTS INCLUDE:
1. •GRAVITY SANITARY SEWER, CC-1 PLAZA AND NORTH ALLEY SURFACING AND SITE IMPROVEMENTS, STORM DRAINAGE, SITE UTILITIES, CC-1 LIFT STATION UPGRADES, LANDSCAPING, ELECTRICAL, AND INSTRUMENTATION AND CONTROL

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

PROJECT PHASING PLAN

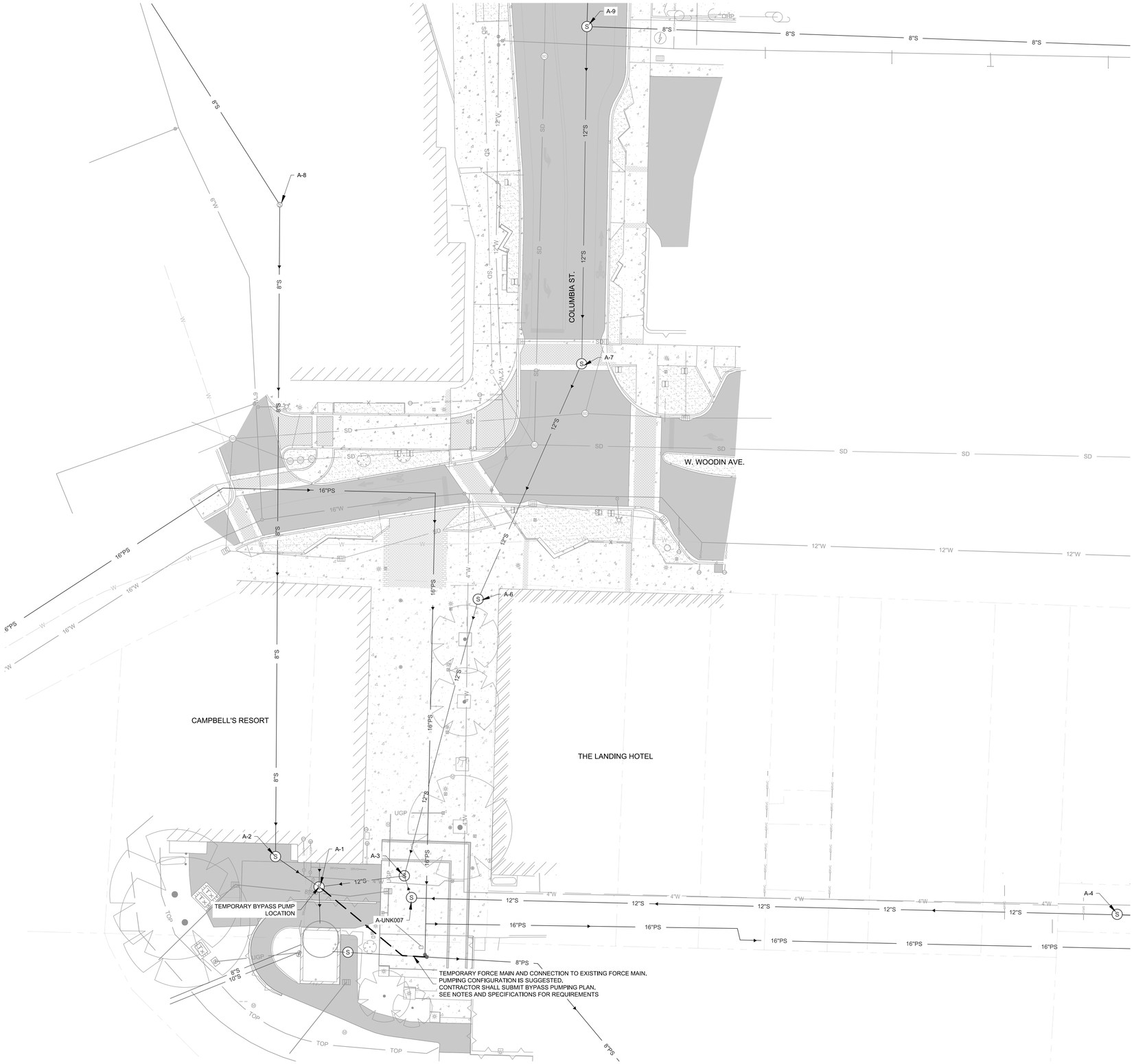
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0 10 20 40 60

SEWER FLOWS	
MANHOLE	ASSUMED/EXPECTED PEAK FLOW (GPM)
A-1	678
A-2	10
A-3	665
A-6	645
A-UNK007	10
A-4	7
A-7	642
A-8	3
A-9	639

NOTE: ALL FLOWS ARE BASED ON CITY OF CHELAN 2023 GENERAL SEWER PLAN MODEL. ACTUAL CONDITIONS MAY VARY.

BYPASS PUMPING NOTES:

1. CONTRACTOR SHALL HAVE A SEWER BYPASS PUMPING PLAN APPROVED BY THE CITY, AND INSTALLED PRIOR TO CONSTRUCTION. THE SEWER BYPASS PUMPING PLAN SHALL INCLUDE ALL PROVISION AND PRECAUTIONS TO BE TAKEN BY THE CONTRACTOR REGARDING THE HANDLING OF WASTEWATER FLOWS. THIS PLAN MUST BE SPECIFIC AND COMPLETE, INCLUDING SUCH ITEMS AS PHASING, LOCATIONS, CAPACITIES OF EQUIPMENT, ELEVATIONS, MATERIALS, AND ALL OTHER INCIDENTAL ITEMS NECESSARY AND/OR REQUIRED TO INSURE PROPER PROTECTION. SEE SECTION 011217- TEMPORARY BYPASS PUMPING SYSTEM IN THE SPECIFICATIONS.
2. THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER AND CITY AN EMERGENCY RESPONSE PLAN THAT INCLUDES HOW THE CONTRACTOR SHALL MONITOR THE BYPASS PUMPING, SPARE TOOLS AND EQUIPMENT IN CASE OF FAILURE, AND A CALL PATH OR SEQUENCE FOR ON-CALL STALL RESPONSE. THE CONTRACTOR SHALL HAVE A MINIMUM OF THREE (3) INDIVIDUALS LISTED WITH THE CALL PATH.
3. BYPASS PUMPING NOISE SHALL NOT EXCEED 85 DECIBELS AT A DISTANCE OF 5 FEET FROM ANY PART OF THE UNIT. CONTRACTOR SHALL USE SOUND BOXES, SCREENS, OR HAY BALES TO MITIGATE THE NOISE LEVELS.
4. CONTRACTOR SHALL PERFORM LEAKAGE AND PRESSURE TESTS OF THE BYPASS PUMPING USING AIR PRIOR TO THE START OF ACTUAL OPERATION. EQUIPMENT SHALL HAVE ZERO LEAKAGE. TESTING SHALL OCCUR FOR EACH PHASE AND FOLLOWING EACH EQUIPMENT RELOCATION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER 48 HOURS PRIOR TO TESTING.
5. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO ENSURE THE SUCCESS OF THE BYPASS PUMPING PROGRAM, INCLUDING STANDBY, BACKUP PUMPS, ALONG WITH ANY AND ALL PROVISIONS AS NECESSARY FOR SUCCESSFUL BYPASS PUMPING.
6. THE CONTRACTOR SHALL INSPECT THE BYPASS PUMPING SYSTEM AT A MINIMUM OF ONCE EVERY TWO HOURS TO ENSURE THE THE SYSTEM IS WORKING CORRECTLY. THE CONTRACTOR SHALL RECORD ALL INSPECTIONS AND RELEVANT INFORMATION OF THE BYPASS PUMPING SYSTEM AND SUBMIT THE DAILY TO THE ENGINEER.

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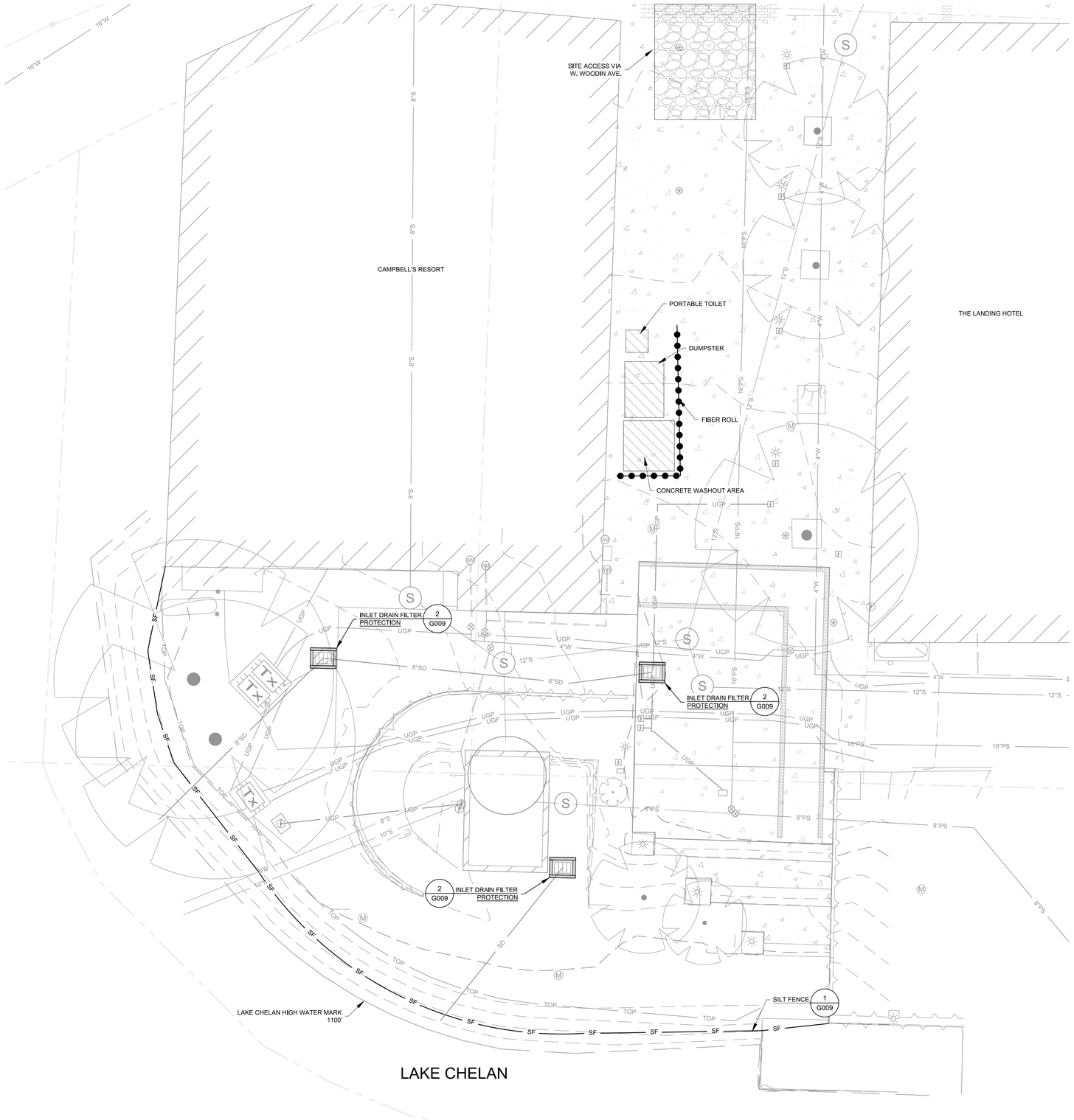
BYPASS PUMPING PLAN

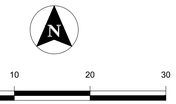
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EROSION CONTROL NOTES:

1. ALL PROJECTS HAVING THE POTENTIAL FOR RUNOFF DISCHARGE TO ANY SURFACE WATER BODY SHALL FILE A NOTICE OF INTENT (NOI), AND OBTAIN A CONSTRUCTION STORM WATER GENERAL PERMIT (CSWGP) WITH THE WASHINGTON STATE DEPARTMENT OF ECOLOGY. COPIES OF ANY REQUIRED STORM WATER POLLUTION PREVENTION PLANS (SWPPP) AND NOI SHALL BE PROVIDED TO THE PROJECT ENGINEER ON RECORD PRIOR TO THE START OF CONSTRUCTION.
2. ALL BMPS AND SEDIMENT CONTROL ARE TO BE INSTALLED AND MAINTAINED PER THE STORMWATER MANAGEMENT MANUAL FOR EASTERN WASHINGTON AND APPROVED SWPPP.
3. THE INFORMATION DISPLAYED ON THESE EROSION AND SEDIMENT CONTROL DRAWINGS ARE FOR REFERENCE AND INFORMATION ONLY. THE CONTRACTOR IS RESPONSIBLE FOR CREATING AND SUBMITTING THE REQUIRED DOCUMENTATION TO WASHINGTON STATE DEPARTMENT OF ECOLOGY.
4. REFER TO SHEET G002 - GENERAL LEGEND, SYMBOLS & NOTES FOR ADDITIONAL NOTES
5. CONTRACTOR IS RESPONSIBLE FOR OPERATIONS AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROL PLAN AND BEST MANAGEMENT PRACTICES THROUGHOUT THE SITE. CONTRACTOR TO UTILIZE BMP'S LISTED IN THE EASTERN WASHINGTON STORM WATER MANUAL. BMP'S TO BE USED INCLUDE BUT ARE NOT LIMITED TO;
   - 5.a. C105E STABILIZED CONSTRUCTION ENTRANCE
   - 5.b. C106E WHEEL WASH
   - 5.c. C152E SAWCUTTING AND SURFACE POLLUTION PREVENTION
   - 5.d. C154E CONCRETE WASHOUT AREA
   - 5.e. C220E INLET PROTECTION
   - 5.f. C233E SILT FENCE

LEGEND

STABILIZED CONSTRUCTION ENTRANCE	
SILT FENCE	SF
FIBER ROLL	

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EROSION AND SEDIMENT CONTROL PLAN

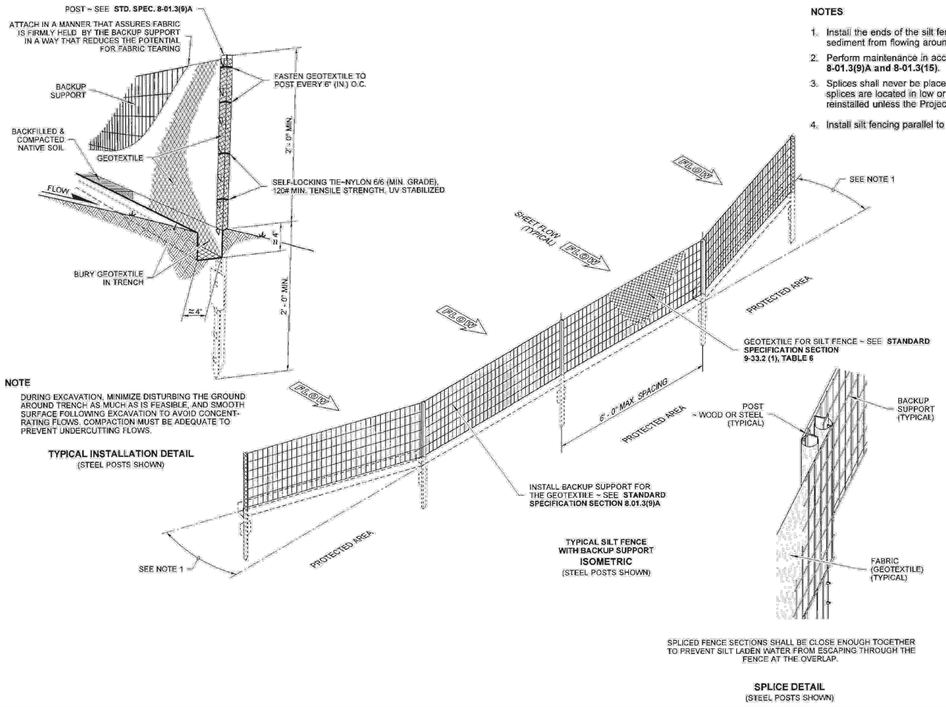
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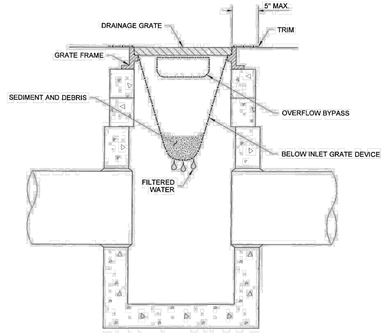
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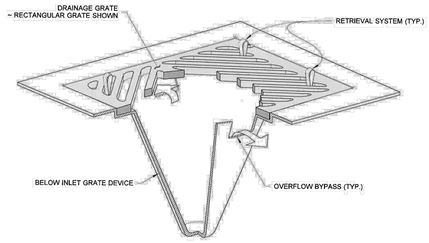
NOTES

1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
2. Perform maintenance in accordance with **Standard Specifications 8-01.3(9)A and 8-01.3(15).**
3. Splices shall never be placed in low spots or sump locations. If splices are located in low or sump areas, the fence may need to be reinstalled unless the Project Engineer approves the installation.
4. Install silt fencing parallel to mapped contour lines.

SILT FENCE WITH BACKUP SUPPORT (WSDOT STANDARD PLAN I-30.10-02) N.T.S. 1



SECTION VIEW
NOT TO SCALE

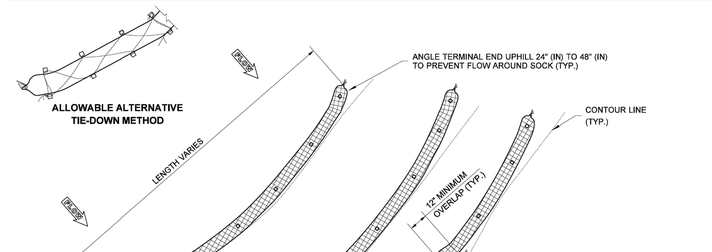


ISOMETRIC VIEW

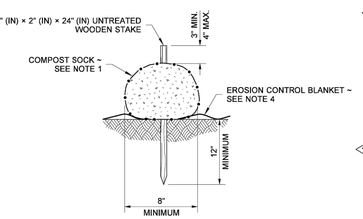
NOTES

1. Size the Below Inlet Grate Device (BIGD) for the storm water structure it will service.
2. The BIGD shall have a built-in high-flow relief system (overflow bypass).
3. The retrieval system must allow removal of the BIGD without spilling the collected material.
4. Perform maintenance in accordance with Standard Specification 8-01.3(15).

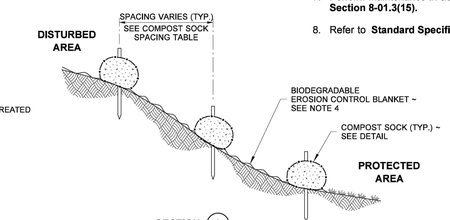
INLET DRAIN FILTER PROTECTION (WSDOT STANDARD PLAN I-40.20-00) N.T.S. 2

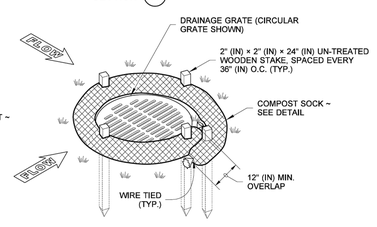


8" DIAMETER MINIMUM COMPOST SOCK SPACING TABLE	
SLOPE	MAXIMUM SPACING
1H : 1V	5' - 0"
2H : 1V	10' - 0"
3H : 1V	15' - 0"
4H : 1V	20' - 0"



COMPOST SOCK DETAIL





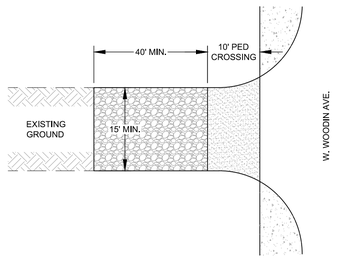
ISOMETRIC VIEW

CATCH BASIN INSTALLATION

NOTES

1. Compost Sock shall be in accordance with **Standard Specification, Section 9-14.5(6).**
2. Securely knot each end of Compost Sock. Overlap adjacent Compost Sock ends 12" (in) behind one another and securley tie together.
3. Compost to be dispersed on site as determined by the Engineer, when vegetation covers the surface.
4. If Erosion Control Blanket is specified, place Compost Sock on top of blanket. See **Standard Plan I-60.10.**
5. Install Compost Sock perpendicular to flow along contours.
6. Remove sediment from the up slope side of the Compost Sock when accumulation has reached 1/2 of the effective height of the Compost Sock without compromising the intended function of the Compost Sock per **Standard Specification, section 8-01.3(12)** as determined by the Engineer.
7. Perform maintenance in accordance with **Standard Specification, Section 8-01.3(15).**
8. Refer to **Standard Specification, Section 8-01.3(16)** for removal.

COMPOST SOCK DETAILS (WSDOT STANDARD PLAN I-30.40-02) N.T.S. 3



PLAN VIEW



PROFILE VIEW

NOTES:

1. STONE SHALL BE 2 INCH STONE OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT.
2. LENGTH SHALL BE AS REQUIRED, BUT NOT LESS THAN 50 FEET.
3. WIDTH SHALL BE 15 FEET MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
4. FILTER CLOTH SHALL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING STONE.
5. CONTRACTOR SHALL MAINTAIN THE ENTRANCE IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHT-OF-WAY OR DESIGNATED WORK ZONE SHALL BE REMOVED IMMEDIATELY.
6. WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAYS. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
7. CONTRACTOR SHALL PERIODICALLY INSPECT AND PROVIDE REQUIRED MAINTENANCE AFTER EACH RAIN STORM.

CONSTRUCTION ENTRANCE DETAIL N.T.S. 4

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CITY OF CHELAN
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EROSION AND SEDIMENT CONTROL DETAILS

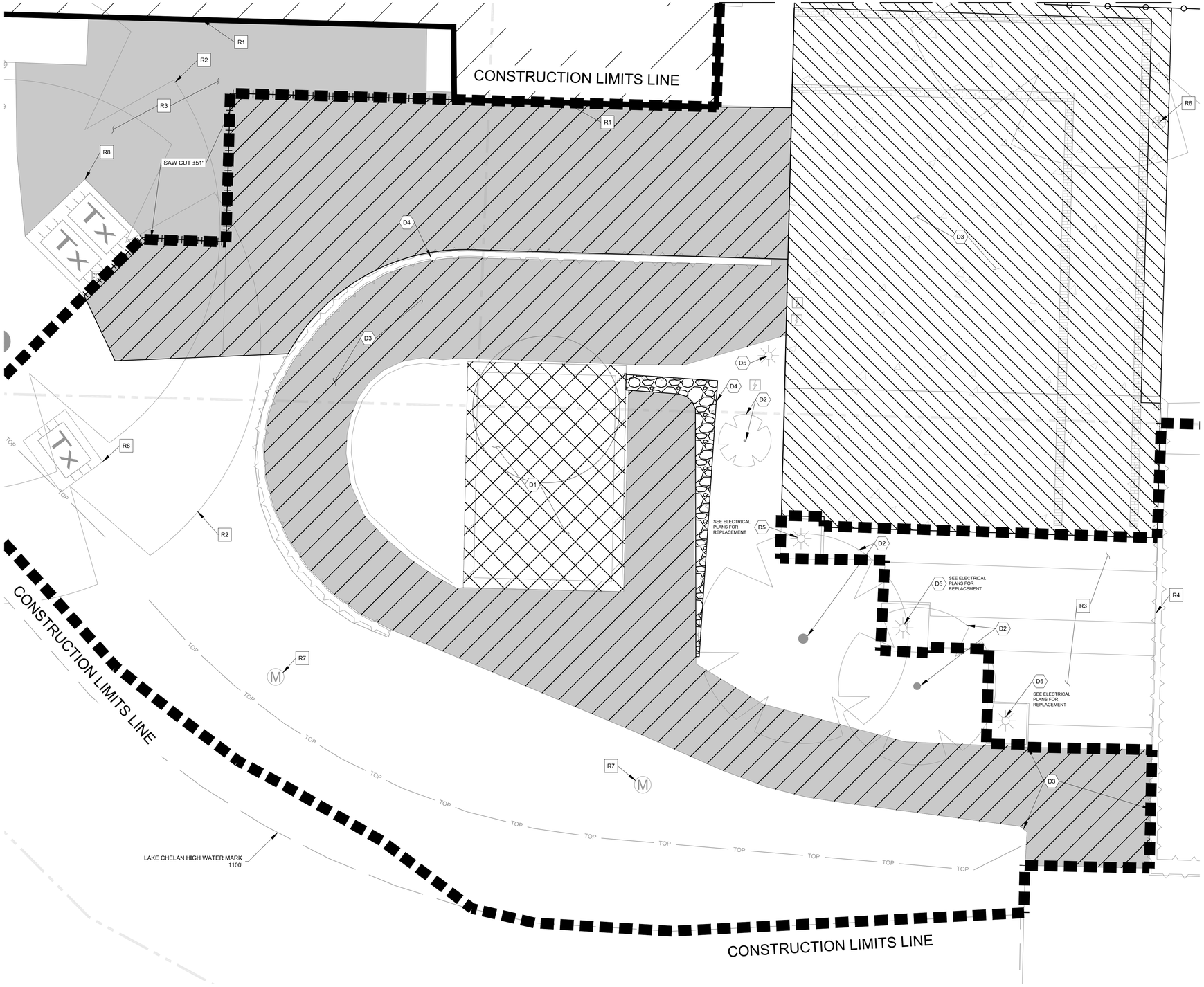
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DEMOLITION NOTES:

1. DAMAGE TO PROPERTY OUTSIDE THE CONSTRUCTION LIMITS OF THE PROJECT AND/OR STRUCTURES AND MATERIAL NOT SCHEDULED FOR DEMOLITION SHALL BE PROMPTLY REPAIRED BY THE CONTRACTOR TO ORIGINAL CONDITION OR BETTER. THE COST OF REPAIRS AND ANY TIME DELAY SHALL BE AT THE CONTRACTOR'S SOLE EXPENSE.
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4. CONCRETE PAVEMENT INDICATED FOR REMOVAL SHALL BE REMOVED AT THE NEAREST JOINT WHERE THE REMOVAL LIMITS OVERLAP, UNLESS OTHERWISE SHOWN.
5. THIS DRAWING REPRESENTS SURFACE/SITE DEMOLITION ONLY. SEE SHEETS D400, D401, D500, D600, AND E004 FOR ADDITIONAL DEMOLITION.

KEY NOTES:

D1	EXISTING LIFT STATION BUILDING TO BE DEMOLISHED SEE SHEET D600
D2	EXISTING TREE TO BE DEMOLISHED
D3	EXISTING PAVEMENT TO BE DEMOLISHED
D4	EXISTING ROCK RETAINING WALL TO BE DEMOLISHED
D5	EXISTING LIGHT POLE TO BE REMOVED
D6	EXISTING SHRUB TO BE DEMOLISHED
D7	EXISTING BOLLARD TO BE REMOVED
R1	RETAIN AND PROTECT EXISTING BUILDING
R2	RETAIN AND PROTECT EXISTING TREE PER SPECIFICATIONS AND DETAIL 1 ON SHEET L300
R3	RETAIN AND PROTECT EXISTING PAVEMENT
R4	RETAIN AND PROTECT EXISTING RETAINING WALL AND RAILINGS
R5	RETAIN AND PROTECT EXISTING LIGHT POLE AND BASE
R6	RETAIN AND PROTECT EXISTING BOLLARD
R7	RETAIN AND PROTECT EXISTING MONITORING WELL. SEE DETAIL 1, SHEET C702 FOR MONITORING WELL SURFACE ADJUSTMENT
R8	RETAIN AND PROTECT EXISTING TRANSFORMER

LEGEND:

	EXISTING EDGE OF PAVEMENT
	EXISTING RETAINING WALL
	EXISTING BUILDING
	SAW CUT
	TREE PROTECTION FENCING
	EXISTING CONCRETE
	EXISTING PAVEMENT
	EXISTING BUILDING DEMOLITION
	EXISTING CONCRETE DEMOLITION
	EXISTING PAVEMENT DEMOLITION
	EXISTING ROCK RETAINING WALL DEMOLITION

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SITE DEMOLITION PLAN - 01

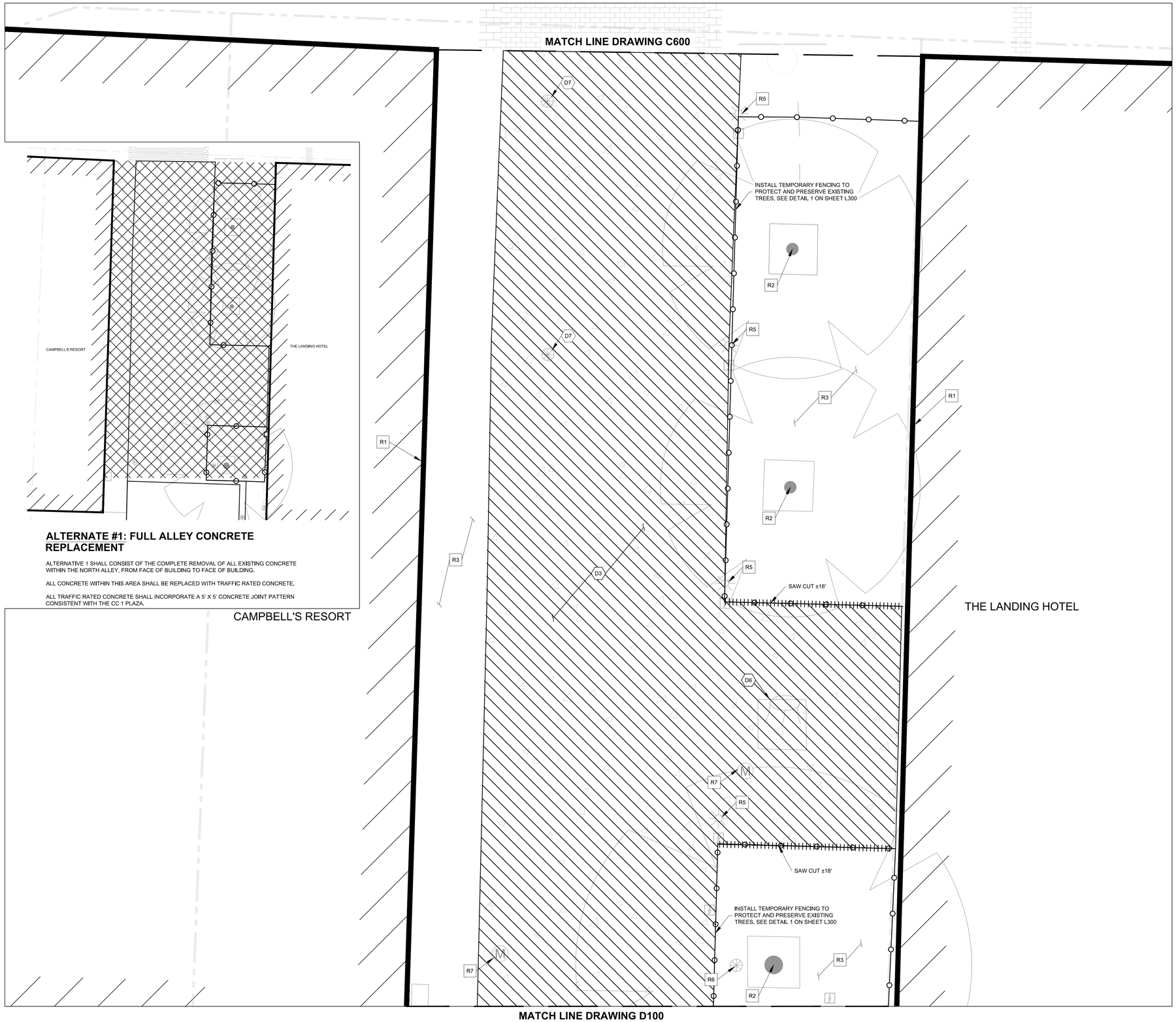
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ALTERNATE #1: FULL ALLEY CONCRETE REPLACEMENT

ALTERNATIVE 1 SHALL CONSIST OF THE COMPLETE REMOVAL OF ALL EXISTING CONCRETE WITHIN THE NORTH ALLEY, FROM FACE OF BUILDING TO FACE OF BUILDING.

ALL CONCRETE WITHIN THIS AREA SHALL BE REPLACED WITH TRAFFIC RATED CONCRETE.

ALL TRAFFIC RATED CONCRETE SHALL INCORPORATE A 5' X 5' CONCRETE JOINT PATTERN CONSISTENT WITH THE CC 1 PLAZA.

0 2.5 5 10 15

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KEY NOTES:

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D3	EXISTING PAVEMENT TO BE DEMOLISHED
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R6	RETAIN AND PROTECT EXISTING BOLLARD
R7	RETAIN AND PROTECT EXISTING MONITORING WELL. SEE DETAIL 1, SHEET C702 FOR MONITORING WELL SURFACE ADJUSTMENT
R8	RETAIN AND PROTECT EXISTING TRANSFORMER

LEGEND:

- EXISTING EDGE OF PAVEMENT
- EXISTING RETAINING WALL
- EXISTING BUILDING
- SAW CUT
- TREE PROTECTION FENCING
- EXISTING CONCRETE
- EXISTING PAVEMENT
- EXISTING BUILDING DEMOLITION
- EXISTING CONCRETE DEMOLITION
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LIFT STATION CC-1 UPGRADES

SITE DEMOLITION PLAN - 02

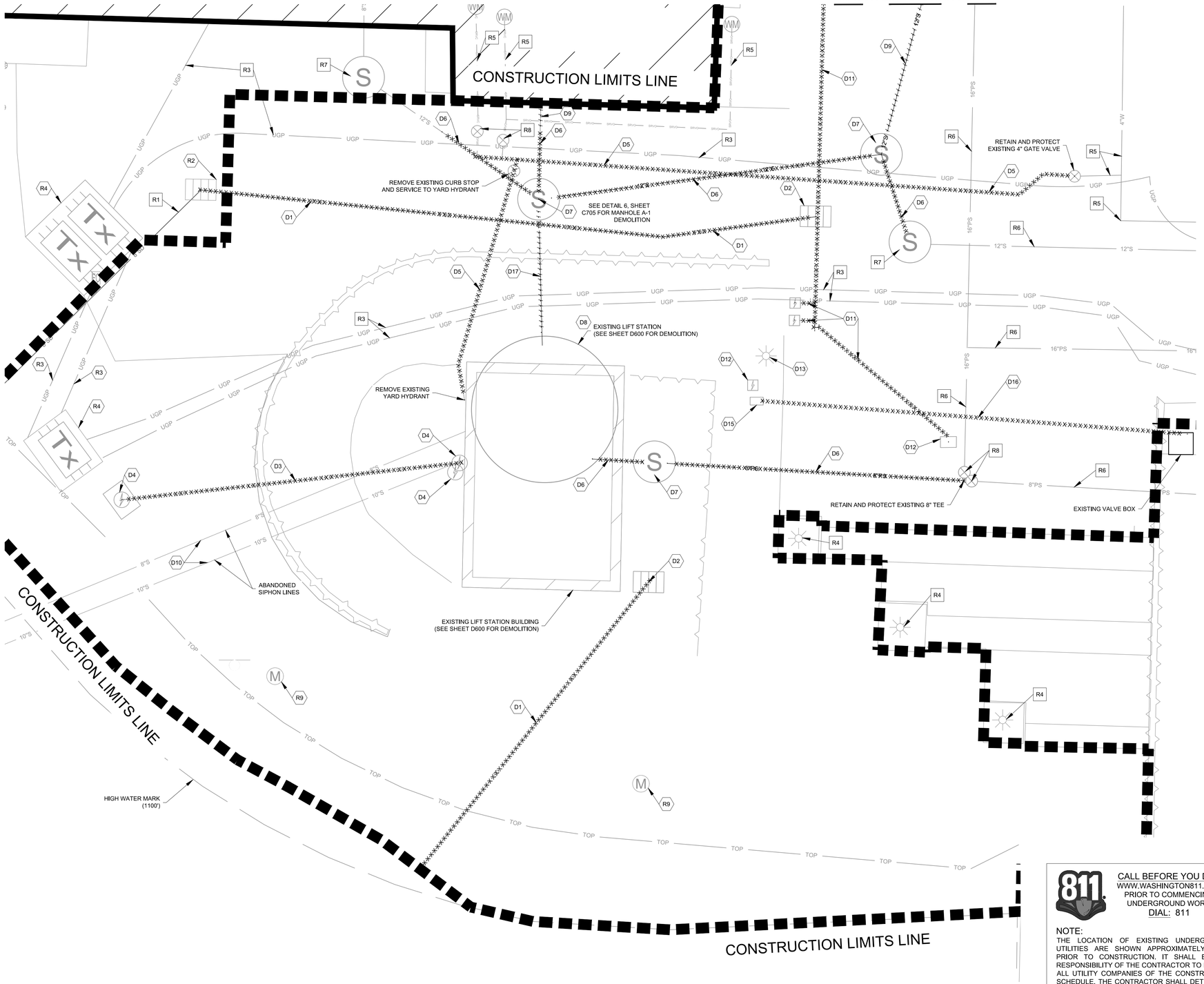
ATTENTION:
0 1/2
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

JOB NO:	A-240217
DATE:	JUNE 2026

D101

BID SET

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DEMOLITION NOTES:

1. ALL BURIED PIPE SCHEDULED FOR DEMOLITION SHALL BE REMOVED FROM THE GROUND IN ITS ENTIRETY. ABANDONMENT IN PLACE MAY TAKE PLACE ONLY IF REMOVAL IS NOT POSSIBLE OR WHERE SPECIFICALLY CALLED FOR ON PLANS. ABANDONED PIPES AND ABANDONMENT PROCESS MUST BE APPROVED BY ENGINEER AND OWNER PRIOR TO ABANDONMENT, SEE DETAIL 5, SHEET C705.
2. DAMAGE TO PROPERTY OUTSIDE THE CONSTRUCTION LIMITS OF THE PROJECT AND/OR STRUCTURES AND MATERIAL NOT SCHEDULED FOR DEMOLITION SHALL BE PROMPTLY REPAIRED BY THE CONTRACTOR TO ORIGINAL CONDITION OR BETTER, THE COST OF REPAIRS AND ANY TIME DELAY SHALL BE AT THE CONTRACTORS SOLE EXPENSE.
3. THE DEMOLITION DRAWINGS MAY NOT LIST ALL COMPONENTS ASSOCIATED WITH A GIVEN STRUCTURE DESIGNATED FOR DEMOLITION OR REMOVAL, UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL REMOVE/ DEMO ALL COMPONENTS ASSOCIATED WITH A STRUCTURE DESIGNATED FOR REMOVAL/DEMO, INCLUDING BUT NOT LIMITED TO; EQUIPMENT, FOUNDATION, PIPING AND ELECTRICAL, ANCHOR BOLTS, FACILITY SUPPORTS ETC.
4. UNLESS OTHERWISE NOTED, ALL ITEMS INCLUDING BUT NOT LIMITED TO; STRUCTURES DESIGNATED FOR REMOVAL/ DEMO, EQUIPMENT, MATERIALS, DEBRIS, BIOSOLIDS, SOILS SHALL BECOME THE PROPERTY OF THE CONTRACTOR, ALL DISPOSAL OF MATERIALS SHALL BE DONE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.
5. REMOVE ALL EXISTING ELECTRICAL WIRING, CONDUIT, DEVICES, AND ASSOCIATED EQUIPMENT BACK TO THE ORIGINATING PANEL SOURCE. COORDINATE WITH THE ELECTRICAL PLANS AND THE ELECTRICAL CONTRACTOR TO ENSURE SAFE DISCONNECTION AND TERMINATION AT THE PANEL.
6. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING DOMESTIC WATER SERVICE FOR THE DURATION OF THE PROJECT.
7. THIS DRAWING REPRESENTS UTILITY DEMOLITION ONLY. SEE SHEETS D100, D101, D500, D600, E004 FOR ADDITIONAL DEMOLITION.

KEY NOTES:

- D1 EXISTING STORM DRAIN LINE TO BE DEMOLISHED
- D2 EXISTING STORM DRAIN CATCH BASIN TO BE DEMOLISHED
- D3 EXISTING UNDERGROUND POWER LINE TO BE DEMOLISHED, SEE ELECTRICAL PLANS.
- D4 EXISTING POWER STRUCTURE TO BE REMOVED, SEE ELECTRICAL PLANS
- D5 EXISTING WATER LINE TO BE DEMOLISHED
- D6 EXISTING SEWER LINE TO BE DEMOLISHED
- D7 EXISTING MANHOLE TO BE DEMOLISHED
- D8 EXISTING LIFT STATION DEMOLITION, SEE SHEET D600
- D9 CUT, CAP, AND ABANDON EXISTING SEWER MAIN IN PLACE, SEE SEWER ABANDONMENT AND TERMINATION NOTES DETAIL 4, SHEET C705
- D10 REMOVE AND CAP ABANDONED SEWER LINES IN PLACE AS ENCOUNTERED
- D11 REMOVE EXISTING HANDHOLE AND ELECTRICAL CONDUIT (CONDUIT EMPTY)
- D12 REMOVE EXISTING ELECTRICAL HANDHOLE. FIELD-VERIFY ALL EXISTING CABLES AND EITHER REROUTE OR REMOVE AS REQUIRED TO ACCOMODATE NEW WORK
- D13 REMOVE EXISTING LIGHT POLE
- D14 ABANDON EXISTING MANHOLE. SEE SEWER ABANDONMENT AND TERMINATION NOTES DETAIL 4, SHEET C705
- D15 CONTRACTOR TO REMOVE EXISTING VALVE BOX AND VALVES (RETURN TO OWNER), DISCONNECT AND COIL WRAP VALVE WIRES FOR RECONNECTION. SEE L200 IRRIGATION PLAN FOR MORE INFORMATION.
- D16 CONTRACTOR TO REMOVE EXISTING IRRIGATION MAIN AND VALVE WIRES. COIL WRAP VALVE WIRES FOR RECONNECTION. SEE L200 IRRIGATION PLAN FOR MORE INFORMATION.
- D17 ABANDON THE EXISTING SANITARY SEWER LINE EXTENDING FROM MANHOLE A-1 TO LIFT STATION CC-1, CAP LINE AND FILL WITH CONTROLLED DENSITY FILL (CDF) OR NON SHRINK GROUT FROM END TO END AND ABANDON IN PLACE. REFER TO SHEET C600 FOR LIFT STATION CC-1 DEMOLITION REQUIREMENTS AND TO DETAIL 5 ON SHEET C705 FOR MANHOLE A-1 DEMOLITION.
- R1 RETAIN AND PROTECT EXISTING STORM DRAIN LINE
- R2 RETAIN AND PROTECT EXISTING STORM DRAIN CATCH BASIN
- R3 RETAIN AND PROTECT EXISTING UNDERGROUND POWER LINE
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- R6 RETAIN AND PROTECT EXISTING SEWER LINE
- R7 RETAIN AND PROTECT EXISTING MANHOLE
- R8 RETAIN AND PROTECT EXISTING VALVES
- R9 RETAIN AND PROTECT EXISTING MONITORING WELLS. SEE DETAIL 1, SHEET C702 FOR MONITORING WELL SURFACE ADJUSTMENT

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DIAL: 811

NOTE:
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LEGEND:

SEW	EXISTING SEWER LINE
SD	EXISTING STORM DRAIN LINE
UGP UGP	EXISTING UNDERGROUND POWER LINE
W	EXISTING WATER LINE
XXXXXXXXXXXXXXXXXXXXXXXX	PIPE DEMOLITION EXTENTS
-·-	CUT, CAP, AND ABANDON PIPE IN PLACE

JAKE CAMDON BENDER
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APPROVED X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

UTILITY DEMOLITION PLAN - 01

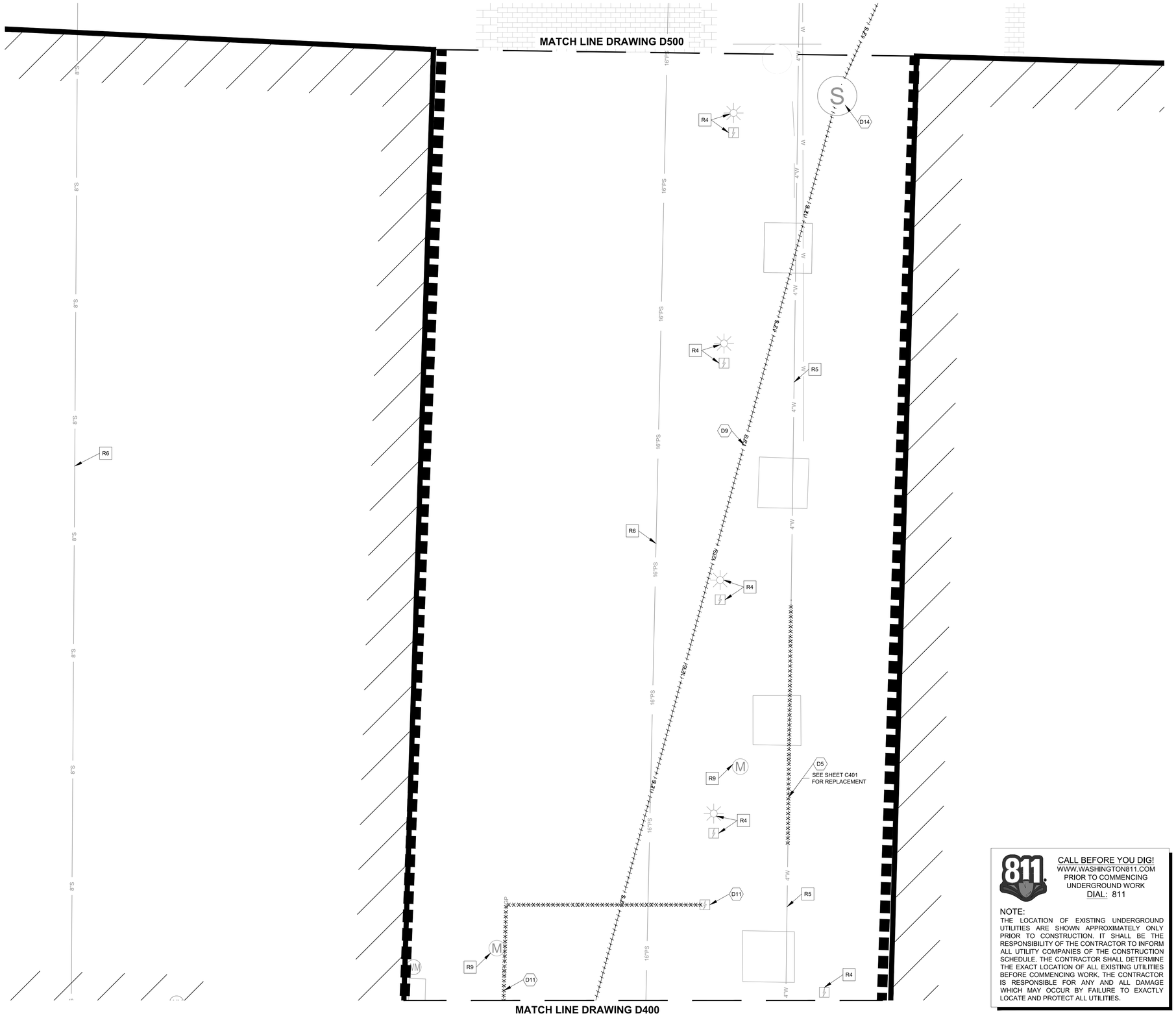
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D400

BID SET

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5. REMOVE ALL EXISTING ELECTRICAL WIRING, CONDUIT, DEVICES, AND ASSOCIATED EQUIPMENT BACK TO THE ORIGINATING PANEL SOURCE. COORDINATE WITH THE ELECTRICAL PLANS AND THE ELECTRICAL CONTRACTOR TO ENSURE SAFE DISCONNECTION AND TERMINATION AT THE PANEL.
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D9	CUT, CAP, AND ABANDON EXISTING SEWER MAIN IN PLACE, SEE SEWER ABANDONMENT AND TERMINATION NOTES DETAIL 4, SHEET C705
D10	REMOVE AND CAP ABANDONED SEWER LINES IN PLACE AS ENCOUNTERED
D11	REMOVE EXISTING HANDHOLE AND ELECTRICAL CONDUIT (CONDUIT EMPTY)
D12	REMOVE EXISTING ELECTRICAL HANDHOLE. FIELD-VERIFY ALL EXISTING CABLES AND EITHER REROUTE OR REMOVE AS REQUIRED TO ACCOMODATE NEW WORK
D13	REMOVE EXISTING LIGHT POLE
D14	ABANDON EXISTING MANHOLE. SEE SEWER ABANDONMENT AND TERMINATION NOTES DETAIL 4, SHEET C705
D15	CONTRACTOR TO REMOVE EXISTING VALVE BOX AND VALVES (RETURN TO OWNER). DISCONNECT AND COIL WRAP VALVE WIRES FOR RECONNECTION. SEE L200 IRRIGATION PLAN FOR MORE INFORMATION.
D16	CONTRACTOR TO REMOVE EXISTING IRRIGATION MAIN AND VALVE WIRES. COIL WRAP VALVE WIRES FOR RECONNECTION. SEE L200 IRRIGATION PLAN FOR MORE INFORMATION.
D17	ABANDON THE EXISTING SANITARY SEWER LINE EXTENDING FROM MANHOLE A-1 TO LIFT STATION CC-1. CAP LINE AND FILL WITH CONTROLLED DENSITY FILL (CDF) OR NON SHRINK GROUT FROM END TO END AND ABANDON IN PLACE. REFER TO SHEET C600 FOR LIFT STATION CC-1 DEMOLITION REQUIREMENTS AND TO DETAIL 5 ON SHEET C705 FOR MANHOLE A-1 DEMOLITION.
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XXXXXXXXXXXXXXXXXXXXXXXXX	PIPE DEMOLITION EXTENTS
	CUT, CAP, AND ABANDON PIPE IN PLACE

0 2.5 5 10 15

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CHECKED	X. XXX
APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

UTILITY DEMOLITION PLAN - 02

ATTENTION:
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MATCH LINE DRAWING D401

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6. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING WATER SERVICE FOR THE DURATION OF THE PROJECT.
7. CONTRACTOR TO RETAIN OR REMOVE AND CAP EXISTING IRRIGATION LINES AND COMPONENTS AS REQUIRED, FIELD-VERIFY ALL IRRIGATION ROUTING AND LOCATIONS PRIOR TO WORK. RELOCATE EXISTING VALVE BOX TO A LANDSCAPED AREA.

KEY NOTES:

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UGP UGP	EXISTING UNDERGROUND POWER LINE
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XXXXXXXXXXXXXXXXXXXXXXXX	PIPE DEMOLITION EXTENTS
- -	CUT, CAP, AND ABANDON PIPE IN PLACE

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BORDER SIZE	22"x34"
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CHECKED	X. XXX
APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

GRAVITY SEWER DEMOLITION PLAN

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D500

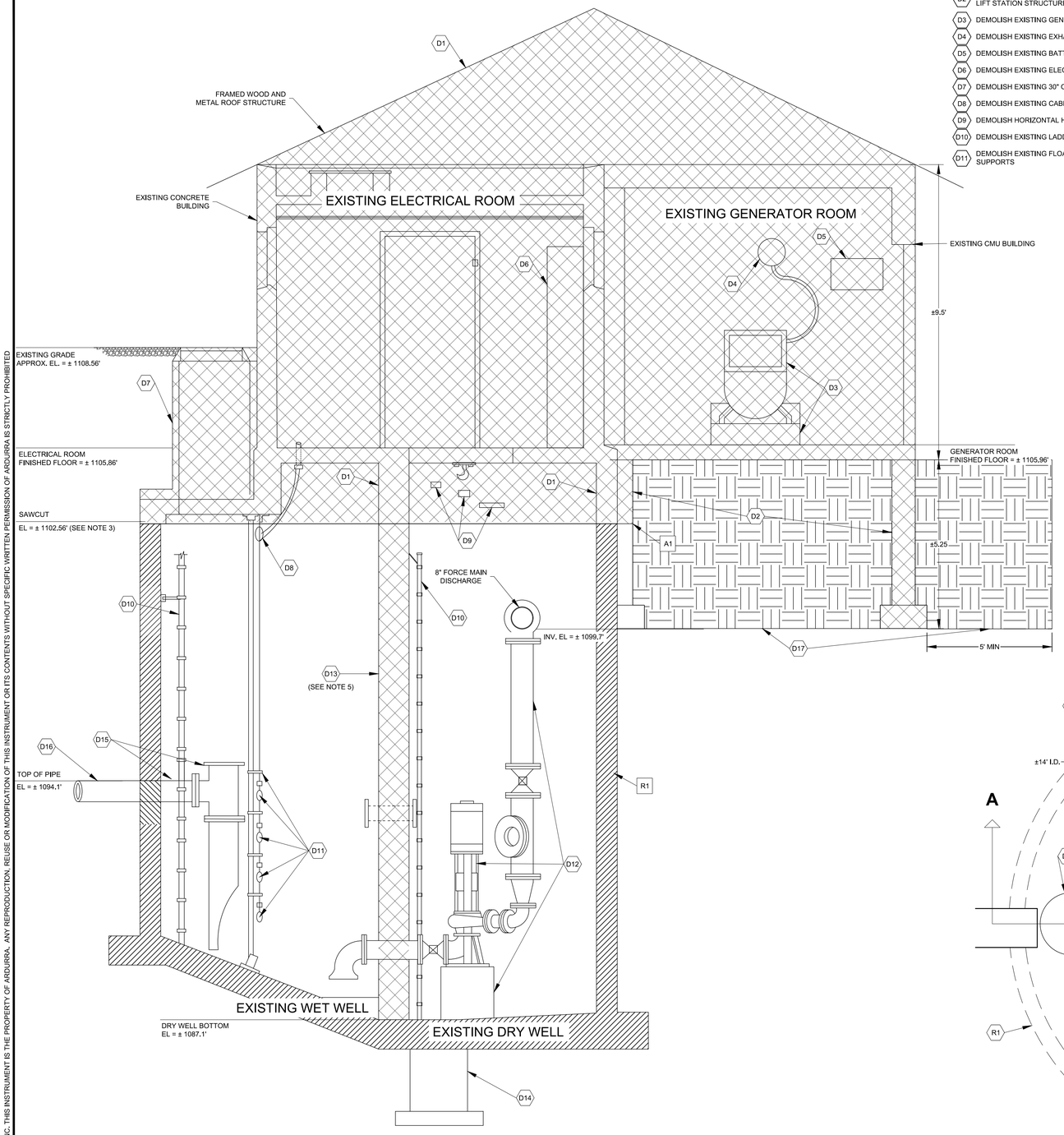
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DEMOLITION NOTES:

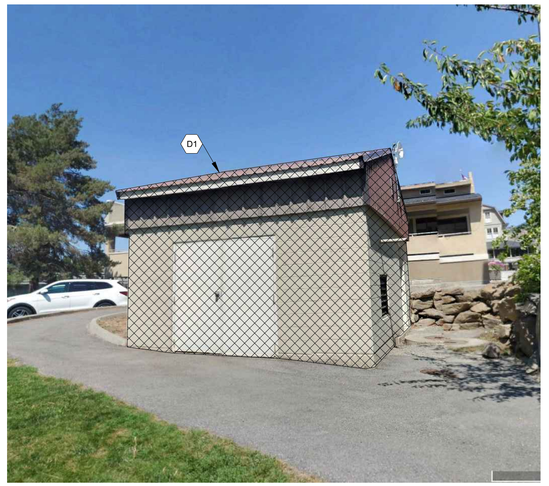
- D1 DEMOLISH EXISTING BUILDING STRUCTURE AND UPPER PORTION OF EXISTING 14' DIA. STRUCTURE, (SEE NOTE 3)
- D2 DEMOLISH EXISTING CMU BUILDING FOUNDATION. EXISTING LIFT STATION STRUCTURE TO REMAIN AND BE PROTECTED
- D3 DEMOLISH EXISTING GENERATOR AND GENERATOR PAD
- D4 DEMOLISH EXISTING EXHAUST VENTING
- D5 DEMOLISH EXISTING BATTERY CHARGER
- D6 DEMOLISH EXISTING ELECTRICAL EQUIPMENT
- D7 DEMOLISH EXISTING 30" CONCRETE TILE MANHOLE RISER
- D8 DEMOLISH EXISTING CABLE HOLDER
- D9 DEMOLISH HORIZONTAL HANGERS, (TYP.)
- D10 DEMOLISH EXISTING LADDER & MOUNTING BRACKETS.
- D11 DEMOLISH EXISTING FLOATS, VERTICAL PIPING, AND PIPE SUPPORTS
- D12 DEMOLISH EXISTING DISCHARGE PIPING, PUMP, CONCRETE SUPPORT, AND APPURTENANCES, (TYP, X3)
- D13 DEMOLISH EXISTING CONCRETE DIVIDER WALL AND ENCASED PIPING, (SEE NOTE 5)
- D14 REMOVE EXISTING SUMP PUMP AND APPURTENANCES, COMPLETELY FILL SUMP AREA WITH NON-SHRINK GROUT, AND SMOOTH GROUT TO SURROUNDING WET WELL FLOOR
- D15 REMOVE EXISTING INFLOW PIPE WITHIN THE STRUCTURE BACK TO FLUSH WITH THE INTERIOR WALL SURFACE, CAP AND FILL THE REMAINING PIPE SEGMENT WITH WATERTIGHT, NON SHRINK GROUT (OR APPROVED EQUAL) TO ENSURE A PERMANENT, LEAK FREE SEAL.
- D16 ABANDON THE EXISTING SANITARY SEWER LINE EXTENDING FROM MANHOLE A-1 TO LIFT STATION CC-1, CAP LINE AND FILL WITH WATERTIGHT, NON SHRINK GROUT (OR APPROVED EQUAL) AND ABANDON IN PLACE, REFER TO DETAIL 7 ON SHEET C705 FOR MANHOLE A-1 DEMOLITION
- D17 REMOVE SOIL BELOW EXISTING GENERATOR BUILDING FOOTPRINT (±5') TO BOTTOM-OF-FOOTING ELEVATION. STOCKPILE EXCAVATED MATERIAL AND SAMPLE IN ACCORDANCE WITH THE PROJECT SOIL AND GROUNDWATER MANAGEMENT PLAN. MANAGE, DISPOSE, OR REUSE SOIL AS SPECIFIED IN THE PLAN
- R1 PROTECT AND RETAIN +- 14' Ø CONCRETE STRUCTURE
- A1 EXISTING BUILDING FOOTING ADJACENT TO WET WELL STRUCTURE MAY BE ABANDONED IN PLACE. FINAL ELEVATION SHALL BE FLUSH WITH REMAINING WET WELL STRUCTURE ELEVATION (±1102.56)

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2. ANY RESIDUAL BOLT HOLES OR ANCHORAGE MARKING FROM REMOVED EQUIPMENT SHALL BE THOROUGHLY CLEANED, FILLED WITH A NON-SHRINK GROUT, AND SMOOTHED FLUSH TO ADJACENT SURFACES.
3. CUT ENTIRETY OF EXISTING 14' Ø STRUCTURE WITHIN $\frac{1}{4}$" OF THE PROVIDED ELEVATION. THE RESIDUAL SURFACE SHALL BE GROUND TO A SMOOTH AND FLAT SURFACE.
4. REMOVE ALL EXISTING ELECTRICAL WIRING, CONDUIT, DEVICES, AND ASSOCIATED EQUIPMENT BACK TO THE ORIGINATING PANEL SOURCE, COORDINATE WITH THE ELECTRICAL PLANS AND THE ELECTRICAL CONTRACTOR TO ENSURE SAFE DISCONNECTION AND TERMINATION AT THE PANEL.
5. SAWCUT AND REMOVE EXISTING 10" THICK CONCRETE DIVIDER WALL. REMOVE CONCRETE TO PROVIDE EVEN SURFACE AT THE WALLS AND FLOOR OF THE STRUCTURE TO REMAIN.



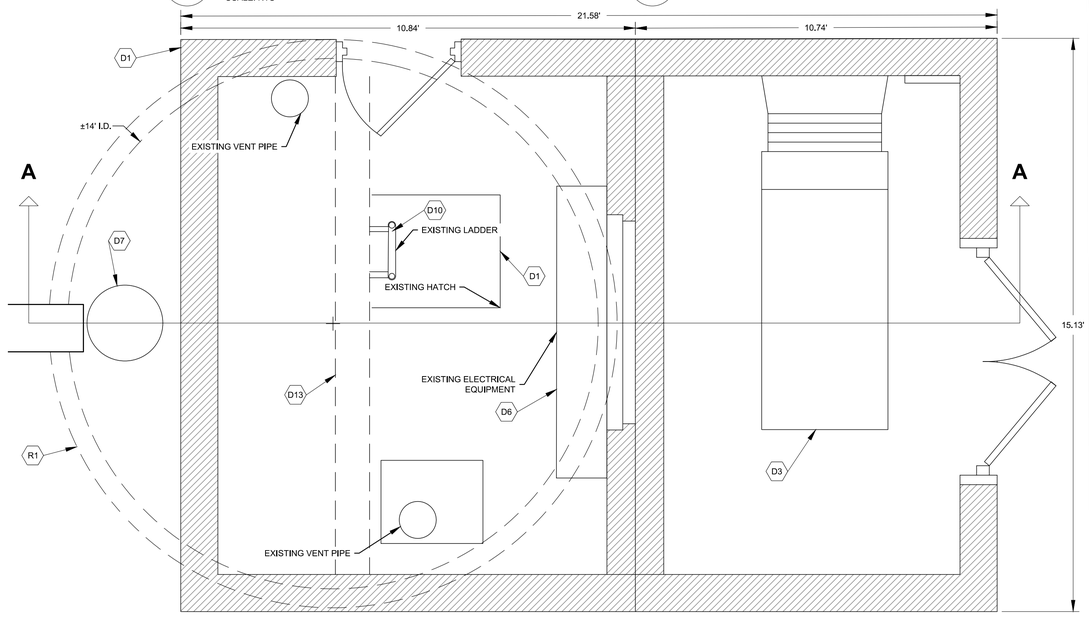
3 **EXISTING LIFT STATION SECTION VIEW A-A**
SCALE: NTS



1 **EXISTING LIFT STATION BUILDING**
SCALE: NTS



4 **EXISTING LIFT STATION DRY PIT**
SCALE: NTS



2 **EXISTING LIFT STATION PLAN VIEW**
SCALE: NTS

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JAKE CAMDON BENDER
STATE OF WASHINGTON
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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

LIFTSTATION DEMOLITION PLAN

ATTENTION:
0 1/2
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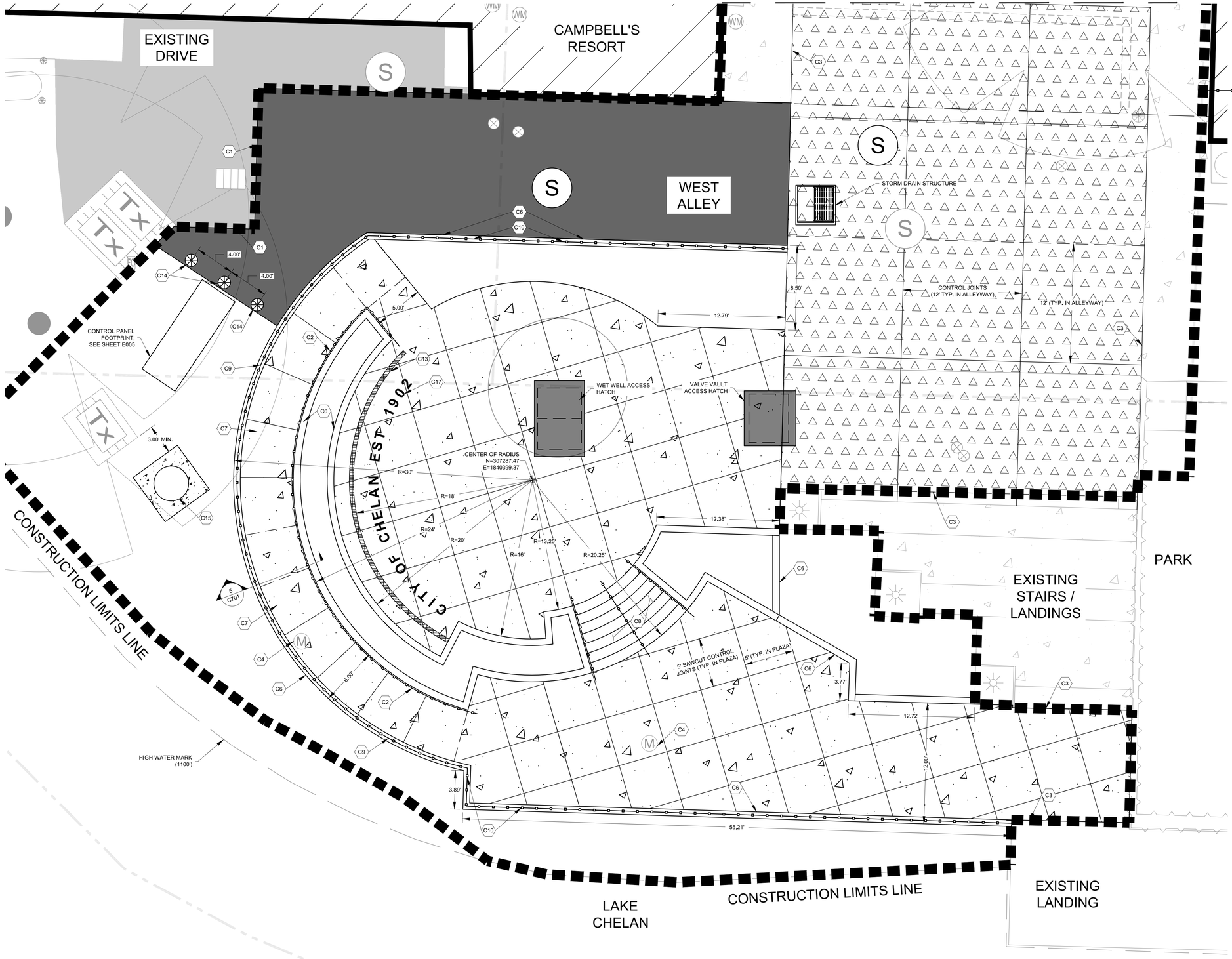
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DATE: JUNE 2026

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MATCH LINE DRAWING C101



LEGEND:

	PROPOSED RAILING
	INSTALL CONCRETE FLATWORK - 4" OVER 4" BASE COURSE, PER DETAIL 1 ON SHEET C700 (BROOMED FINISH)
	INSTALL TRAFFIC RATED CONCRETE FLATWORK - 6" OVER 4" BASE COURSE, PER DETAIL 1 ON SHEET C700 (BROOMED FINISH)
	INSTALL ASPHALT PAVING - 4" OVER 6" BASE COURSE PER DETAIL 2 ON SHEET C700

KEY NOTES:

C1	ASPHALT TO MEET AND MATCH EXISTING ASPHALT PER DETAIL 3 ON SHEET C700
C2	INSTALL HANDRAIL PER DETAIL 5/6 ON SHEET C701
C3	CONCRETE FLATWORK TO MEET AND MATCH EXISTING WALK PER DETAIL 7 ON SHEET C700
C4	INSTALL MONITORING WELL CAP IN FLATWORK/ADJUST GRADE. SEE DETAIL 1, SHEET C702 FOR MONITORING WELL SURFACE ADJUSTMENT
C5	INSTALL STANDARD VERTICAL CURB PER DETAIL 6 ON SHEET C700
C6	CONCRETE RETAINING WALL PER DETAIL 3 ON SHEET C701- SEE GRADING/ STRUCTURAL PLANS
C7	CONCRETE RAMP WITH HAND RAIL PER DETAIL 5 ON SHEET C701 - SEE GRADING PLAN AND DETAIL
C8	CONCRETE STAIRS WITH HANDRAIL PER DETAIL 7 ON SHEET C701 - SEE GRADING PLANS
C9	INSTALL GUARDRAIL/HANDRAIL PER DETAIL 4 ON SHEET C701
C10	INSTALL GUARDRAIL PER DETAIL PER DETAIL 2 ON SHEET C701
C11	INSTALL GENERATOR FENCE/SCREEN WALL PER DETAIL 7, SHEET C702
C12	INSTALL DOUBLE SWING GATES PER DETAIL 7, SHEET C702
C13	INSTALL TRENCH DRAIN AND GRATE ON RADIUS AS SPECIFIED
C14	INSTALL PERMANENT BOLLARD PER DETAIL 5 ON SHEET C702
C15	INSTALL ODOR CONTROL UNIT PER DETAIL 8 ON SHEET C704
C16	BACKUP GENERATOR, STATE FUEL TANK, AND CONCRETE GENERATOR PAD, SEE ELECTRICAL PLANS AND STRUCTURAL PLANS FOR DETAIL
C17	EMBEDDED ARCHITECTURAL SILICON BRONZE LETTERS, SEE SECTION 32 33 00,

NOTES:

1. DIMENSIONS ARE TO EDGE OF CONCRETE, ASPHALT, FACE OF WALL, OR EDGE OF JOINT UNLESS OTHERWISE NOTED.
2. CONTRACTOR SHALL PROVIDE CONCRETE FLATWORK SHOP DRAWINGS INCLUDING PROPOSED JOINT LAYOUT.
3. EXISTING UTILITY APPURTENANCES, INCLUDING MANHOLE FRAMES, VALVE BOXES, GRATES, AND JUNCTION BOXES, SHALL BE RESET TO ACHIEVE A FLUSH CONDITION WITH THE FINAL PAVEMENT OR GROUND SURFACE.

ALTERNATE #1: FULL ALLEY CONCRETE REPLACEMENT

ALTERNATIVE 1 SHALL CONSIST OF THE COMPLETE REMOVAL OF ALL EXISTING CONCRETE WITHIN THE NORTH ALLEY, FROM FACE OF BUILDING TO FACE OF BUILDING.

ALL CONCRETE WITHIN THIS AREA SHALL BE REPLACED WITH TRAFFIC RATED CONCRETE.

ALL TRAFFIC RATED CONCRETE SHALL INCORPORATE A 5' X 5' CONCRETE JOINT PATTERN CONSISTENT WITH THE CC 1 PLAZA.

CALL BEFORE YOU DIG!
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PRIOR TO COMMENCING UNDERGROUND WORK
DIAL: 811

NOTE:
THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN APPROXIMATELY ONLY PRIOR TO CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INFORM ALL UTILITY COMPANIES OF THE CONSTRUCTION SCHEDULE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MAY OCCUR BY FAILURE TO EXACTLY LOCATE AND PROTECT ALL UTILITIES.

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APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

SITE PLAN - 01

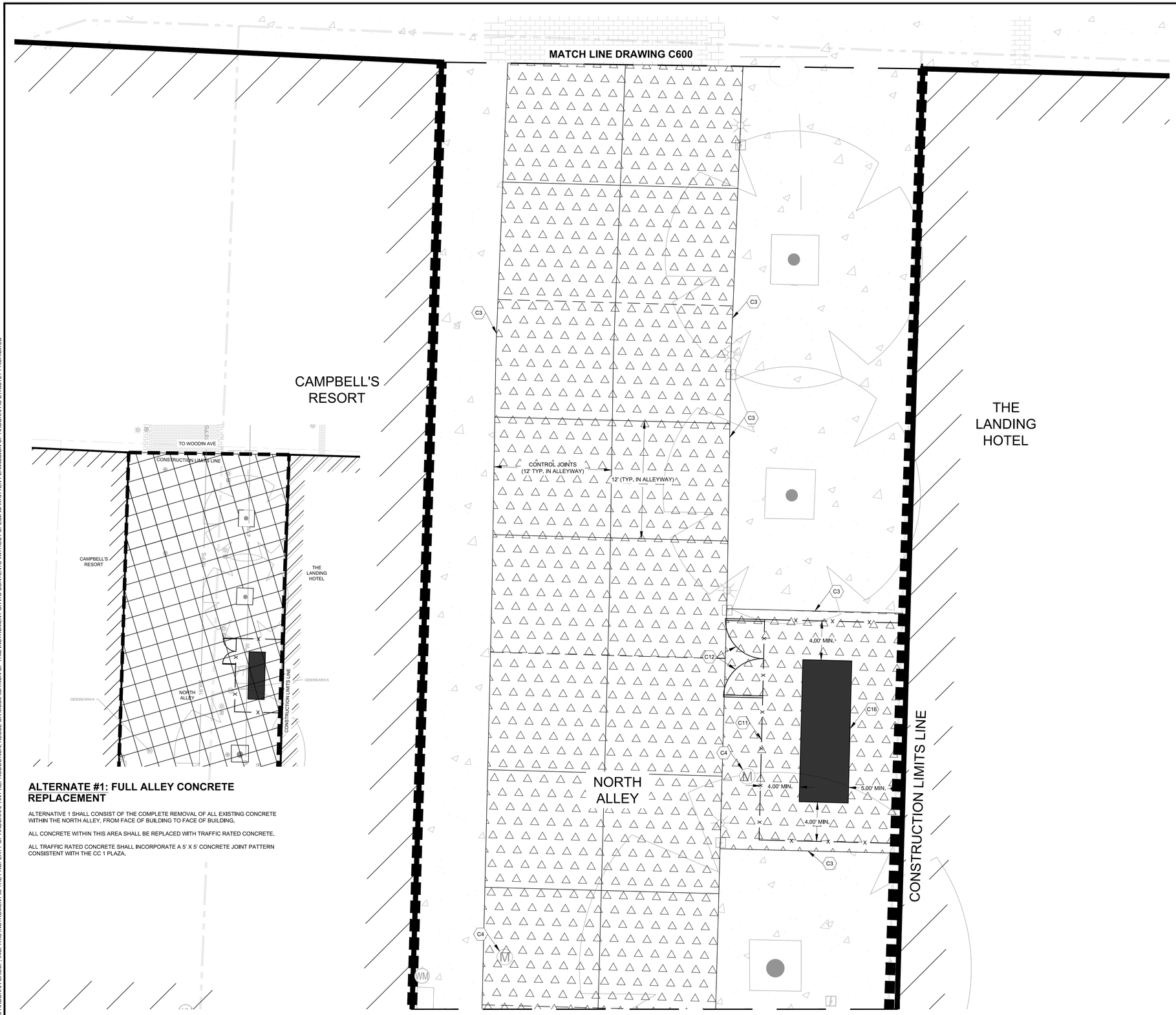
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C100

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0 2.5 5 10 15

LEGEND:

	PROPOSED RAILING
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	INSTALL TRAFFIC RATED CONCRETE FLATWORK - 6" OVER 4" BASE COURSE, PER DETAIL 1 ON SHEET C700 (BROOMED FINISH)
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C16	BACKUP GENERATOR, STATE FUEL TANK, AND CONCRETE GENERATOR PAD. SEE ELECTRICAL PLANS AND STRUCTURAL PLANS FOR DETAIL

NOTES:

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DIAL: 811

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

SITE PLAN - 02

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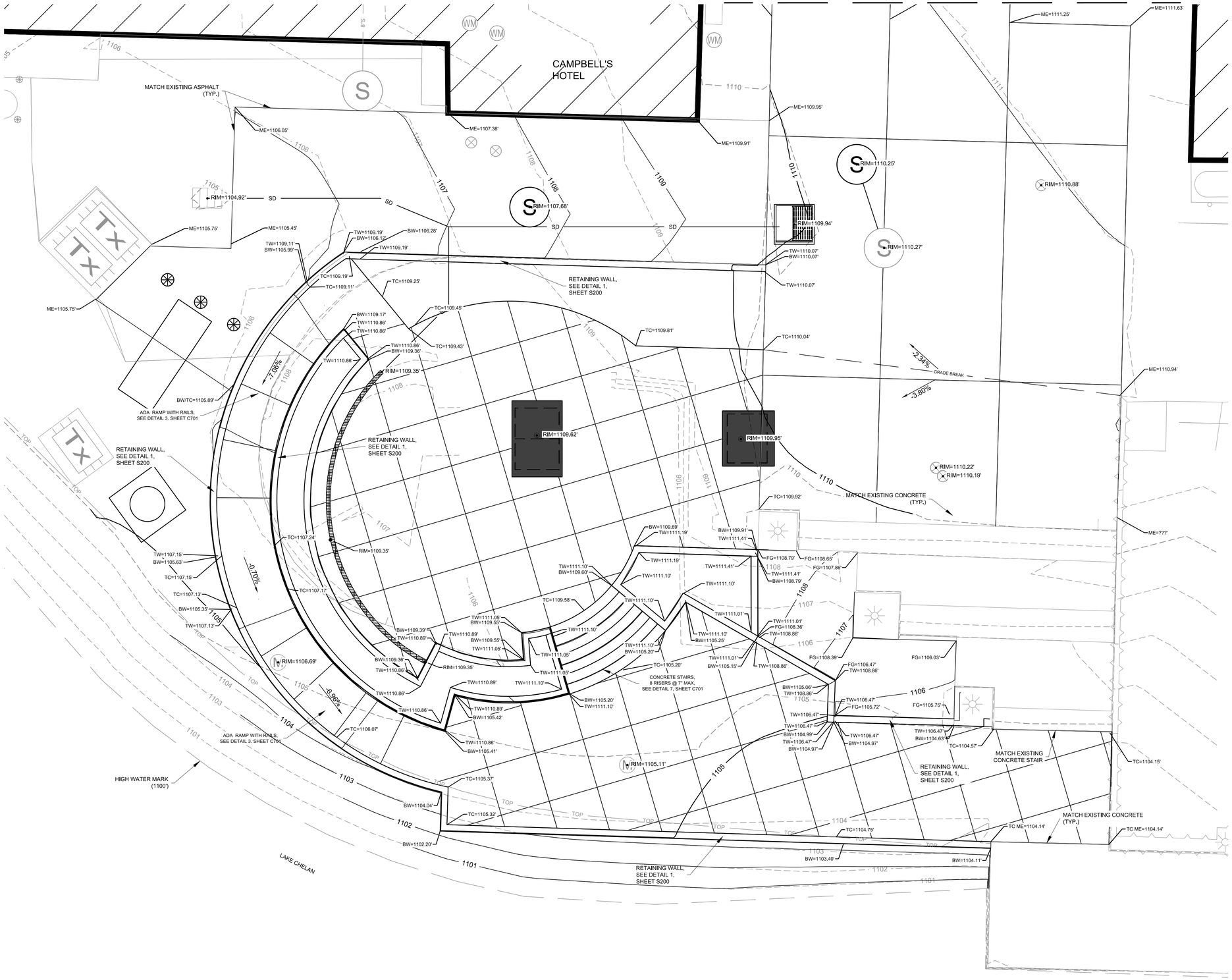
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C101

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MATCH LINE DRAWING C201



ABBREVIATIONS:

BW	BOTTOM OF WALL
TW	TOP OF WALL
TC	TOP OF CONCRETE
ME	MATCH EXISTING
FG	FINISH GRADE
RIM	RIM ELEVATION

NOTES:

1. SEE SHEET G002 FOR ADDITIONAL NOTES.
2. SITE GRADING SHALL BE COMPLETED IN CONFORMANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEERING REPORT, SPECIFICATION SECTION 023200, COMPLETED BY GEOENGINEERS.
3. CONTRACTOR SHALL HANDLE AND DISPOSE OF ON-SITE SOILS AND GROUNDWATER IN ACCORDANCE WITH THE PROJECT SOIL AND GROUNDWATER MANAGEMENT PLAN COMPLETED BY GEOENGINEERS (SECTION 026100).
4. CONTRACTOR TO COORDINATE REQUIRED TESTING AND INSPECTION WITH THE OWNER'S TESTING AGENCY AND THE CITY OF CHELAN.
5. SPOT ELEVATIONS ARE FOR FINISH GRADE UNLESS OTHERWISE NOTED.

811 CALL BEFORE YOU DIG!
CALL DIGLINE INC.
PRIOR TO COMMENCING
UNDERGROUND WORK
DIAL: 811

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

GRADING PLAN - 01

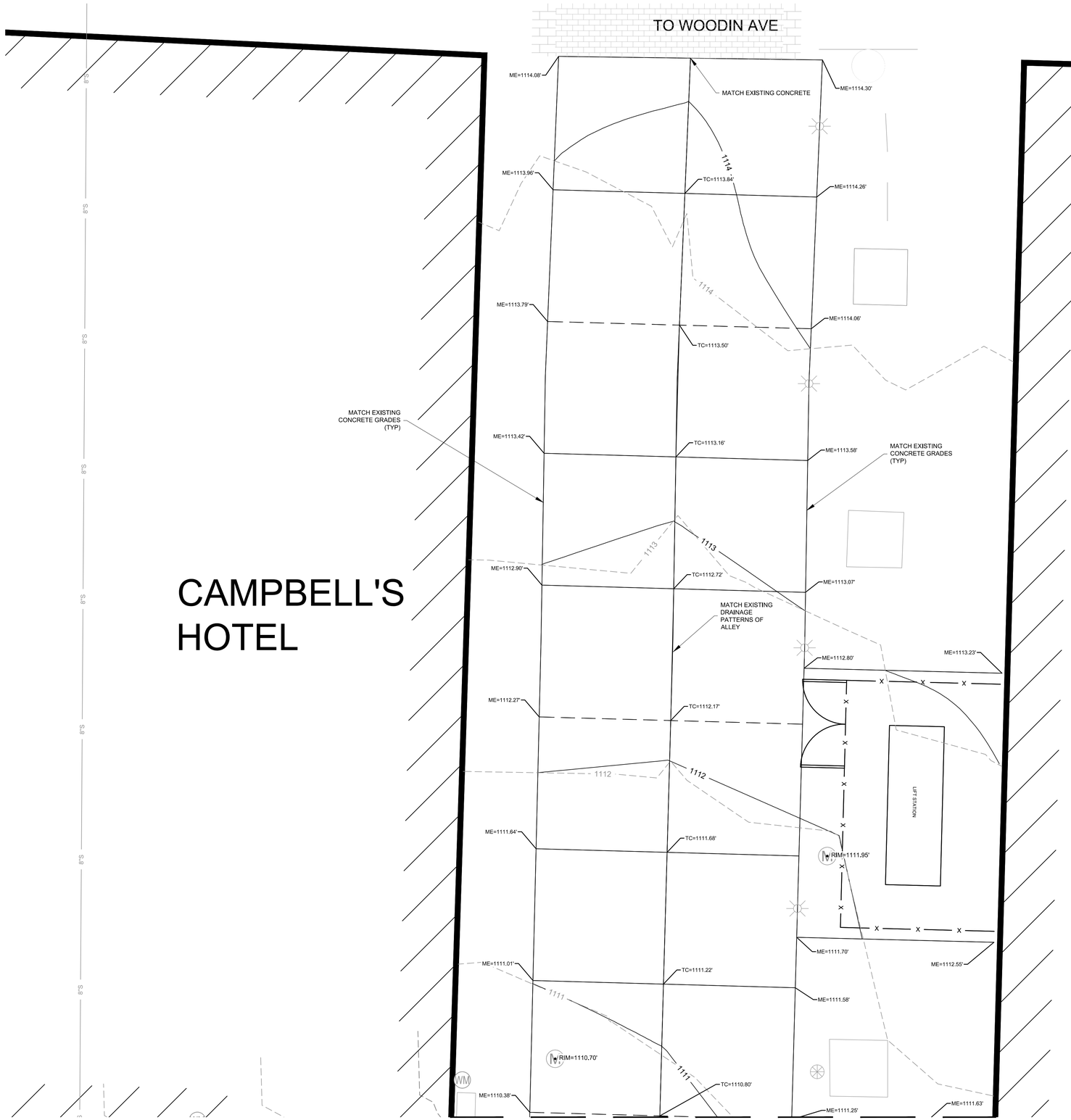
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MATCH LINE DRAWING C200

0 2.5 5 10 15

ABBREVIATIONS:

BW	BOTTOM OF WALL
TW	TOP OF WALL
TC	TOP OF CONCRETE
ME	MATCH EXISTING
FG	FINISH GRADE
RIM	RIM ELEVATION

NOTES:

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DIAL: 811

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

GRADING PLAN - 02

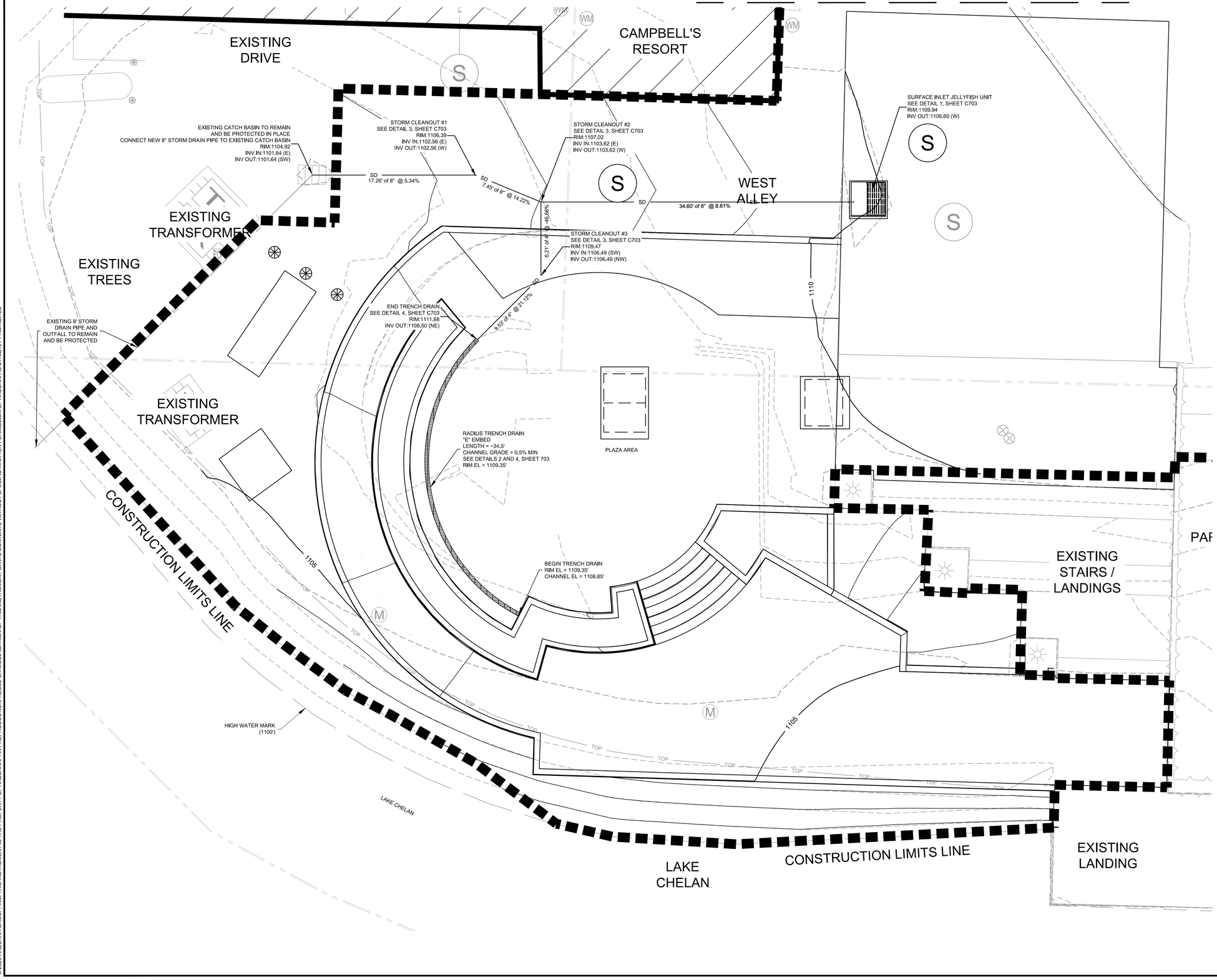
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C201

BID SET

MATCH LINE DRAWING ####



0 2.5 5 10 15

NOTES:

1. SEE SHEET G002 FOR ADDITIONAL NOTES
2. STORM PIPING SHALL BE PVC, IN ACCORDANCE WITH ASTM D3034 SDR35 OR DUCTILE IRON, AWWA C151, AS NOTED.

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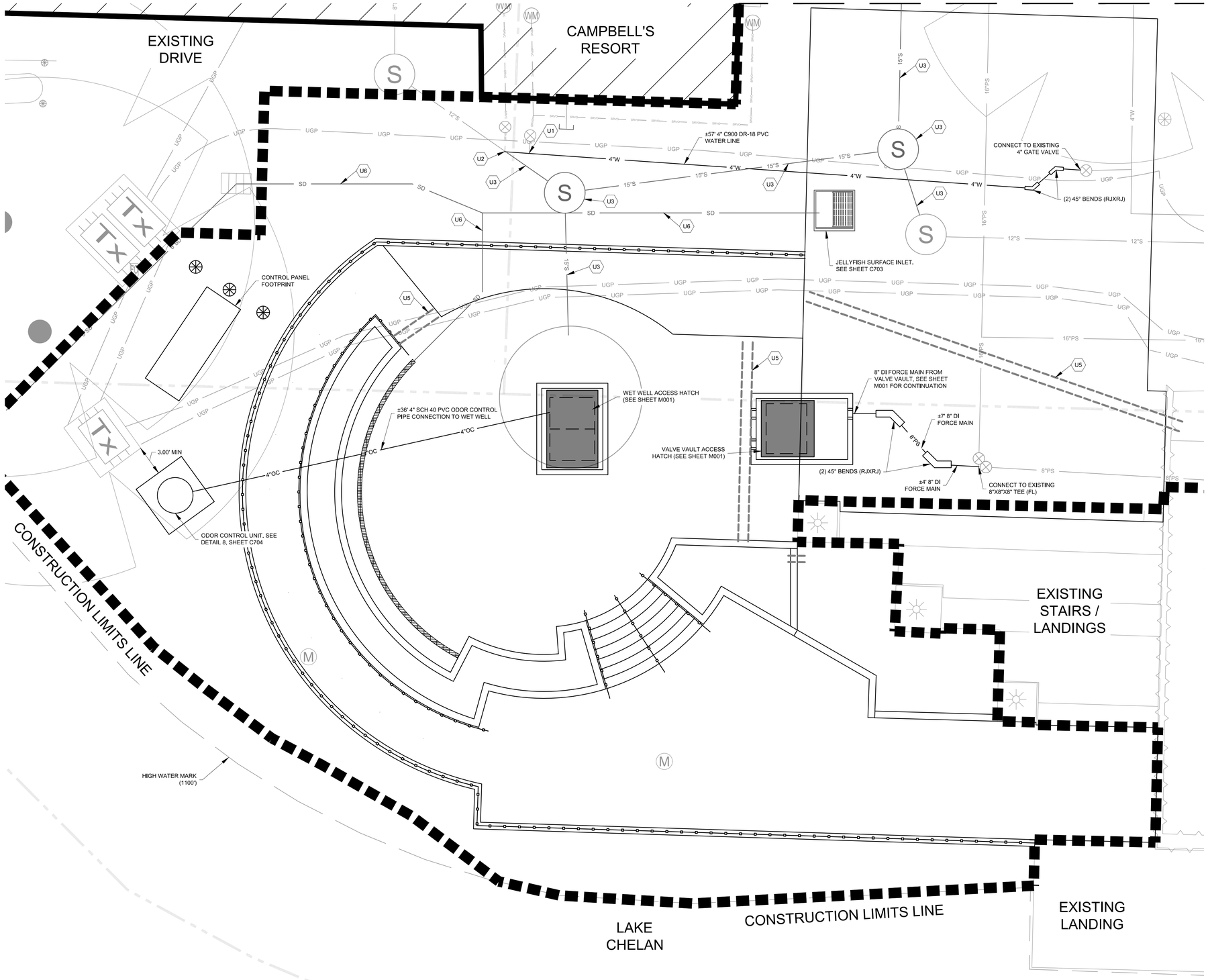
CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

DRAINAGE PLAN - 01

C300

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LEGEND:

8"PS	PROPOSED 8" DUCTILE IRON FORCE MAIN
4"W	PROPOSED 4" C900 DR-18 PVC POTABLE WATER MAIN
X"S	PROPOSED DR-35 PVC GRAVITY SEWER LINE
4"OC	PROPOSED 4" SCH, 40 PVC ODOR CONTROL PIPE
8"SD	PROPOSED 8" PVC STORM DRAIN

KEY NOTES:

U1	CONNECT NEW 4" WATER MAIN TO EXISTING 4" FIRE PROTECTION WATER
U2	CONNECT NEW 4" WATER MAIN TO EXISTING 4" DOMESTIC WATER
U3	SEE SHEET C502 FOR NEW GRAVITY SEWER LINE AND MANHOLES
U4	10" C900 PVC PIPE CASING. PIPE THROUGH CASINGS SHALL BE SUPPORTED WITH RUNNERS SPACED NO FARTHER THAN 6 FEET APART. RUNNERS SHALL BE MANUFACTURED PRODUCTS (PSI, CALPICO, OR APPROVED EQUAL). NO BLOCKS AND STRAPS. PIPELINE AND GRADE SHALL BE MAINTAINED THROGUH THE CASING. RESTRAIN PIPE AS REQUIRED. CASING ENDS SHALL BE CAPPED WITH MANUFACTURED CASING END SEALS.
U5	SEE SHEET L200 FOR IRRIGATION PVC PIPE SLEEVE
U6	SEE SHEET C300 FOR NEW STORM DRAIN

NOTES:

1. EXISTING UTILITIES AND UNDERGROUND PIPING ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. NO GUARANTEE IS MADE OR IMPLIED THAT ALL EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE LOCATION AND DEPTH OF ALL UTILITIES AND UNDERGROUND PIPING. THE CONTRACTOR SHALL CONTACT DIGILINE (811) AT LEAST 48 HOURS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND STRUCTURES NOT IDENTIFIED FOR DEMOLITION.
2. WATER LINES SHALL BE INSTALLED WITH A MINIMUM 48" OF COVER. PROVIDE MECHANICAL PIPE RESTRAINT PER DETAIL 3, ON SHEET C706. THE CITY MAY ALLOW THRUST BLOCKING PER DETAIL 1 AND 2, ON SHEET C706 AT CITY APPROVED LOCATIONS.
3. A MINIMUM SEPARATION OF 18-INCHES VERTICAL AND 10' HORIZONTAL SHALL BE MAINTAINED BETWEEN THE OUTSIDE DIAMETER OF POTABLE WATER LINES AND NON-POTABLE UTILITIES. IF A MINIMUM VERTICAL OR HORIZONTAL SEPARATION CANNOT BE ACHIEVED, THE CONTRACTOR SHALL MEET INSTALLATION REQUIREMENTS PER THE CITY OF CHELAN DEVELOPMENT STANDARDS 1-16 AND 1-17.
4. PRESSURE TESTING AND DISINFECTION REQUIREMENTS SHALL BE PER SPEC. SECTION 330505.31 AND 330110.58, RESPECTIVELY.
5. THE CONTRACTOR SHALL COORDINATE ALL WATER SYSTEM SHUTDOWNS WITH THE CITY IN ACCORDANCE WITH THE GENERAL NOTES. THE CONTRACTOR SHALL FURNISH AND MAINTAIN TEMPORARY WATER SERVICES AS NECESSARY TO COMPLETE THE WORK. ALL TEMPORARY WATER SERVICES SHALL CONFORM TO THE CITY'S DEVELOPMENT STANDARDS.

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PRIOR TO COMMENCING UNDERGROUND WORK
DIAL: 811

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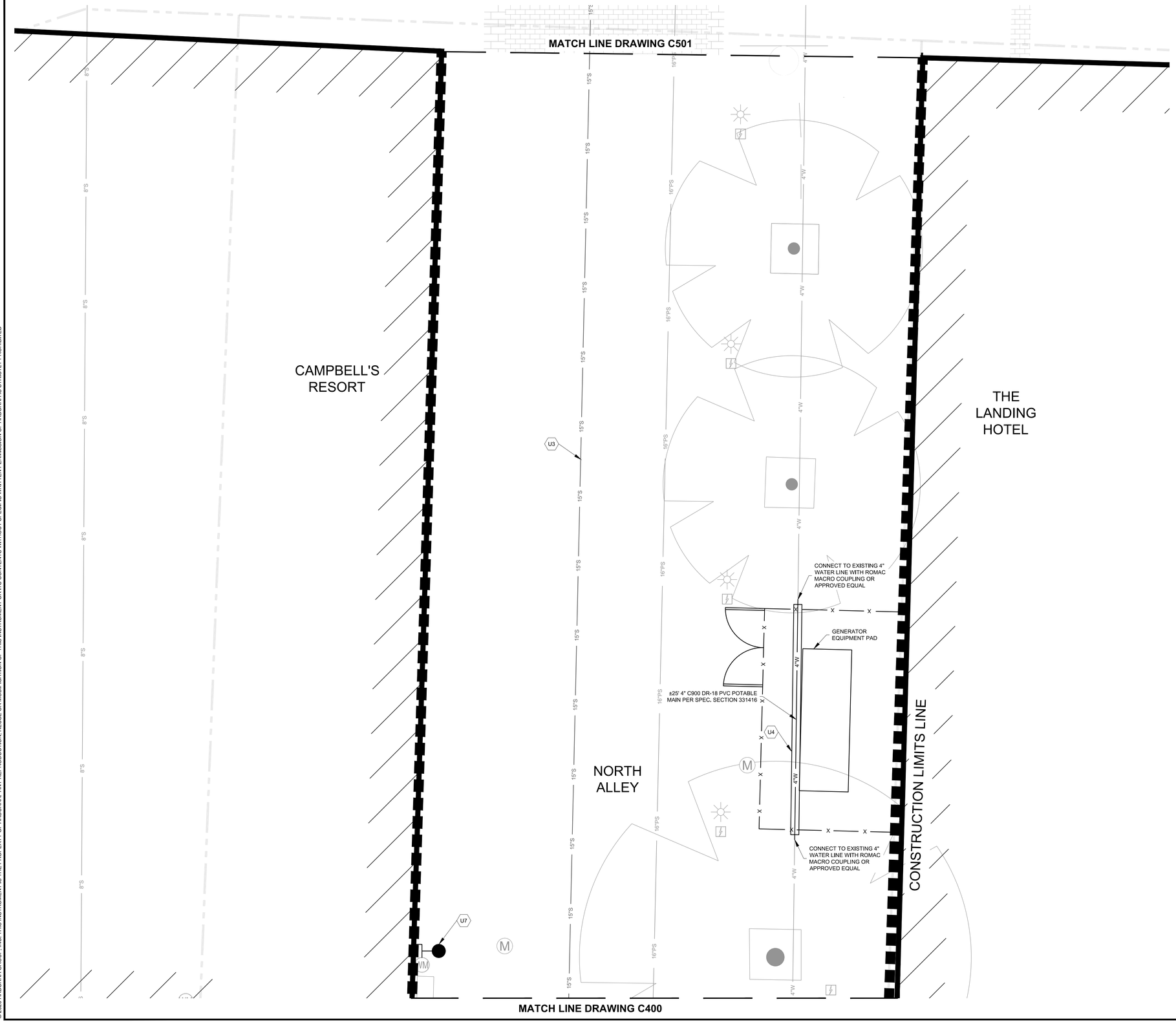
UTILITY PLAN - 01

ATTENTION:
0 1/2
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C400

BID SET



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4"W	PROPOSED 4" C900 DR-18 PVC POTABLE WATER MAIN
X"S	PROPOSED DR-35 PVC GRAVITY SEWER LINE
4"OC	PROPOSED 4" SCH, 40 PVC ODOR CONTROL PIPE
8"SD	PROPOSED 8" PVC STORM DRAIN

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U2	CONNECT NEW 4" WATER MAIN TO EXISTING 4" DOMESTIC WATER
U3	SEE SHEET C502 FOR NEW GRAVITY SEWER LINE AND MANHOLES
U4	10" C900 PVC PIPE CASING. PIPE THROUGH CASINGS SHALL BE SUPPORTED WITH RUNNERS SPACED NO FARTHER THAN 6 FEET APART. RUNNERS SHALL BE MANUFACTURED PRODUCTS (PSI, CALPICO, OR APPROVED EQUAL). NO BLOCKS AND STRAPS. PIPELINE AND GRADE SHALL BE MAINTAINED THROGUH THE CASING. RESTRAIN PIPE AS REQUIRED. CASING ENDS SHALL BE CAPPED WITH MANUFACTURED CASING END SEALS.
U5	SEE SHEET L200 FOR IRRIGATION PVC PIPE SLEEVE
U6	SEE SHEET C300 FOR NEW STORM DRAIN
U7	CONNECT NEW 3/4 INCH WATER LINE TO EXISTING WATER SERVICE LINE DOWNSTREAM OF METER AND INSTALL FROST FREE YARD HYDRANT WOODFORD FREEZELESS IOWA YARD HYDRANT MODEL Y34 OR APPROVED EQUAL). REMOVE AND REPLACE CONCRETE SURFACING AS REQUIRED FOR INSTALLATION

NOTES:

1. EXISTING UTILITIES AND UNDERGROUND PIPING ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. NO GUARANTEE IS MADE OR IMPLIED THAT ALL EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE LOCATION AND DEPTH OF ALL UTILITIES AND UNDERGROUND PIPING. THE CONTRACTOR SHALL CONTACT DIGILINE (811) AT LEAST 48 HOURS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND STRUCTURES NOT IDENTIFIED FOR DEMOLITION.
2. WATER LINES SHALL BE INSTALLED WITH A MINIMUM 48" OF COVER. PROVIDE MECHANICAL PIPE RESTRAINT PER DETAIL 3, ON SHEET C706. THE CITY MAY ALLOW THRUST BLOCKING PER DETAIL 1 AND 2, ON SHEET C706 AT CITY APPROVED LOCATIONS.
3. A MINIMUM SEPARATION OF 18-INCHES VERTICAL AND 10' HORIZONTAL SHALL BE MAINTAINED BETWEEN THE OUTSIDE DIAMETER OF POTABLE WATER LINES AND NON-POTABLE UTILITIES. IF A MINIMUM VERTICAL OR HORIZONTAL SEPARATION CANNOT BE ACHIEVED, THE CONTRACTOR SHALL MEET INSTALLATION REQUIREMENTS PER THE CITY OF CHELAN DEVELOPMENT STANDARDS 1-16 AND 1-17.
4. PRESSURE TESTING AND DISINFECTION REQUIREMENTS SHALL BE PER SPEC. SECTION 330505.31 AND 330110.58, RESPECTIVELY.
5. THE CONTRACTOR SHALL COORDINATE ALL WATER SYSTEM SHUTDOWNS WITH THE CITY IN ACCORDANCE WITH THE GENERAL NOTES. THE CONTRACTOR SHALL FURNISH AND MAINTAIN TEMPORARY WATER SERVICES AS NECESSARY TO COMPLETE THE WORK. ALL TEMPORARY WATER SERVICES SHALL CONFORM TO THE CITY'S DEVELOPMENT STANDARDS AND THE PROJECT SPECIFICATIONS.

811 CALL BEFORE YOU DIG!
WWW.WASHINGTON811.COM
PRIOR TO COMMENCING UNDERGROUND WORK
DIAL: 811

NOTE:
THE LOCATION OF EXISTING UNDERGROUND UTILITIES ARE SHOWN APPROXIMATELY ONLY PRIOR TO CONSTRUCTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INFORM ALL UTILITY COMPANIES OF THE CONSTRUCTION SCHEDULE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGE WHICH MAY OCCUR BY FAILURE TO EXACTLY LOCATE AND PROTECT ALL UTILITIES.

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

UTILITY PLAN - 02

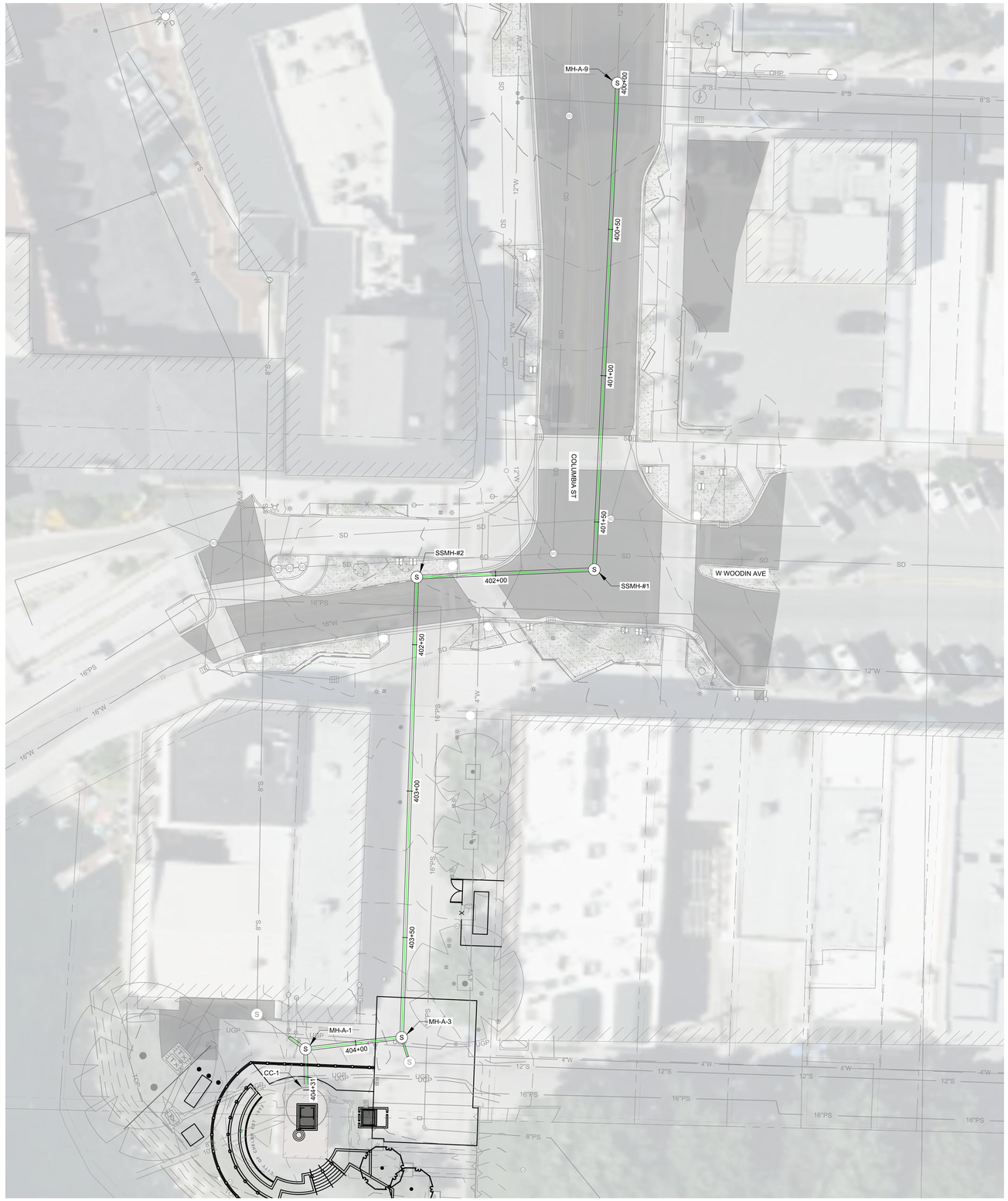
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C401

BID SET

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STRUCTURE TABLE				
STRUCTURE	NORTHING	EASTING	RIM ELEVATION	MANHOLE TYPE
CC-1	307302.91	1840401.70	1109.62	LIFT STATION WET WELL
MH-A-1	307316.90	1840401.34	1107.91	48" MANHOLE
MH-A-3	307321.18	1840434.12	1110.26	48" MANHOLE
MH-A-9	307647.70	1840504.34	1120.88	EXISTING 48" MANHOLE
SSMH-#1	307481.57	1840498.21	1116.34	48" MANHOLE
SSMH-#2	307478.34	1840437.61	1115.32	48" MANHOLE

SURVEY CONTROL TABLE				
POINT #	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	308510.57	1840474.92	1130.93'	3/8" REBAR WITH RED CAP
2	307454.10	1840449.69	1114.57'	PKS
100	307310.75	1840424.39	1109.95'	GPSF PKF MAG CDL CONTROL
101	307307.78	1840676.52	1118.50'	GPSS PKS MAG
102	307278.04	1840400.82	1105.89'	GPSS PKS MAG
103	307273.49	1840377.80	1105.52'	GPSS 60D
104	307291.29	1841649.22	1126.77'	GPSS PKS MAG

MONUMENT LEGEND

△ CONTROL POINT

NOTE:
CONTROL POINTS 1, 101, AND 104 ARE NOT SHOWN ON PLAN AS THEY ARE BEYOND THE LIMITS OF DRAWING.

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

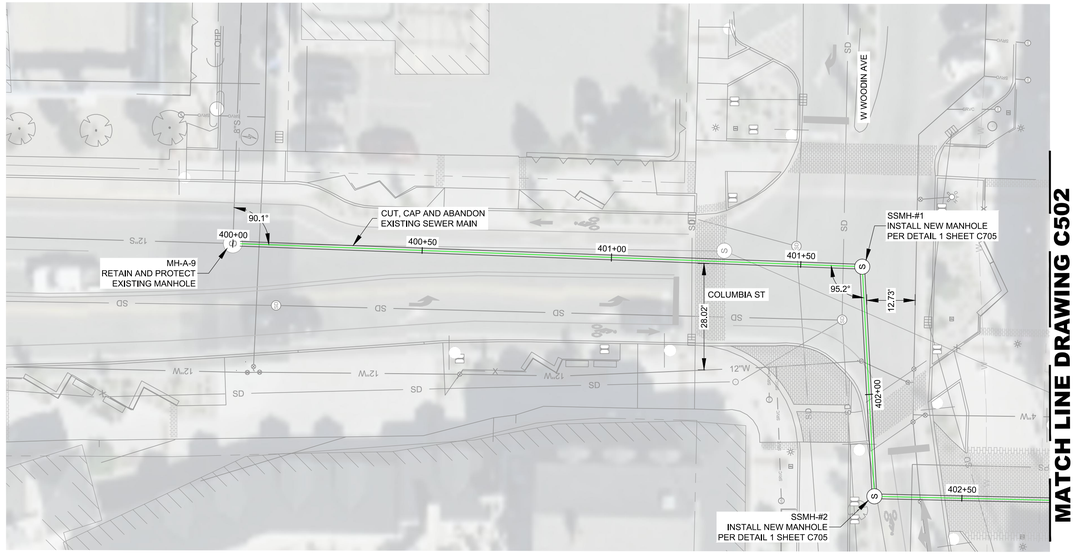
GRAVITY SEWER PLAN OVERALL

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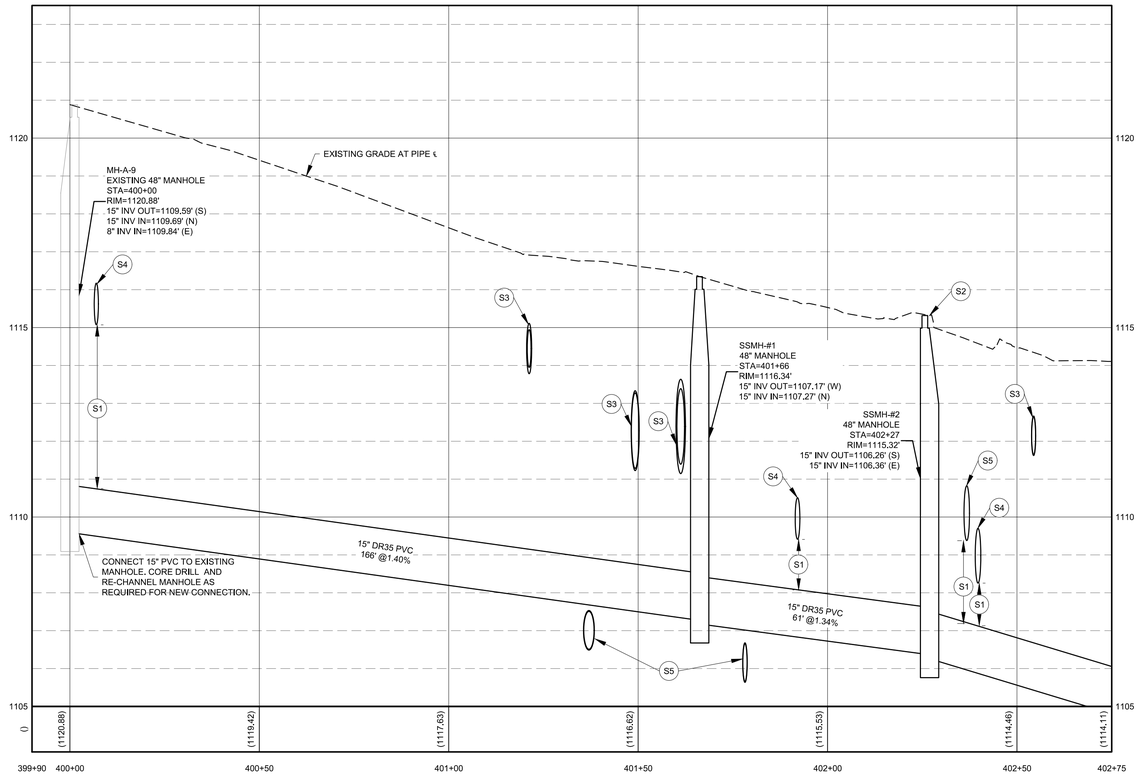
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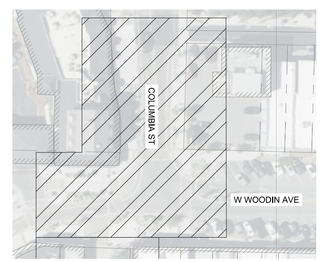
PLAN VIEW STA = 400+00 - 402+00

SCALE: HORIZONTAL 1"= 20'



PROFILE VIEW STA = 400+00 - 402+75

SCALE: HORIZONTAL 1"= 20'
SCALE: VERTICAL 1" = 2'



KEY MAP

SCALE: 1" = 75'

0 10 20 40 60

GENERAL NOTES:

1. EXISTING UTILITIES AND UNDERGROUND PIPING ARE SHOWN IN AN APPROXIMATE LOCATION ONLY. NO GUARANTEE IS MADE OR IMPLIED THAT ALL EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD-VERIFYING THE LOCATION AND DEPTH OF ALL UTILITIES AND UNDERGROUND PIPING. THE CONTRACTOR SHALL CONTACT DIGILINE (811) AT LEAST 48 HOURS PRIOR TO COMMENCING WORK. THE CONTRACTOR SHALL PROTECT ALL EXISTING UTILITIES AND STRUCTURES NOT IDENTIFIED FOR DEMOLITION.
2. EXISTING SEWER MAIN IS COMPOSED OF ASBESTOS CEMENT. CONTRACTOR SHALL DISPOSE OF EXISTING PIPE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS. PIPE SHALL NOT BE CRUSHED IN PLACE. SEE UTILITY DEMOLITION PLAN.
3. IF SPACING BETWEEN PIPES IS LESS THAN 12" INSTALL INSULFOAM GEOFOAM EPS46 OR APPROVED EQUAL, FOAM SHALL BE FITTED BETWEEN PIPES AND EXTENDED 1- FOOT PERPENDICULAR TO EITHER SIDE OF SAID PIPES AND SHALL BE INCIDENTAL TO THE PROJECT.
4. A MINIMUM SEPARATION OF 18-INCHES VERTICAL AND 10-FEET HORIZONTAL SHALL BE MAINTAINED BETWEEN THE OUTSIDE DIAMETER OF SANITARY SEWER LINES AND POTABLE WATER LINES. IF A MINIMUM VERTICAL OR HORIZONTAL SEPARATION CANNOT BE ACHIEVED, THE CONTRACTOR SHALL MEET INSTALLATION REQUIREMENTS PER THE CITY OF CHELAN DEVELOPMENT STANDARDS 1-16 AND 1-17.
5. AS BUILT INFORMATION AND CCTV FOOTAGE INDICATE THAT NO SIDE SEWER CONNECTIONS EXISTS ALONG THIS SECTION OF GRAVITY SEWER MAIN. IF ANY PREVIOUSLY UNIDENTIFIED SIDE SEWER LATERALS ARE DISCOVERED DURING REMOVAL, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY AND THE ENGINEER SO THAT A DETERMINATION CAN BE MADE REGARDING RECONNECTION OR ABANDONMENT.
6. CLEANING, FLUSHING, AND TESTING OF THE INSTALLED SEWER LINES SHALL BE PERFORMED ACCORDING TO THE PROJECT SPECIFICATIONS.

SEWER KEYNOTES

- (S1) MAINTAIN A MINIMUM OF 18" VERTICAL SEPARATION FROM WATER MAIN. SEWER MAIN SHALL BE INSTALLED TO HAVE FULL UNCUT LAY LENGTHS OF PIPE CENTERED AT CROSSING.
- (S2) 48" SANITARY SEWER MANHOLE TYPE 1 PER WSDOT STD PLAN B-15.20-01. PROVIDE CIRCULAR FRAME (RING) WITH LETTERING TO READ "SEWER" PER WSDOT STD PLAN B-30.70-04 AND REINFORCED CONCRETE COLLAR PER DETAIL ON SHEET C705.
- (S3) STORM CROSSING.
- (S4) WATER CROSSING.
- (S5) SEWER CROSSING.

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

GRAVITY SEWER PLAN AND PROFILE - 01

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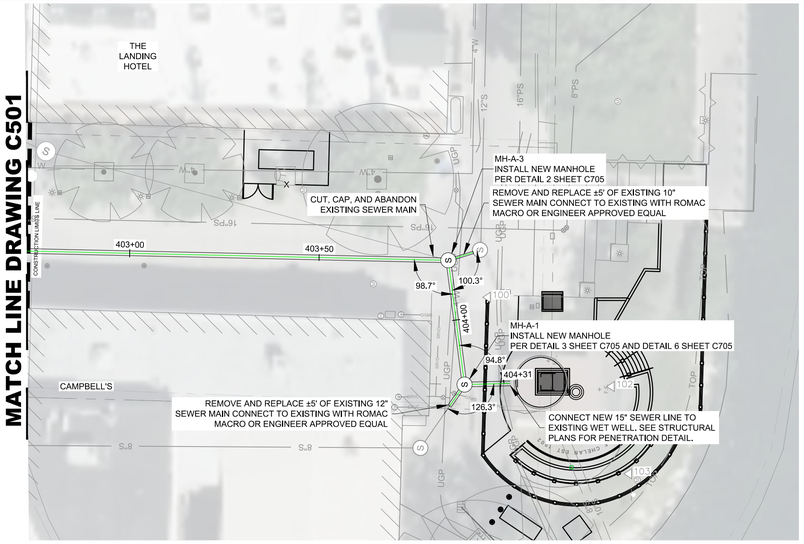
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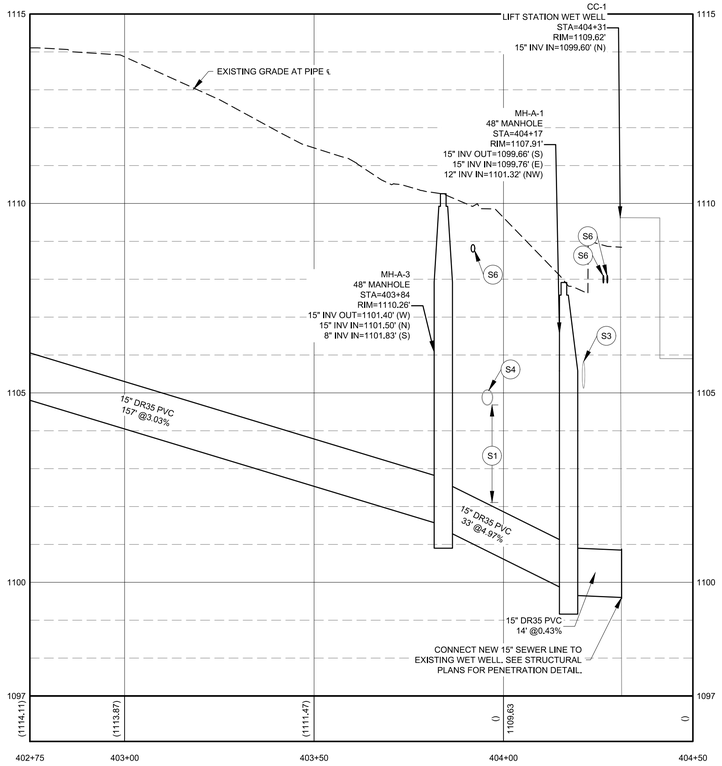
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PLAN VIEW STA = 402+75 - 404+50

SCALE: HORIZONTAL 1"= 20'



PROFILE VIEW STA = 402+75 - 404+50

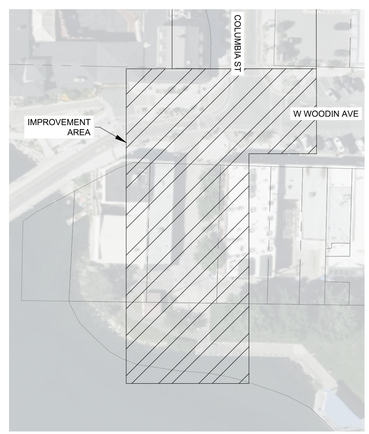
SCALE: HORIZONTAL 1"= 20'
SCALE: VERTICAL 1" = 2'

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3. IF SPACING BETWEEN PIPES IS LESS THAN 12" INSTALL INSULFOAM GEOFOAM EPS46 OR APPROVED EQUAL, FOAM SHALL BE FITTED BETWEEN PIPES AND EXTENDED 1- FOOT PERPENDICULAR TO EITHER SIDE OF SAID PIPES AND SHALL BE INCIDENTAL TO THE PROJECT.
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5. AS BUILT INFORMATION AND CCTV FOOTAGE INDICATE THAT NO SIDE SEWER CONNECTIONS EXISTS ALONG THIS SECTION OF GRAVITY SEWER MAIN. IF ANY PREVIOUSLY UNIDENTIFIED SIDE SEWER LATERALS ARE DISCOVERED DURING REMOVAL, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE CITY AND THE ENGINEER SO THAT A DETERMINATION CAN BE MADE REGARDING RECONNECTION OR ABANDONMENT.
6. CLEANING, FLUSHING, AND TESTING OF THE INSTALLED SEWER LINES SHALL BE PERFORMED ACCORDING TO THE PROJECT SPECIFICATIONS.

SEWER KEYNOTES

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- (S3) STORM CROSSING.
- (S4) WATER CROSSING.
- (S5) SEWER CROSSING.
- (S6) UNDERGROUND POWER CROSSING.



KEY MAP

SCALE:1" = 75'

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

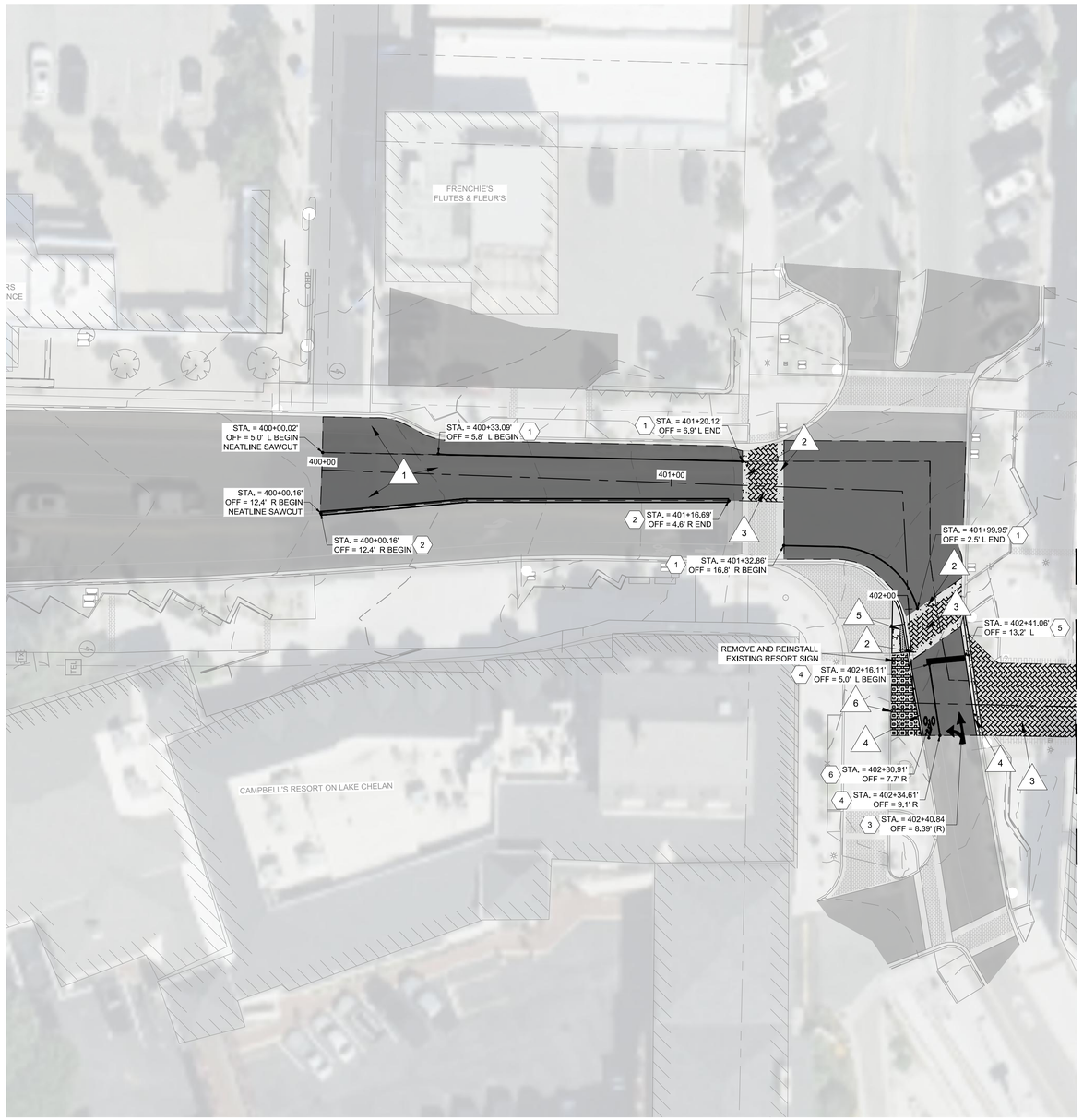
GRAVITY SEWER PLAN AND PROFILE - 02

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PLAN VIEW STA = 400+00 - 402+75

SCALE: HORIZONTAL 1"= 20'

0 10 20 40 60

GENERAL NOTES:

1. ALL WORK AND MATERIALS SHALL CONFORM TO THE CITY OF CHELAN CONSTRUCTION STANDARDS OR THE CURRENT EDITION OF THE WSDOT "STANDARDS SPECIFICATIONS FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION" WHEREIN EACH HAS JURISDICTION. IN CASE OF CONFLICT, CITY OF CHELAN STANDARDS SHALL PREVAIL.
2. REFER TO SHEET G002 FOR GENERAL NOTES.
3. PAVEMENT RESTORATION AREAS SHOWN ON THE PLANS ARE APPROXIMATE AND REPRESENT THE ANTICIPATED LIMITS REQUIRED FOR UTILITY INSTALLATION. THE ACTUAL PAVEMENT REPAIR AREAS SHALL BE DETERMINED BY THE CONTRACTOR AS NEEDED TO COMPLETE THE WORK EFFECTIVELY.
4. ALL UTILITY TRENCH AND PAVEMENT RESTORATION SHALL BE PERFORMED IN ACCORDANCE WITH THE STANDARD DETAILS PROVIDED ON SHEET #### - C704.
5. PAVEMENT JOINTS SHALL BE LOCATED AT THE CENTER OF THE TRAVELED LANE OR AT THE EDGE OF THE TRAVELED LANE ONLY. JOINTS SHALL EXTEND TO THE NEAREST EDGE OR CENTER OF THE LANE AS NEEDED TO COMPLETE THE WORK EFFECTIVELY.
6. CONTRACTOR SHALL DOCUMENT EXISTING CONDITIONS IN THE FIELD PRIOR TO BEGINNING DEMOLITION ACTIVITIES. ALL DEMOLITION WORK SHALL BE PERFORMED IN A MANNER THAT PREVENTS DAMAGE TO ADJACENT IMPROVEMENTS INTENDED TO REMAIN.
7. CONCRETE PAVEMENT, SIDEWALK, AND CURB SHALL BE REMOVED IN NEAT, VERTICAL SAWCUT EDGES OR THE NEAREST EXITING JOINT. SAWCUT LINES SHALL BE STRAIGHT, UNIFORM, AND FULL DEPTH UNLESS OTHERWISE SPECIFIED.

PAVEMENT MARKINGS KEYNOTES

1. PROVIDE 4" WHITE EDGE LINE PER WSDOT STD PLAN M-20.10-04.
2. PROVIDE DOUBLE LANE LINE PER WSDOT STD PLAN M-20.10-04.
3. PROVIDE TYPE 3SL TRAFFIC ARROW PER WSDOT STD PLAN M-24.40-02.
4. PROVIDE 4" YELLOW EDGE LINE PER WSDOT STD PLAN M-20.10-04.
5. PROVIDE STOP LINE PER WSDOT STD PLANS M-15.10-02 AND M-24.60-04.
6. PROVIDE BIKE LANE SYMBOL PER WSDOT STD PLANS M-9.50-02.

SURFACE RESTORATION KEYNOTES

1. ASPHALT ROADWAY SURFACE RESTORATION PER DETAIL 6, SHEET C704.
2. REPAIR CONCRETE CROSSWALK BAND TO MATCH EXISTING PER DETAIL 03, SHEET C702
3. REPAIR CONCRETE PAVERS, EXISTING PAVERS MAY BE STOCKPILED AND REUSED, NEW PAVERS SHALL MATCH EXISTING. SEE DETAIL 02, SHEET C702.
4. REPLACE CEMENT CONCRETE TRAFFIC CURB/CURB AND GUTTER PER WSDOT STD PLAN F-10.12-04.
5. REPLACE 4" CONCRETE SIDEWALK AND DETECTABLE WARNING SURFACE TO MATCH EXISTING.
6. REMOVE AND REPLACE EXISTING TREE (1) AND LANDSCAPE BUSHES (4), TREE SHALL BE SAME TYPE AND CALIPER AS EXISTING. SEE LANDSCAPING PLANS FOR TREE PLANTING DETAIL. REPLACE LANDSCAPING ROCKS TO MATCH EXISTING. REPAIR EXISTING IRRIGATION.

LEGEND:	
	ASPHALT PAVEMENT REPAIR
	PAVER REPAIR
	CONCRETE FLATWORK REPAIR, SIDEWALK/CROSSWALK BAND
	LANDSCAPE REPAIR AREA
	TACTILE WARNING SURFACE



SITE MAP

SCALE: 1" = 75'

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

ROADWAY SURFACE RESTORATION PLAN

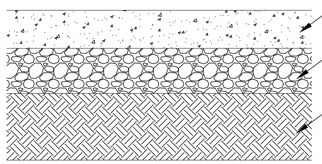
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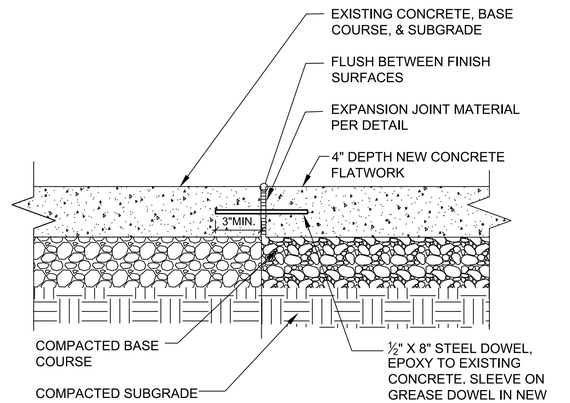
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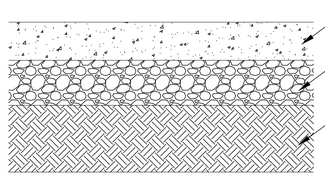


NOTES:

1. SEE SHEET C100 FOR LOCATION AND FINISH.
2. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR SLAB CONSTRUCTION INCLUDING FINAL JOINT PATTERN . ISOLATION JOINTS SHALL BE USED AT INTERFACE WITH STRUCTURES, MANHOLES, VAULT LIDS, ETC. SHOP DRAWINGS MUST BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION.
3. ISOLATION JOINTS SHALL USE A 3/8" PRE-MOLDED JOINT FILLER PER SEC 9-04.1(2). JOINTS SHALL EXTEND THROUGH THE FULL CROSS-SECTION OF THE SLAB & CURB, WHERE APPLICABLE.
4. CONSTRUCTION JOINTS SHALL BE PROVIDED BETWEEN AREAS OF CONCRETE PLACED AT DIFFERENT TIMES.

PEDESTRIAN CONCRETE PAVEMENT N.T.S. 1

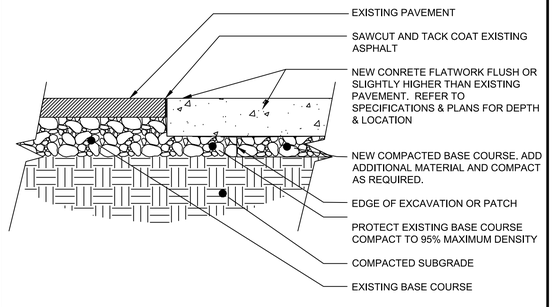


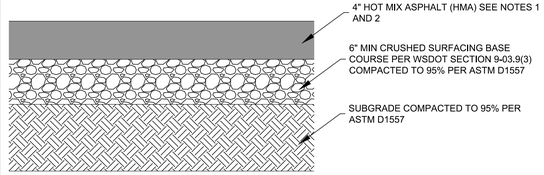


NOTES:

1. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR SLAB CONSTRUCTION INCLUDING FINAL JOINT PATTERN . ISOLATION JOINTS SHALL BE USED AT INTERFACE WITH STRUCTURES, MANHOLES, VAULT LIDS, ETC. SHOP DRAWINGS MUST BE APPROVED BY ENGINEER PRIOR TO CONSTRUCTION.
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3. CONSTRUCTION JOINTS SHALL BE PROVIDED BETWEEN AREAS OF CONCRETE PLACED AT DIFFERENT TIMES.

VEHICULAR CONCRETE PAVEMENT N.T.S. 2

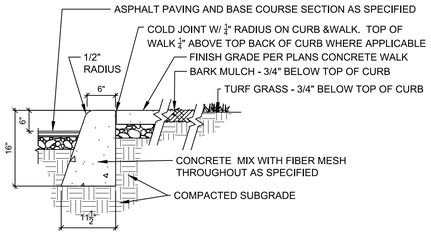




NOTES:

1. HOTMIX ASPHALT (HMA) SHALL CONFORM TO SECTION 5-04 OF THE WSDOT STANDARDS. HMA SHALL CONSIST OF 3/8 INCH MINUS NOMINAL AGGREGATE SIZE.
2. PERFORMANCE GRADED ASPHALT BINDER (PG 64-H28) SHALL COMPLY WITH AASHTO M332 TABLE 1, IN CONFORMANCE WITH WSDOT STANDARD SPECIFICATION SECTION 9-02.
3. CRUSHED SURFACING TOP COURSE SHALL CONFORM TO SECTION 9-03.9(3)OF THE WSDOT STANDARDS.

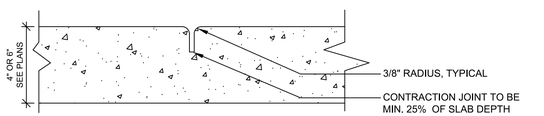
ASPHALT PAVEMENT N.T.S. 3



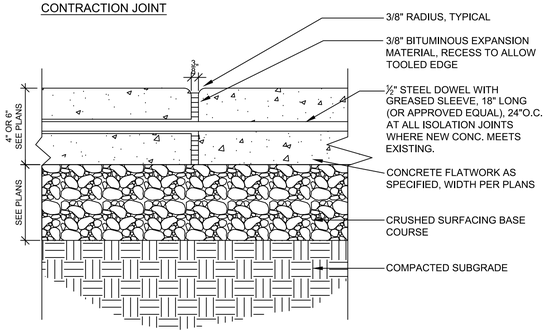
NOTES:

1. CONTRACTION JOINTS @ MAX. 10' 0.C.
2. ISOLATION & CONSTRUCTION JOINTS @ MAX. 40' 0.C.
3. PROVIDE EXPANSION JOINTS AT THE INTERSECTION OF STRAIGHT CURB & RADII.
4. ISOLATION AND CONSTRUCTION JOINTS SHALL BE PREFORMED JOINT FILLER OF ⅜" THICKNESS.
5. CONTRACTION JOINTS SHALL BE MINIMUM ⅛" WIDE, 1½" DEEP, AND ROUNDED CORNERS.

NEW CONCRETE MEETS EXISTING CONCRETE N.T.S. 4



CONTRACTION JOINT

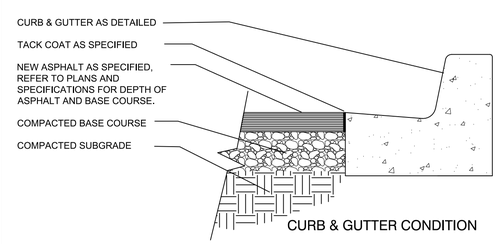


CONSTRUCTION OR ISOLATION JOINTS

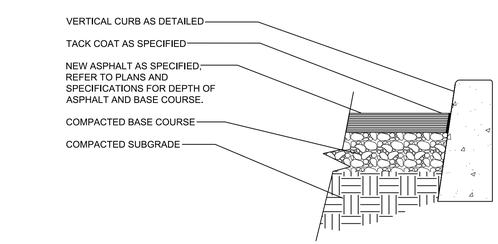
NOTE:

1. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR SLAB CONSTRUCTION INCLUDING FINAL JOINT PATTERN.
2. WHEREVER CONCRETE FLATWORK ABUTS BUILDINGS OR COLUMNS IT SHALL HAVE EXPANSION MATERIAL.
3. PROVIDE JOINTS AS SHOWN ON PLANS.

CONCRETE JOINT DETAILS N.T.S. 7



CURB & GUTTER CONDITION



CURB/EDGE CONDITION

NOTES:

1. REFER TO PLAN FOR LOCATIONS.
2. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

ASPHALT/CURB EDGE N.T.S. 8

EXISTING ASPHALT/NEW ASPHALT EDGE N.T.S. 9

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BORDER SIZE 22"x34"
DESIGNED X.XXX
DRAWN X.XXX
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APPROVED X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

CIVIL DETAILS - SITE

ATTENTION:
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BID SET

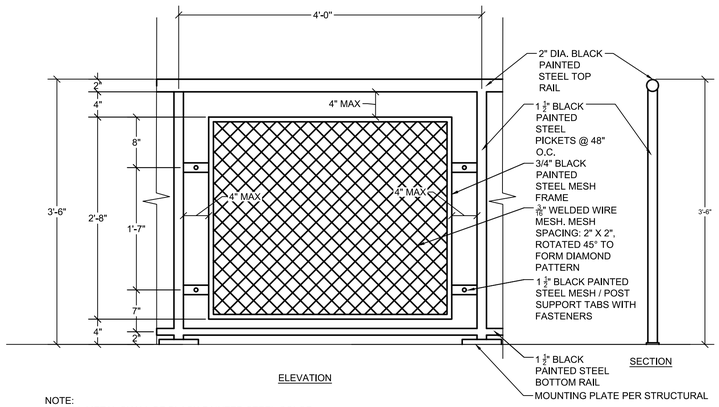






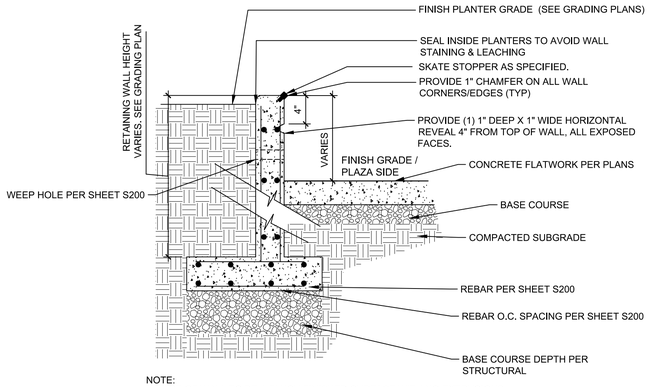
NOTES:
- MATCH EXISTING RAILS / GUARDRAILS NEARBY AT CAMBELL'S RESORT & WOODIN AVE. BRIDGE
- BLACK PAINT FINISH
- SURFACE MOUNT

GUARDRAIL/HANDRAIL - PRECEDENTS N.T.S. 1



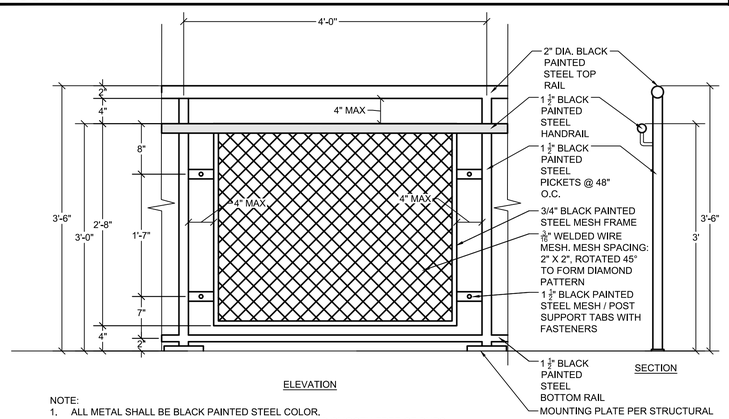
NOTE:
1. ALL METAL SHALL BE BLACK PAINTED STEEL COLOR.
2. ALL WELDS & FINISHED SURFACES SHALL BE GROUND SMOOTH FREE OF BURS.
3. CONTRACTOR TO SUBMIT SHOP DRAWING FOR APPROVAL PRIOR TO FABRICATION

GUARDRAIL N.T.S. 2



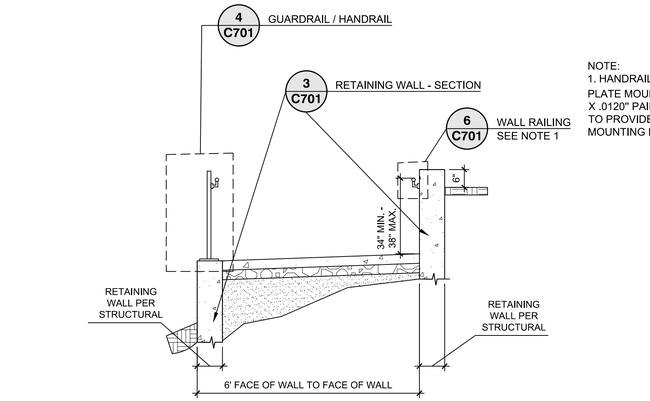
NOTE:
1. FACE OF WALL TO BE A FLUSH FINISHED SURFACE WITH NO EXTRUSIONS.
2. PROVIDE SAWCUT AND/OR TOOLED JOINT ON FACE OF WALL, TOP OF WALL AND BACK OF WALL 24" FROM CORNER OF WALL AND APPROX. 48" O.C. FOR SYMMETRY.
3. INSTALL SKATE STOPPERS AT 30" O.C. ON PLAZA SIDE OF WALL
4. SEE GRADING PLAN FOR WALL HEIGHT.

RETAINING WALL - SECTION N.T.S. 3



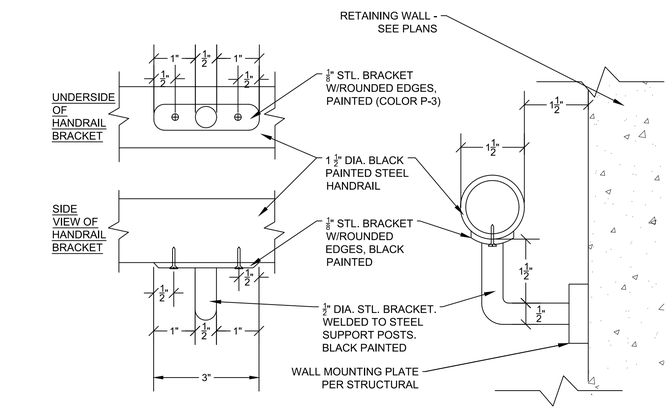
NOTE:
1. ALL METAL SHALL BE BLACK PAINTED STEEL COLOR.
2. ALL WELDS & FINISHED SURFACES SHALL BE GROUND SMOOTH FREE OF BURS.
3. CONTRACTOR TO SUBMIT SHOP DRAWING FOR APPROVAL PRIOR TO FABRICATION

GUARDRAIL/HANDRAIL N.T.S. 4

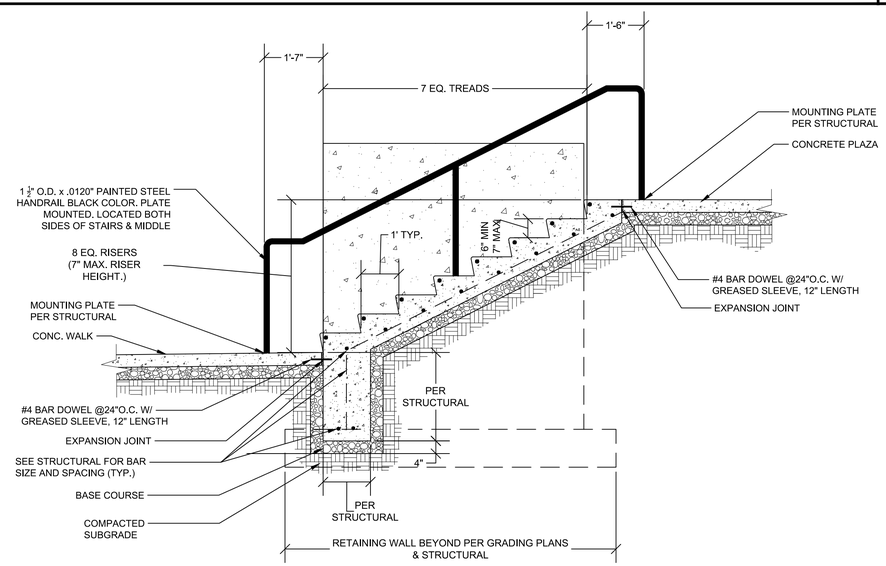


NOTE:
1. HANDRAIL SHALL BE WALL MOUNTED OR PLATE MOUNTED TO FLOOR WITH 1 ½" O.D. X .0120" PAINTED STEEL SUPPORTS 8' O.C. TO PROVIDE HANDRAIL HEIGHT OF 34"-38". MOUNTING PLATE PER STRUCTURAL.

RAMP/RAIL SECTION N.T.S. 5



WALL RAILING N.T.S. 6



CONCRETE STAIRS N.T.S. 7

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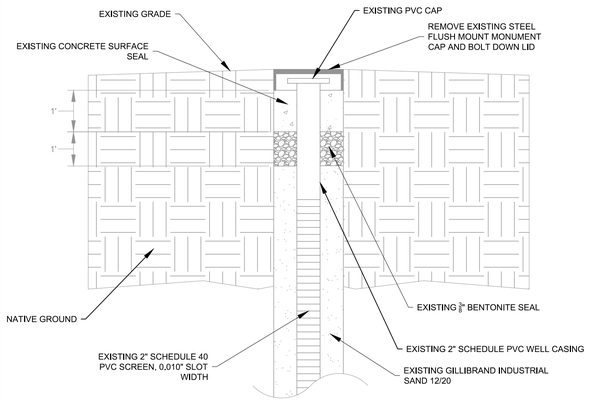
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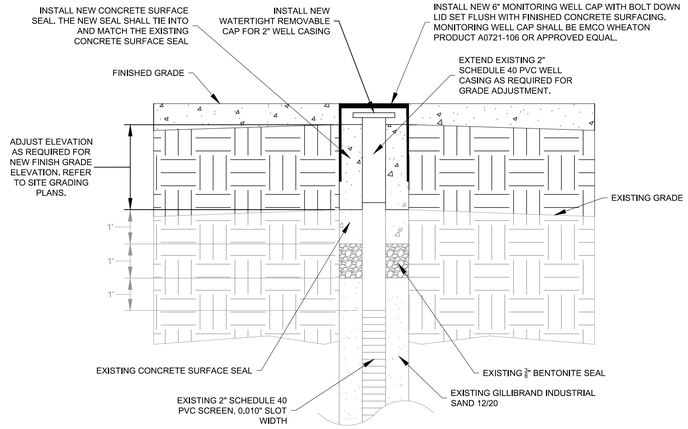
C701

BID SET

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EXISTING MONITORING WELL

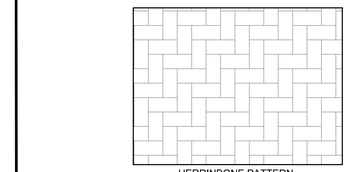


PROPOSED MONITORING WELL SURFACE ADJUSTMENT

NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING DEPARTMENT OF ECOLOGY STANDARDS FOR THE ALTERATION OF THE EXISTING MONITORING WELL PER CHAPTER 173-162 WAC INCLUDING THE FOLLOWING: THE ALTERATION OF RESOURCE PROTECTION WELLS SHALL BE DONE BY AN INDIVIDUAL LICENSED UNDER THE PROVISIONS OF CHAPTER 173-162 WAC. A NOTICE OF INTENT TO ALTER THE RESOURCE PROTECTION WELL SHALL BE FILED WITH THE DEPARTMENT OF ECOLOGY A MINIMUM OF SEVENTY-TWO HOURS PRIOR TO INITIATING WORK AND ACCOMPANYING FEE MUST BE PAID BY THE CONTRACTOR.
2. CONTRACTOR SHALL ALTER THE EXISTING MONITORING WELL BY:
   A. REMOVING THE EXISTING WELL COVER.
   B. EXTEND THE EXISTING 2 INCH SCHEDULE 40 PVC WELL CASING AS REQUIRED TO MEET THE NEW FINISH GRADE ELEVATION. REFER TO THE SITE GRADING PLANS FOR FINAL ELEVATION REQUIREMENTS.
   C. ADJUST GRADE AROUND THE WELLS PER THE GRADING PLANS.
   D. EXTEND THE CONCRETE SURFACE SEAL AS REQUIRED TO MEET THE NEW FINISH GRADE ELEVATION.
   E. INSTALL A FLUSH MOUNT STEEL WELL CAP SET FLUSH WITH THE FINISHED CONCRETE SURFACING PER THE SITE PLANS.
3. CONTRACTOR SHALL PROVIDE AN AS-BUILT SURFACE ADJUSTMENT ELEVATION, DOCUMENTING THE CHANGE IN ELEVATION BETWEEN THE EXISTING MONITORING WELL CAP RIM AND THE AS-BUILT MONITORING
4. A WELL IDENTIFICATION TAG SHALL BE PERMANENTLY ATTACHED TO NEW WELL COVER ACCORDING TO DEPARTMENT OF ECOLOGY STANDARDS.

MONITORING WELL SURFACE ADJUSTMENT — N.T.S. | 1

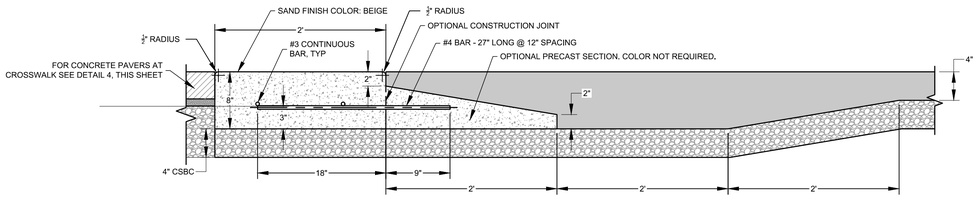


HERRINBONE PATTERN
HARVEST BLEND COLOR
(4X8)

NOTES:

1. NEW PAVERS USED IN PAVER REPAIR AREAS SHALL MATCH EXISTING PAVERS IN COLOR DIMENSION. PROVIDE PHYSICAL SAMPLE FOR APPROVAL BY CITY AND ENGINEER.
2. PAVERS SHALL BE INSTALLED IN HERRINGBONE PATTERN TO MATCH EXISTING PAVER LAYOUT.

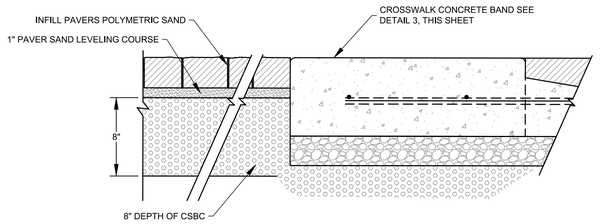
CONCRETE PAVERS — N.T.S. | 2



NOTES:

1. INSTALL CONCRETE CROSSWALK BAND TO MATCH EXISTING AS SHOWN IN THE DETAIL.
2. DOWEL NEW CROSSWALK CONCRETE BAND TO EXISTING PER DETAIL 7, SHEET ####.

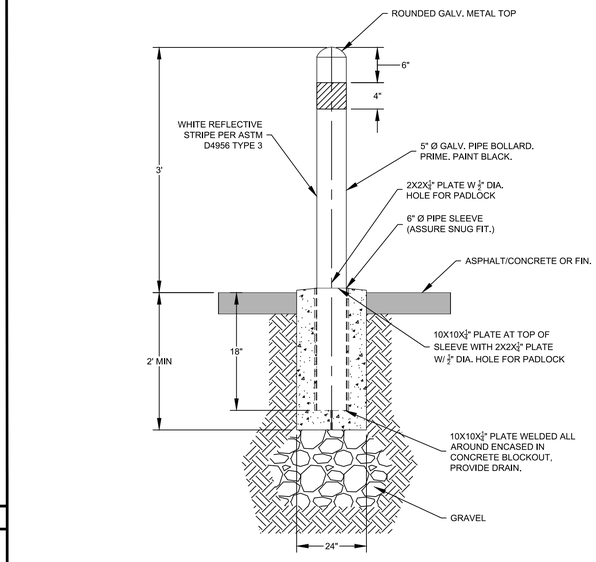
CROSSWALK CONCRETE BAND — N.T.S. | 3



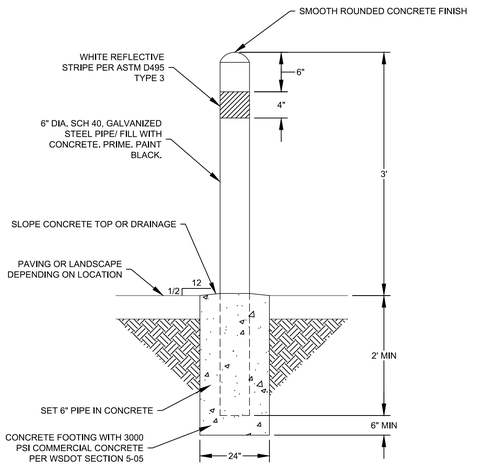
NOTES:

1. AFTER FINAL INSTALLATION OF ALL PAVERS, SEAL WITH WHITE MOUNTAIN WET LOOK OX SOLVENT BASED ACRYLIC PER MANUFACTURERS RECOMMENDATIONS.
2. EXISTING PAVERS MAY BE STOCKPILED AND REUSED, NEW PAVERS SHALL MATCH EXISTING.

CROSSWALK PAVERS — N.T.S. | 4



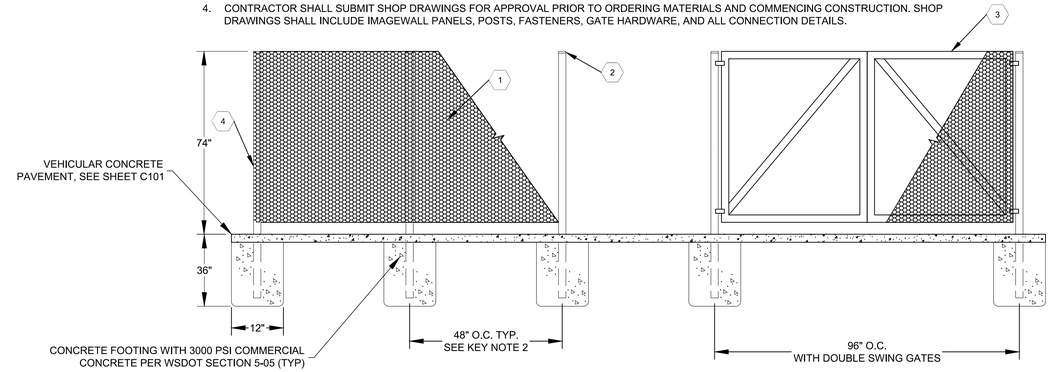
REMOVABLE BOLLARD — N.T.S. | 5



PERMANENT BOLLARD — N.T.S. | 6

NOTES:

1. CONTRACTOR SHALL PROVIDE A FULLY FUNCTIONAL GATE AND FENCE SYSTEM DESIGNED TO RESTRICT PUBLIC ACCESS TO THE GENERATOR AREA.
2. FENCE AND GATE LAYOUT SHALL BE AS SHOWN ON SHEET C101.
3. CONTRACTOR SHALL COORDINATE POSTS, GATE FRAMING, FASTENERS, AND ALL RELATED HARDWARE WITH THE IMAGEWALL PANEL MANUFACTURER TO ENSURE FULL COMPATIBILITY.
4. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR APPROVAL PRIOR TO ORDERING MATERIALS AND COMMENCING CONSTRUCTION. SHOP DRAWINGS SHALL INCLUDE IMAGEWALL PANELS, POSTS, FASTENERS, GATE HARDWARE, AND ALL CONNECTION DETAILS.



KEYNOTES:

1. SCREEN WALL / FENCE SHALL BE ZAHNER IMAGEWALL DOUBLE-RETURN SHORT-SPAN PANELS WITH CUSTOM IMAGE AND CROSS-SEAM PERFORATION, OR EQUAL. PANELS SHALL BE FABRICATED FROM 14-GAUGE STEEL WITH SOLANUM FINISH ON ONE SIDE. PANELS SHALL BE 72" TALL MINIMUM. PANELS SHALL INCLUDE 0.268" DIAMETER FASTENER HOLES AT 12" MAXIMUM O.C. ALONG VERTICAL EDGES FOR ATTACHMENT TO POSTS. IMAGEWALL PANELS SHALL BE PROVIDED ALONG THE FULL FENCE LENGTH AND AT THE DOUBLE SWING GATE. CUSTOM IMAGE WILL BE PROVIDED BY OWNER FOR COORDINATION WITH MANUFACTURER. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS PRIOR TO FABRICATION.
2. FENCE POSTS SHALL BE SQUARE STEEL TUBING, HSS 3"X3"X0.120" WALL (MIN.), ASTM A500 GR. B, FINISH SHALL BE FIELD-PAINTED BLACK. PROVIDE POST CAP TO PREVENT WATER INTRUSION. VERIFY POST SPACING WITH IMAGEWALL PANEL MODULE DIMENSIONS. SET POSTS PER PLAN.
3. DOUBLE SWING GATE PANELS SHALL BE FABRICATED FROM SQUARE STEEL TUBING, HSS 2"X2"X0.120" WALL (MIN.), ASTM A500 GR. B, FINISH SHALL BE FIELD-PAINTED BLACK. CONTRACTOR SHALL PROVIDE HINGES AND SECURING/LOCKING MECHANISM FOR GATES. GATE FRAMES SHALL BE COORDINATED WITH IMAGEWALL PANEL MODULE DIMENSIONS TO ALLOW ATTACHMENT OF IMAGEWALL SECTIONS TO GATE PANELS AND TO ENSURE SMOOTH OPENING AND OPERATION OF THE GATE.
4. CONTRACTOR SHALL SUPPLY TAMPER PROOF FASTENER HARDWARE FOR ATTACHMENT OF IMAGEWALL PANELS TO POSTS. FASTENERS SHALL BE TAMPER PROOF #10-#14 SELF-TAPPING SCREWS. PROVIDE MINIMUM 3 FULL THREADS OF ENGAGEMENT. MAINTAIN 3/4" MINIMUM EDGE DISTANCE FOR FASTENERS. FIELD-DRILL AS REQUIRED FOR PANEL ALIGNMENT.

GENERATOR FENCE / SCREEN WALL — N.T.S. | 7

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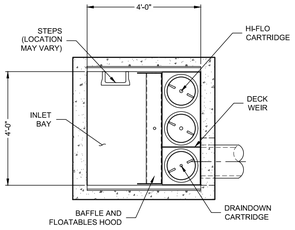
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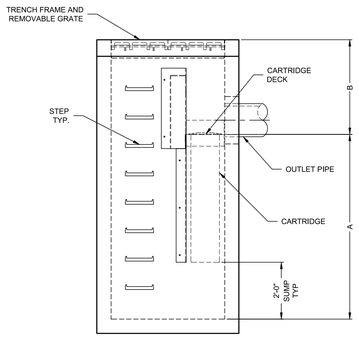
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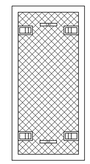
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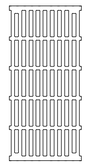


PLAN VIEW
(TOP SLAB NOT SHOWN FOR CLARITY)





24" TRENCH COVER
N.T.S.



24" TRENCH GRATE
N.T.S.

GENERAL NOTES:
1.CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2.FOR SITE SPECIFIC DRAWINGS WITH DETAILED STRUCTURE DIMENSIONS AND WEIGHT, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS REPRESENTATIVE. www.ContechES.com
3.JELLYFISH WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING. CONTRACTOR TO CONFIRM STRUCTURE MEETS REQUIREMENTS OF PROJECT.
4.STRUCTURE SHALL MEET AASHTO HS-20 OR PER APPROVING JURISDICTION REQUIREMENTS, WHICHEVER IS MORE STRINGENT, ASSUMING EARTH COVER OF 0', AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 LOAD RATING AND BE CAST WITH THE CONTECH LOGO.
5.STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND AASHTO LOAD FACTOR DESIGN METHOD.
6. OUTLET PIPE INVERT IS EQUAL TO THE CARTRIDGE DECK ELEVATION.
7. THE OUTLET PIPE DIAMETER FOR NEW INSTALLATIONS IS RECOMMENDED TO BE ONE PIPE SIZE LARGER THAN THE INLET PIPE (WHERE APPLICABLE) AT EQUAL OR GREATER SLOPE.
8. NO PRODUCT SUBSTITUTIONS SHALL BE ACCEPTED UNLESS SUBMITTED 10 DAYS PRIOR TO PROJECT BID DATE, OR AS DIRECTED BY THE ENGINEER OF RECORD.

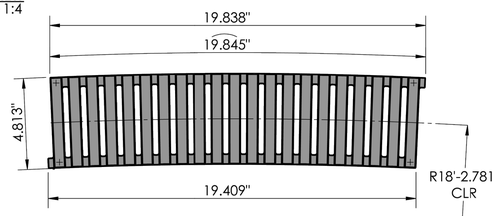
INSTALLATION NOTES
A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STRUCTURE.
C. CONTRACTOR WILL INSTALL AND LEVEL THE STRUCTURE, SEALING THE JOINTS, LINE ENTRY AND EXIT POINTS (NON-SHRINK GROUT WITH APPROVED WATERSTOP OR FLEXIBLE BOOT).
D. CARTRIDGE INSTALLATION. BY CONTECH, SHALL OCCUR ONLY AFTER SITE HAS BEEN STABILIZED AND THE JELLYFISH UNIT IS CLEAN AND FREE OF DEBRIS. CONTACT CONTECH TO COORDINATE CARTRIDGE INSTALLATION WITH SITE STABILIZATION.

JELLYFISH SURFACE INLET UNIT | SCALE: N.T.S. | 1

3 ARRAY
scale 1:7



TOP VIEW
scale 1:4



CASTING-ID
scale 1:2



SIDE VIEW
scale 1:4



ISO-VIEW
scale 1:8



Regular Joe 5" x 20" Trench Grate
18'-3" C.L.R.

NOTES:
1. ADA Compliant: No thru openings greater than ½".
2. Ships in pieces: 1
3. Due to casting inconsistencies, all dimensions are nominal.

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Telephone 206.276.0925
www.ironagegrates.com

Material:	Ductile Iron 65-45-12	**Weight:**	9.83 lbs.	**Free Drain Area:**	23.12	in/sq., or	24.47	%	**By:** MS **Checked:** MS **Date:** 2-21-22
Finish:	Raw	**Edge:**	0.8125"	**Flow Rate:**	30.29	GPM, or	.067	CuFt./sec.	**© Registration:** Pending **Scale:** NTS
Fits:	Iron Age Custom Frames SOLD SEPARATELY	**Product ID:**	RJR5-20I9918	**Drawing Name:**	01_RJoe_I_5x18'3"_TrenchGrate				Page 1

RADIUS TRENCH DRAIN GRATE | SCALE: N.T.S. | 2

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STATE OF WASHINGTON
20100361
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PROFESSIONAL ENGINEER

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SPOKANE, WA 99224
PHONE: (509)-319-2580
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NO.	DATE	REVISION	BY

BORDER SIZE 22"x34"
DESIGNED X.XXX
DRAWN X.XXX
CHECKED X. XXX
APPROVED X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

CIVIL DETAILS - DRAINAGE

ATTENTION:
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IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

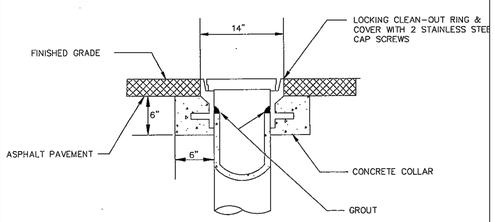
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DATE: JUNE 2026

C703

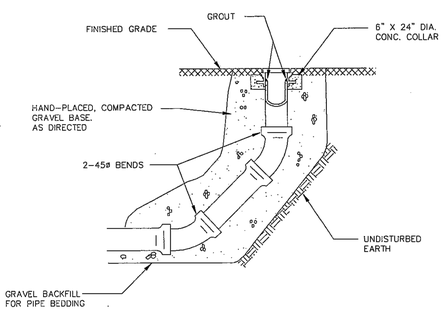
BID SET

SECTION FOUR - SEWER DESIGNS CITY OF CHELA

SANITARY SEWER CLEANOUT - 8" MIN.



STREET USE.

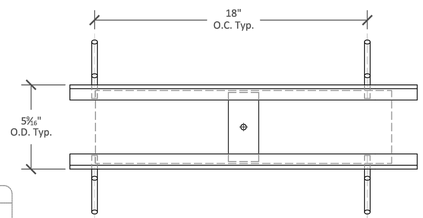


NON STREET USE

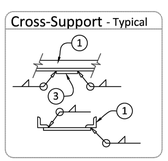
STORM CLEANOUT | SCALE: N.T.S. | 3

Domestic Steel Required?
☐ Yes ☐ No
If left blank, Steel will be chosen at the discretion of Iron Age Designs

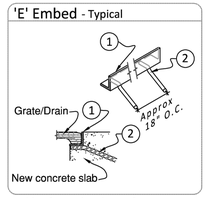
Item#	MATERIALS LIST	Qty.
1	1"x 1"x ⅛" Angle	Xx
2	⅜" Dia. Bar	Xx
3	2"x ¼" F.B. Support	Xx



Cross-Support - Typical



'E' Embed - Typical



NOTES:
1. All welds to be kept outside of grate bearing surfaces, or ground smooth.

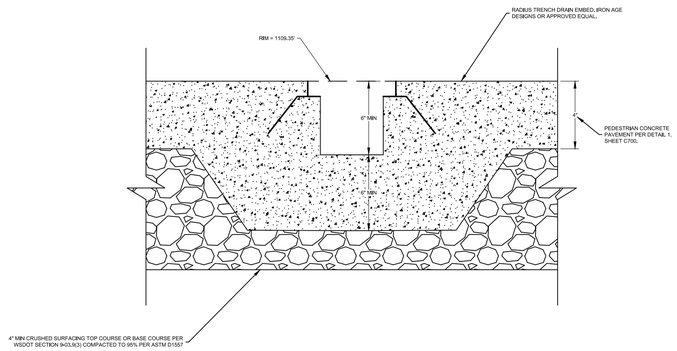
5" Trench Frame Example

Made in USA ©2025 Iron Age Designs

IRON AGE DESIGNS
Telephone 206.276.0925
www.ironagegrates.com

Material: Mild Steel A36	N/A	N/A	**By:** RJ	**Date:**	2-4-25
Finish: Raw	**Casting Thickness:** 0.813"		N/A	**Scale:**	1:5
Fits: 5"x 20" Rain Trench Grate By Iron Age	**Product ID:** N/A	**Drawing Name:** 01_FR_E_5TrenchExample			

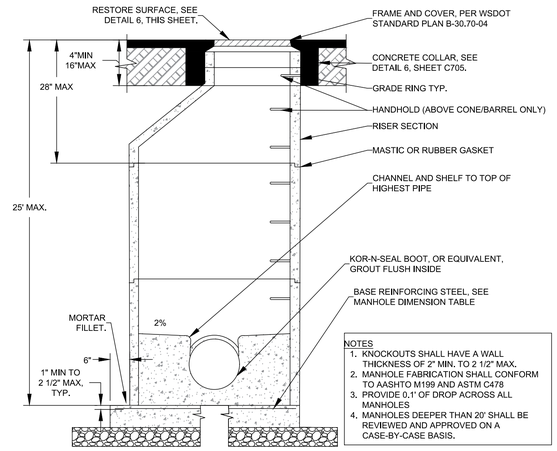
RADIUS TRENCH DRAIN FRAME | SCALE: N.T.S. | 4



NOTES:
1. TRENCH DRAIN SHALL BE IRON AGE DESIGNS REGULAR JOE 5" X 18'-3" CENTER LINE RADIUS TRENCH DRAIN OR APPROVED EQUAL. LAYOUT SHALL BE PER PER SITE, GRADING, AND DRAINAGE PLANS. TRENCH DRAIN FRAME SHALL BE CAST INTO NEW CONCRETE FLAT WORK.
2. THE TRENCH DRAIN SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
3. BOTTOM OF CONCRETE TRENCH DRAIN CHANNEL SHALL BE SLOPED AT 1.0% (0.5%) MINIMUM TOWARD OUTLET.
4. 4" OUTLET PIPE SHALL EXIT BOTTOM OF THE TRENCH DRAIN.

RADIUS TRENCH DRAIN DETAIL | SCALE: N.T.S. | 5

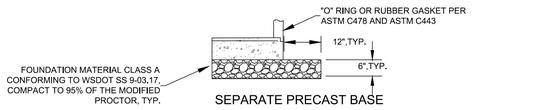
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NOTES
1. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. TO 2 1/2" MAX.
2. MANHOLE FABRICATION SHALL CONFORM TO AASHTO M199 AND ASTM C478
3. PROVIDE 0.1' OF DROP ACROSS ALL MANHOLES
4. MANHOLES DEEPER THAN 20' SHALL BE REVIEWED AND APPROVED ON A CASE-BY-CASE BASIS.

SEPARATE CAST IN PLACE BASE

PRECAST BASE WITH INTEGRAL RISER



SEPARATE PRECAST BASE

MANHOLE DIMENSION TABLE						
DIA.	MINIMUM WALL THICKNESS	MINIMUM BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS	BASE REINFORCING STEEL SQ IN/FT EACH DIRECTION	
					INTEGRAL BASE	SEPARATE BASE
48"	4"	6"	36"	8"	0.22	0.26
54"	4 1/2"	8"	42"	8"	0.22	0.26
60"	5"	8"	48"	8"	0.25	0.26

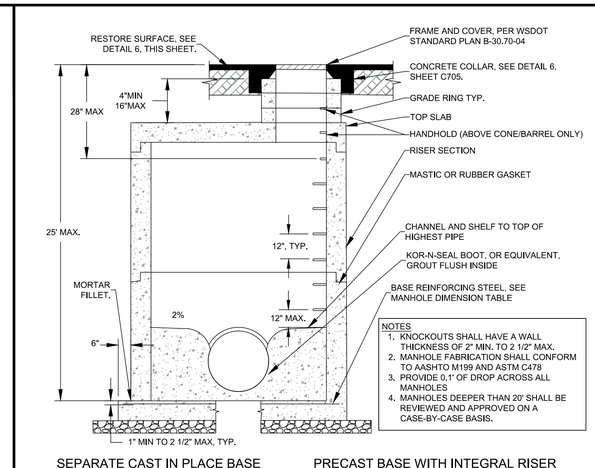
CITY OF CHELAN
135 E JOHNSON AVE.
(509) 682-4037

SEWER SYSTEM STANDARD DETAIL

MANHOLE TYPE 1

DATE: APRIL 2026 | DETAIL #: 01 | SCALE: NTS

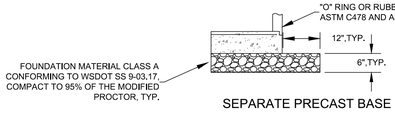
MANHOLE TYPE 1 | SCALE: N.T.S. | 1



NOTES
1. KNOCKOUTS SHALL HAVE A WALL THICKNESS OF 2" MIN. TO 2 1/2" MAX.
2. MANHOLE FABRICATION SHALL CONFORM TO AASHTO M199 AND ASTM C478
3. PROVIDE 0.1' OF DROP ACROSS ALL MANHOLES
4. MANHOLES DEEPER THAN 20' SHALL BE REVIEWED AND APPROVED ON A CASE-BY-CASE BASIS.

SEPARATE CAST IN PLACE BASE

PRECAST BASE WITH INTEGRAL RISER



SEPARATE PRECAST BASE

MANHOLE DIMENSION TABLE						
DIA.	MINIMUM WALL THICKNESS	MINIMUM BASE THICKNESS	MAXIMUM KNOCKOUT SIZE	MINIMUM DISTANCE BETWEEN KNOCKOUTS	BASE REINFORCING STEEL SQ IN/FT EACH DIRECTION	
					INTEGRAL BASE	SEPARATE BASE
48"	4"	6"	36"	8"	0.22	0.26
54"	4 1/2"	8"	42"	8"	0.22	0.26
60"	5"	8"	48"	8"	0.25	0.26
72"	6"	8"	60"	12"	0.24	0.35
96"	8"	12"	84"	12"	0.29	0.39

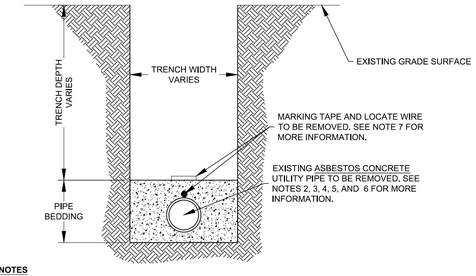
CITY OF CHELAN
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SEWER SYSTEM STANDARD DETAIL

MANHOLE TYPE 3

DATE: APRIL 2026 | DETAIL #: 02 | SCALE: NTS

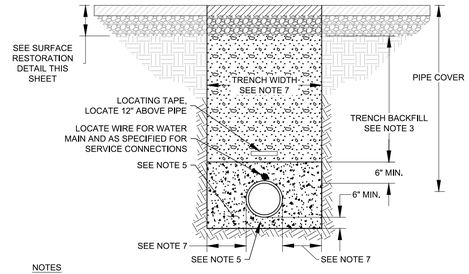
MANHOLE TYPE 2 | SCALE: N.T.S. | 2



NOTES

1. SHORE TRENCH WALLS TO MAINTAIN STABILITY OF EXCAVATION PER OSHA REQUIREMENTS.
2. ALL BURIED PIPE SCHEDULED FOR DEMOLITION SHALL BE REMOVED FROM THE GROUND IN ITS ENTIRETY. ABANDONMENT IN PLACE MAY TAKE PLACE IF REMOVAL IS NOT POSSIBLE OR WHERE SPECIFICALLY CALLED FOR ON PLANS. SEE DETAIL 5, SHEET C705 FOR ABANDONMENT REQUIREMENTS.
3. ALL DEMOLITION WORK SHALL CONFORM TO THE APPROVED DEMOLITION PLAN AND THE SPECIFICATIONS. TEMPORARY SERVICES MUST BE INSTALLED PRIOR TO DEMOLITION OF EXISTING UTILITIES.
4. DAMAGE TO PROPERTY OUTSIDE THE CONSTRUCTION LIMITS OF THE PROJECT AND/OR STRUCTURES AND MATERIAL NOT SCHEDULED FOR DEMOLITION SHALL BE PROMPTLY REPAIRED BY THE CONTRACTOR. THE COST OF REPAIRS AND ANY TIME DELAY SHALL BE AT THE CONTRACTORS SOLE EXPENSE.
5. THE DEMOLITION DRAWINGS MAY NOT LIST ALL COMPONENTS ASSOCIATED WITH A GIVEN STRUCTURE DESIGNATED FOR DEMOLITION OR REMOVAL. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL REMOVE/ DEMO ALL COMPONENTS ASSOCIATED WITH A STRUCTURE DESIGNATED FOR REMOVAL/ DEMO, INCLUDING BUT NOT LIMITED TO; EQUIPMENT, FOUNDATION, PIPING AND ELECTRICAL, ANCHOR BOLTS, FACILITY SUPPORTS ETC.
6. UNLESS OTHERWISE NOTED, ALL ITEMS INCLUDING BUT NOT LIMITED TO; PIPE AND STRUCTURES DESIGNATED FOR REMOVAL/ DEMO, EQUIPMENT, MATERIALS, DEBRIS, BIOSOLIDS, AND SOILS SHALL BECOME THE PROPERTY OF THE CONTRACTOR. ALL DISPOSAL OF MATERIALS SHALL BE DONE IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL REGULATIONS.
7. MARKING TAPE AND LOCATE WIRE SHALL BE REMOVED FROM THE GROUND IN ITS ENTIRETY.

EXISTING UTILITY DEMOLITION | SCALE: N.T.S. | 3

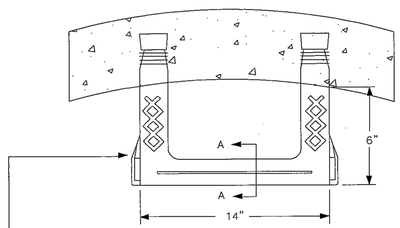


NOTES

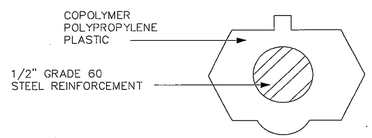
1. ALL TRENCHING AND SHORING TO BE DONE IN ACCORDANCE WITH OSHA AND WISHA STANDARDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR TRENCH SAFETY AND EXCAVATION AS SOIL CONDITIONS CHANGE IN THE FIELD.
2. PIPE BEDDING SHALL BE GRAVEL BACKFILL FOR PIPE ZONE BEDDING PER WSDOT 9-03.12(3) AND PLACED PER WSDOT 7-08.3(3) .
3. TRENCH BACKFILL SHALL BE SELECT NATIVE MATERIAL SUBJECT TO ENGINEER APPROVAL. WHERE NO SUITABLE NATIVE MATERIAL IS AVAILABLE, CONTRACTOR SHALL BACKFILL WITH BANK RUN GRAVEL PER WSDOT STD SPEC 9-03.19, ALL BACKFILL MATERIAL SHALL BE COMPACTED IN 6" MAX. LIFTS TO 95% BASED ON MAXIMUM DRY DENSITY AS DETERMINED BY MODIFIED PROCTOR TEST. UNLESS OTHERWISE DIRECTED BY THE OWNER'S GEOTECHNICAL ENGINEER BASED ON FIELD CONDITIONS.
4. CONTROLLED DENSITY FILL (CDF) ALSO KNOWN AS CONTROLLED LOW STRENGTH MATERIAL (CLSM) MAY BE USED IN LIEU OF NATIVE BACKFILL OR BANK RUN WHERE IT IS NOT PRACTICAL TO COMPACT PIPE ZONE BEDDING BACKFILL TO THE REQUIRED DENSITY. USE OF CDF AND CDF MIX DESIGN SHALL BE PRE-APPROVED BY THE ENGINEER AND CITY.
5. WHEN APPROVED FOR USED OR SPECIFICALLY CALLED FOR IN THE PLANS; CONTRACTOR SHALL ENSURE MINIMUM PIPE BEDDING AREA IS MAINTAINED WHEN POURING CDF MIX. THIS MAY INCLUDE ELEVATING PIPE WITH SUPPORT WHILE POURING CDF. MECHANICAL ANCHORS, REBAR OR SIMILAR APPARATUS SHALL BE USED TO PREVENT PIPE BUOYANCY WHEN POURING CDF.
6. WHEN APPROVED FOR USE OR SPECIFICALLY CALLED FOR IN THE PLANS; CONTROLLED LOW-STRENGTH MATERIAL DENSITY FILL (CDF) SHALL BE ALLOWED TO CURE FOR A MINIMUM OF 48 HOURS PRIOR TO BACKFILL IN AREAS SUBJECTED TO TRAFFIC, OR ADDITIVES FOR FAST CURING MIX MAY BE UTILIZED UPON APPROVAL BY THE ENGINEER AND CITY.
7. TRENCH WIDTH BELOW SUBGRADE SHALL NOT EXCEED THE FOLLOWING WIDTHS: FOR PIPES SMALLER THAN 4-INCHES, = 36-INCHES, FOR PIPES 4-INCHES AND LARGER, = PIPE O.D. + 36 INCHES WHEN NO SHORING OR SPEED SHORING IS USED. WHEN A SHORING SYSTEM IS USED = PIPE O.D. + 48 INCHES. A SHORING SYSTEM SHALL BE USED FOR ALL TRENCHES GREATER THAN FOUR FEET IN DEPTH AND LOCATED WITHIN 10-FEET OF THE VEHICLE TRAVELED WAY OR WHERE CONSTRUCTION TRAFFIC WILL BE WITHIN 10-FEET OF THE OPEN TRENCH.

TYPICAL UTILITY TRENCH | SCALE: N.T.S. | 4

Note: Embedment depth to meet manufacturer's specifications.



'MA INDUSTRIES,INC.'
1/2"GRADE 60 STEEL
REINFORCED COPOLYMER
POLYPROPYLENE PLASTIC
PS2-PF MANHOLE STEPS



SECTION A-A
N.T.S.

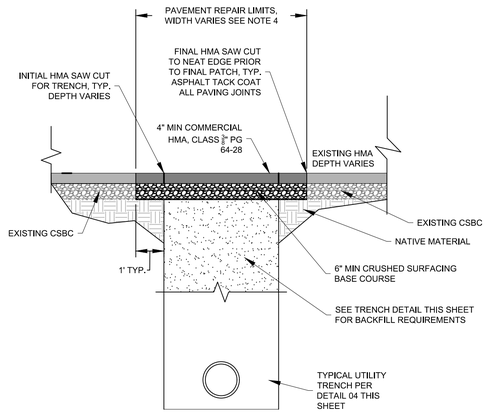
CITY OF CHELAN
135 E JOHNSON AVE.
(509) 682-4037

SEWER SYSTEM STANDARD DETAIL

TYPICAL MANHOLE STEPS

DATE: APRIL 2026 | DETAIL #: 05 | SCALE: NTS

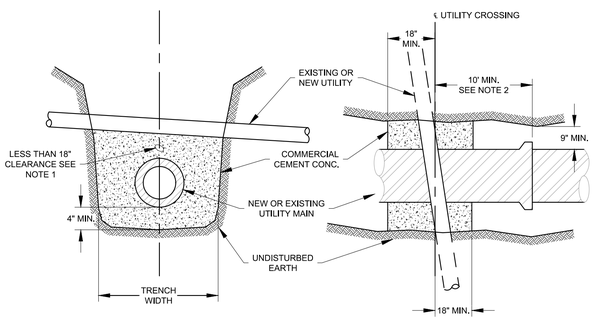
TYPICAL MANHOLE STEPS | N.T.S. | 5



NOTES:

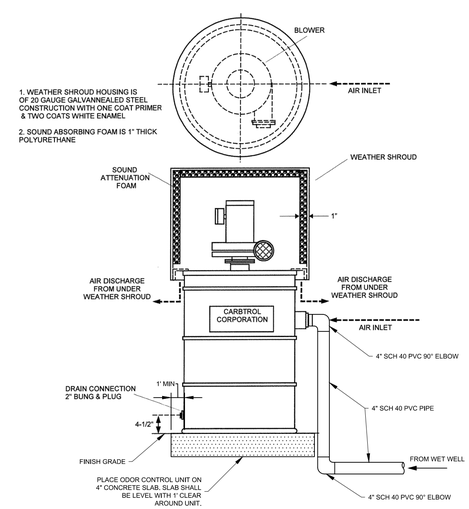
1. EXISTING HMA (HOT MIX ASPHALT), SHALL MATCH EXISTING PAVEMENT THICKNESS BUT SHALL NOT BE LESS THAN 4". CONTRACTOR SHALL FIELD VERIFY ACTUAL PAVEMENT STRUCTURE BASED ON ACTUAL FIELDCONDITIONS.
2. HMA SHALL CONFORM TO SECTION 5-04 OF THE WSDOT STANDARDS. HMA SHALL CONSIST OF 3/8 INCH INCH MINUS NOMINAL AGGREGATE SIZE, PERFORMANCE GRADED ASPHALT BINDER (PG 64-H28) SHALL COMPLY WITH AASHTO M332 TABLE 1, IN CONFORMANCE WITH WSDOT STANDARD SPECIFICATION SECTION 9-02.
3. NEW CRUSHED SURFACING BASE COURSE (CSBC) SHALL MATCH EXISTING THICKNESS BUT SHALL NOT BE LESS THAN 6". CSBC SHALL CONFORM TO SECTION 9-03.9(3). CSBC SHALL BE SHALL PLACED IN ACCORDANCE WITH WSDOT STD SPECS COMPACTION SHALL BE ACHIEVED IN 6" MAX. LIFTS TO 95% BASED ON MAXIMUM DRY DENSITY AS DETERMINED BY MODIFIED PROCTOR TEST UNLESS OTHERWISE DIRECTED BY THE OWNER'S GEOTECHNICAL ENGINEER BASED ON FIELD CONDITIONS.
4. HMA RESTORATION AREA SHALL EXTEND TO EDGE OF LANE OR CENTER OF LANE AND AS SHOWN IN THE ROADWAY SURFACE RESTORATION PLANS. NO PAVEMENT JOINT SHALL TERMINATE IN WHEELPATH. REFER TO THE ROADWAY SURFACE RESTORATION PLANS FOR APPROXIMATE EXTENTS. CONTRACTOR SHALL PROVIDE PAVEMENT REPLACEMENT EXTENTS AS NECESSARY TO COMPLETE WORK.

ASPHALT ROADWAY SURFACE RESTORATION | N.T.S. | 6



NOTES:
1. CONTRACTOR SHALL PROVIDE CONCRETE PIPE ENCASEMENT AT ALL EXISTING UTILITY CROSSINGS IN THE EVENT THAT AN 18" SEPEARATION CANNOT BE PROVIDED. THE CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE SIDE UTILITIES TO ANTICIPATE PROVIDING AND INSTALLING CONCRETE ENCASEMENTS WHERE NECESSARY. THIS SHALL ALSO APPLY AT NEW STORM DRAIN STRUCTURES NEAR EXISTING WATER MAINS.
2. CONTRACTOR SHALL NOT CONSTRUCT ANY NEW PIPE JOINT WITHIN 10 FEET OF THE EXISTING CENTERLINE OF THE UTILITY CROSSING.

CEMENT CONCRETE PIPE ENCASEMENT DETAIL | N.T.S. | 7



ODOR CONTROL DETAIL | N.T.S. | 8

JAKE CAMDON BENDER
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20100361
REGISTERED
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SPOKANE, WA 99224
PHONE: (509)-319-2580
WWW.ARDURRA.COM

NO.	DATE	REVISION	BY

BORDER SIZE 22"x34"
DESIGNED X.XXX
DRAWN X.XXX
CHECKED X. XXX
APPROVED X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

CIVIL DETAILS - SEWER

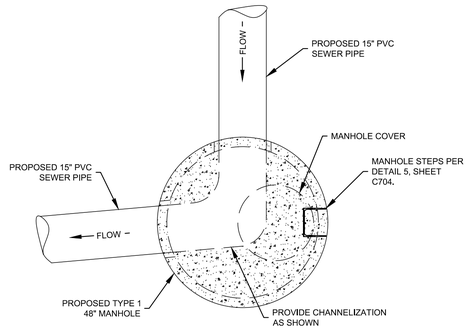
ATTENTION:
0 1/2
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

JOB NO: A-240217
DATE: JUNE 2026

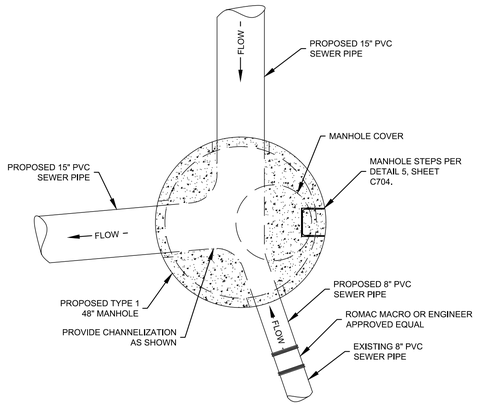
C704

BID SET

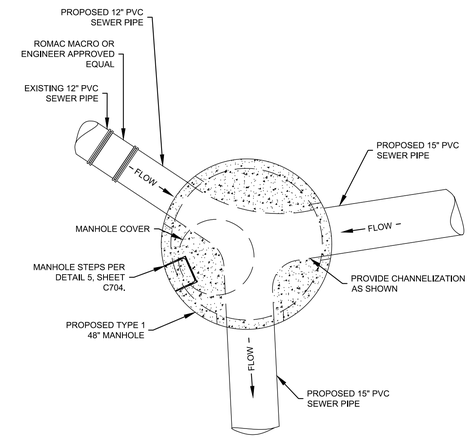
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TYPICAL 90° MANHOLE | SCALE: N.T.S. | 1



MANHOLE-A-3 | SCALE: N.T.S. | 2



EXISTING RIM = 1107.91'

MANHOLE-A-1 | SCALE: N.T.S. | 3

SEWER ABANDONMENT AND TERMINATION NOTES

CITY SHALL BE SOLE DETERMINER OF APPROPRIATE ABANDONMENT PROCEDURES AND METHODS. RESTORE ALL DISTURBED SURFACES TO ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY. RETURN ALL REMOVED FACILITIES TO THE CITY, AT THE DISCRETION OF THE CITY. UNUSABLE EQUIPMENT SHALL BE DISPOSED OF BY THE CONTRACTOR. THE FOLLOWING METHODS ARE APPROVED ABANDONMENT PROCEDURES FOR TERMINATED FACILITIES.

ABANDONED SEWERS, SIDE SEWERS, AND FORCE MAINS, ETC, SHALL BE TERMINATED AT THE FACILITY LOCATION AND AT THE MAINLINE.

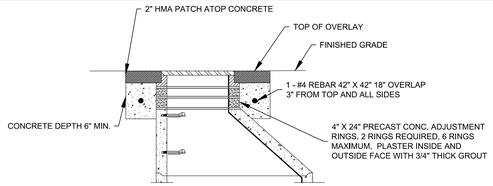
VALVES
1. REMOVE VALVES AND VALVE BOXES. PLUG OR BLIND FLANGE THE FORCE MAIN.
2. AN ALTERNATIVE METHOD OF ABANDONMENT IS ACCEPTABLE IF, AT THE DISCRETION OF THE CITY, THE VALVE CANNOT BE REMOVED, PLUG AND CLOSE THE VALVE, THEN REMOVE THE VALVE BOX.

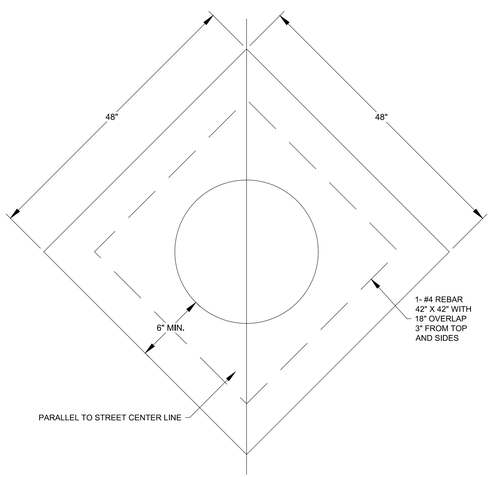
MANHOLES
1. SALVAGE MANHOLE FRAME AND COVER; RETURN TO CITY YARD.
2. PLUG ALL CONNECTIONS.
3. ABANDON PER WSDOT SS 7-05.3(2)

FORCE OR GRAVITY SEWERS
1. DRAIN AND PROPERLY DISPOSE OF WASTE WATER PRIOR TO CUTTING THE ABANDONED MAIN WHERE EXPOSED DURING CONSTRUCTION.
2. REMOVE SEWERS IN THE WAY OF NEW CONSTRUCTION. SAW CUT AND REMOVE SHORT SECTIONS OF PIPE. PIPE SHALL NOT BE FORCIBLY REMOVED WITH HEAVY EQUIPMENT DUE TO POTENTIAL DAMAGE TO SURROUNDING UTILITIES.
3. SEWER THAT WILL BE TERMINATED BUT NOT ENCOUNTERED DURING NEW TRENCHING MAY BE LEFT IN PLACE. BUT ALL VALVES AND MANHOLES MUST BE ABANDONED AS DESCRIBED UNDER "VALVES" AND "MANHOLES" RESPECTIVELY.
4. PLUG ENDS OF ALL ABANDONED SEWERS EXPOSED DURING CONSTRUCTION PER WSDOT SS 7-08.3(4).

CITY OF CHELAN 135 E JOHNSON AVE. (509) 682-4037	SEWER SYSTEM STANDARD DETAIL ABANDONMENT OF TERMINATED SANITARY SEWER FACILITIES	
	DATE: APRIL 2026	DETAIL #: 05

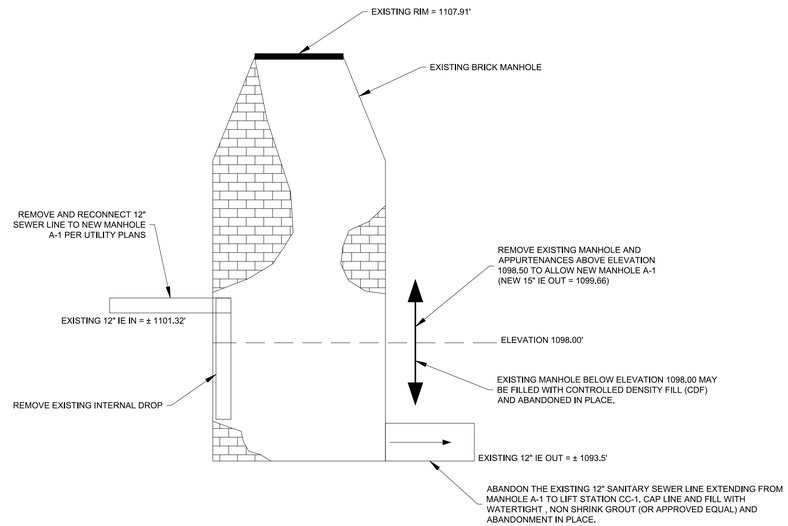
ABANDONMENT OF TERMINATED SANITARY SEWER FACILITIES | 4





CITY OF CHELAN 135 E JOHNSON AVE. (509) 682-4037	SEWER SYSTEM STANDARD DETAIL TYPICAL MANHOLE COLLAR		
	DATE: APRIL 2026	DETAIL #: 06	SCALE: NTS

TYPICAL MANHOLE COLLAR | SCALE: N.T.S. | 5



EXISTING MANHOLE A-1 DEMOLITION | SCALE: N.T.S. | 6

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

CIVIL DETAILS - SEWER

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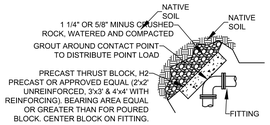
CONSTRAINTS
1. SOIL CONDITIONS AND BEARING CHARACTERISTICS ARE TO BE DETERMINED BY THE CITY.
2. THIS STANDARD DETAIL S FOR HORIZONTAL THRUST RESTRAINT ONLY.
3. CONCRETE BLOCKING SHALL BE PER DOT/APWA SPECIFICATION 7-09.3(21), CURRENT ADDITION.
4. MAINTAIN 18" MIN. GROUND COVER OVER TOP OF ALL CONCRETE BLOCKING.
5. ALL THRUST BLOCKS TO BE FORMED AND FITTINGS COVERED IN PLASTIC.
6. ANY TEMPORARY THRUST BLOCKING USED TO SUPPORT FITTINGS DURING CONSTRUCTION SHALL BE REMOVED PRIOR TO BACKFILLING.

PROCEDURE
1. DETERMINE BEARING FACTOR IN TABLE 1 CORRESPONDING TO APPROPRIATE PIPE SIZE AND TYPE OF FITTING.
2. MULTIPLY THE BEARING FACTOR TO DETERMINED IN TABLE 1 BY THE MULTIPLICATION FACTOR IN TABLE 2 FOR THE APPROPRIATE SOIL CLASSIFICATION.
3. USING TABLE 3 LOCATE THE MINIMUM DEPTH OF CONCRETE (Dmin) CORRESPONDING TO THE REQUIRED BEARING AREA.
4. USING Dmin, THE HEIGHTS AND LENGTH OF THE THRUST BLOCKING CAN BE DETERMINED FROM THE DIMENSION RELATIONSHIPS ILLUSTRATED IN FIGURE 1 AND DESCRIBED BELOW.
   - A. "H" EQUALS "D"
   - B. MAX. "L" EQUALS 2 x "H"
   - C. MIN. "L" EQUALS "H"

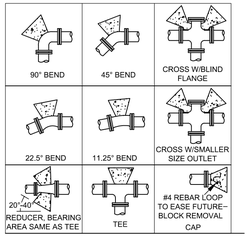
SIZE	TEST PRESSURE	TEES DEAD ENDS	90° BEND	45° BEND	22.5° BEND	11.25° BEND
3	300	2.3*	2.6	2.3*	2.3*	2.3*
4	300	2.3*	3.8	2.3*	2.3*	2.3*
6	300	5.6	7.9	4.3	2.3*	2.3*
8	300	9.6	13.6	7.4	3.8	2.3*
10	300	14.5	20.5	11.1	5.7	2.8
12	300	20.5	29.0	15.7	8.0	4.0
14	300	27.6	39.0	21.1	10.8	5.4
16	300	35.7	50.4	27.3	13.9	7.0
18	300	44.8	63.4	34.3	17.5	8.8
20	300	55.0	77.7	42.1	21.4	10.8
24	300	78.4	111.0	60.0	30.6	15.4

REQ'D BEARING AREA (SQ. FT.)	MINIMUM DEPTH Dmin
2.25 MIN. - 5.0	1.5'
5.01 - 10.0	2.3'
10.01 - 15.0	3.0'
15.01 - 30.0	4.0'
30.01 - 40.0	4.5'
40.01 - 50.0	5.0'
50.01 - 70.0	6.0'

SOIL CONDITIONS	MULTIPLICATION FACTOR
*MUSK, PEAT, etc.	-
SOFT CLAY	2.0
SILT	1.3
SAND AND SANDY SILT	1.0
SAND AND GRAVEL	0.7
SAND AND GRAVEL CEMENTED W/CLAY	0.5
HARD SHALE	0.2



PRECAST THRUST BLOCK



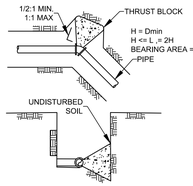
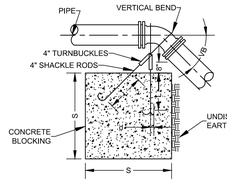
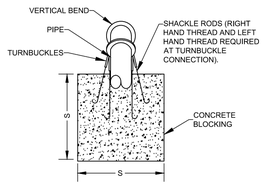


FIGURE 1

VERTICAL THRUST BLOCKING FOR 11.25°, 22.5°, AND 45° BENDS								
		VB		S	d	L		
PIPE SIZE NOM. DIAMETER - INCHES	TEST PRESSURE - PSI	VERTICAL BEND DEGREES	AMOUNT CONCRETE IN CUBIC FEET	LENGTH OF SIDE FEET	SHACKLE ROD DIA. INCHES	DEPTH OF ROD IN CONCRETE INCHES	NUMBER OF THE RODS SETS (2 - EMBEDDED RODS PER SET)	
3"	300	11.25	5.8	1.8	5/8"	12"	2	
		22.5	11.5	1.8	5/8"	12"	2	
		45	22.6	1.8	5/8"	12"	2	
4"	300	11.25	8.5	1.8	5/8"	12"	2	
		22.5	17.0	1.8	5/8"	12"	2	
		45	33.2	1.8	5/8"	12"	2	
6"	300	11.25	17.6	1.8	5/8"	12"	2	
		22.5	35.0	1.8	5/8"	12"	2	
		45	68.7	1.8	5/8"	12"	2	
8"	300	11.25	30.3	1.8	3/4"	12"	2	
		22.5	60.2	1.8	3/4"	12"	2	
		45	118	1.8	3/4"	12"	4	
10"	300	11.25	45.5	1.8	3/4"	12"	2	
		22.5	90.6	1.8	3/4"	12"	2	
		45	178	1.8	3/4"	24"	4	
12"	300	11.25	64.4	1.8	3/4"	12"	2	
		22.5	128	1.8	3/4"	12"	4	
		45	251	1.8	3/4"	12"	6	
14"	250	11.25	86.5	1.8	3/4"	12"	2	
		22.5	172	1.8	3/4"	24"	4	
		45	338	1.8	1"	24"	6	
16"	250	11.25	112	1.8	3/4"	12"	3	
		22.5	223	1.8	3/4"	12"	6	
		45	436	1.8	1"	12"	6	
18"	250	11.25	141	1.8	3/4"	24"	4	
		22.5	280	1.8	1"	24"	4	
		45	549	1.8	1 1/4	24"	6	



BLOCKING FOR VERTICAL BENDS



VERTICAL THRUST BLOCKING

NOTES:
1. RESTRAINED JOINTS ARE PREFERRED OVER VERTICAL THRUST BLOCKING UNLESS RESTRAINTS ARE NOT PRACTICAL.
2. CONCRETE SHALL HAVE A MINIMUM OF 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI.
3. TURNBUCKLES TO HAVE LOCKING NUTS OR A COTTER KEY TO PREVENT LOOSENING.

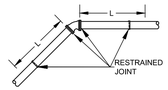
1. RESTRAINED JOINTS ARE THE CITY OF CHELAN'S PREFERRED PIPE RESTRAINT METHOD. THE FOLLOWING APPLICATIONS MUST USE SOME RESTRAINED JOINTS UNLESS IMPRACTICAL.
   - 1.1. DEAD END MAINS THAT MAY BE EXTENDED IN THE FUTURE.
   - 1.2. SOFT OR SATURATED SOILS, FITTINGS NEAR TOP OF SLOPE, OR BEARING AGAINST AN ADJACENT UTILITY.
   - 1.3. VERTICAL BENDS WITH FORCE DIRECTION UPWARDS ARE NOT COVERED HERE. MUST BE DESIGNED BY ENGINEER FOR EACH CASE.
2. MECHANICAL JOINT RESTRAINTS SHALL BE COATED WITH FUSION BONDED POLYESTER OR ZINC & EPOXY COATING. EBAA MEGABOND, ROMAC ROMABOND, FORD ARMORGUARD E-COAT, OR APPROVED EQUAL.
3. TYLER TUFGRIP RESTRAINTS ARE NOT ALLOWED. SET-SCREW STYLE RESTRAINTS ARE NOT ALLOWED.
4. THE FOLLOWING TABLES ARE BASED ON EQUATIONS FROM THE *DUCTILE IRON PIPE RESEARCH ASSOCIATION'S 2016 THRUST BLOCK AND RESTRAINT FOR DUCTILE IRON PIPE*. THE FOLLOWING CONDITIONS MUST BE MET FOR THESE RESULTS TO BE VALID. IF ANY OF THESE CONDITIONS CANNOT BE MET , PROJECT SPECIFIC CALCULATIONS MUST BE PROVIDED:
   - 4.1. THESE TABLES ONLY FOR BARE (UNWRAPPED) DUCTILE IRON OR PVC PIPE.
   - 4.2. PIPE LAYING CONDITIONS TYPE 4 or 5, DEFINED AS:
     - 4.2.1. SELECT GRANULAR BEDDING MATERIAL BELOW PIPE.
     - 4.2.2. PIPE ZONE BEDDING EXTENDING TO TOP OF PIPE MECHANICALLY
   - 4.3 PIPE RESTING DIRECTLY ON NATIVE TRENCH BOTTOM IS NOT ACCEPTABLE.
   - 4.4 SANDY SILT BEDDING, FOR IMPORT CLEAN SAND OR 5/8" TOP COURSE, LENGTHS MAY BE REDUCED BY 25%.
   - 4.5 DEPTH OF COVER IS 3.5' MIN. AT THE TIME OF PRESSURE TESTING.
   - 4.6 250 psi TEST PRESSURE MAX. FOR HIGHER TEST PRESSURE, MULTIPLY "L" BY THE PROPORTIONAL DIFFERENCE.
     - 4.6.1. EXAMPLE: FOR 300 psi, 300/250=1.2 THEREFORE, LENGTHS MUST BE MULTIPLIED BY 120%. THE LENGTH "L" GIVEN BELOW IS THE DISTANCE THAT PIPE MUST BE RESTRAINED PAST THE FITTING JOINT. ALL JOINTS WITHIN THIS DISTANCE MUST BE RESTRAINED. INCLUDING THE FITTING.

DIA.	11.25° BEND	22.5° BEND	33.75° BEND	45° BEND	67.5° BEND	90° BEND	DEAD END	REDUCER *
4"	3'	5'	8'	10'	17'	25'	61'	20"
6"	4'	7'	11'	14'	23'	34'	86'	58"
8"	5'	9'	14'	19'	30'	44'	112'	81"
10"	6'	11'	16'	22'	36'	53'	135'	83"
12"	7'	13'	19'	26'	41'	62'	158'	84"
16"	8'	16'	24'	33'	53'	78'	203'	86"
18"	9'	18'	27'	36'	58'	86'	224'	121"
PVC**	1.2x	1.2x	1.2x	1.2x	1.2x	1.2x	1.4x	1.4x

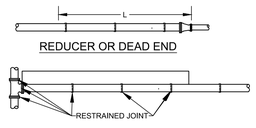
* ASSUMES REDUCER DOWN 2 SIZES. (EXAMPLE 12"x18"). LARGER REDUCTIONS SHALL BE TREATED AS A TEE.
** FOR PVC OR CPVC-BAGGED PIPE, MULTIPLY THE LENGTHS BY THE VALUE SHOWN IN THE PVC ROW.

BRANCH REDUCING TEE TABLE (1.4x FOR PVC)								
BRANCH DIAMETER	4"	4"	6"	8"	10"	12"	16"	18"
	6"	46'	39'	31'	23'	15'	1'	
	8"		70'	65'	60'	55'	43'	37'
	10"			97'	93'	89'	80'	75'
	12"	13'			119'	116'	109'	105'
	16"					143'	137'	133'
							187'	184'
								207'

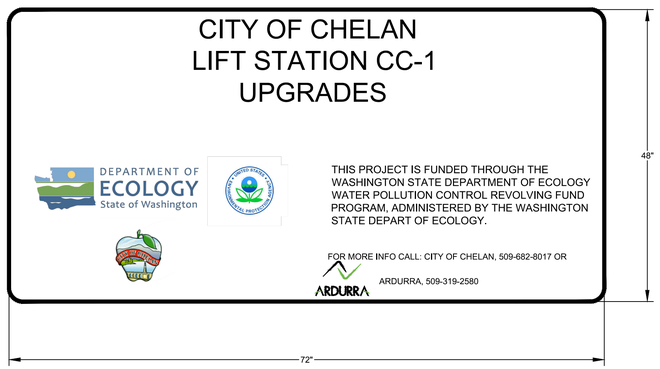
RESTRAIN TEE/CROSS RUN LEGS WITH A MINIMUM 5' STICK OF PIPE IN EACH LEG.
BRANCH INCREASING OR "BULLHEAD" TEES RESTRAINED AS A DEAD-END, LENGTH BASED ON LARGEST SIZE.



TYPICAL BEND



TEE



NOTE:
1. AGENCY FUNDING SIGNAGE DETAIL IS PROVIDED FOR REFERENCE ONLY. THE CONTRACTOR SHALL PROVIDE NOTIFICATION SIGNAGE IN ACCORDANCE WITH THE WASHINGTON STATE DEPARTMENT OF ECOLOGY CWSRF FUNDING REQUIREMENTS, CLEARLY INDICATING THAT THE PROJECT IS FUNDED THROUGH THE CWSRF PROGRAM. ALL SIGNS SHALL BE INSTALLED IN LOCATIONS THAT CAN BE DIRECTLY ASSOCIATED WITH THE WORK BEING PERFORMED AND SHALL BE MAINTAINED IN GOOD, LEGIBLE CONDITION FOR THE DURATION OF THE CONSTRUCTION PERIOD.
2. SIGNAGE SHALL BE WEATHER RESISTANT AND ROUGHLY THE SIZE SHOWN.
3. USE OF ECOLOGY AND EPA LOGOS SHALL COMPLY WITH EACH AGENCY'S OFFICIAL LOGO AND BRANDING GUIDELINES.
4. THE CONTRACTOR SHALL SUBMIT THE PROPOSED SIGNAGE LAYOUT FOR REVIEW AND APPROVAL PRIOR TO ORDERING AND PRINTING THE SIGNS.

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HORIZONTAL THRUST BLOCKING | DATE: APRIL 2026 | DETAIL #: 01 | SCALE: NTS

HORIZONTAL THRUST BLOCKING | SCALE: N.T.S. | 1

CITY OF CHELAN | 135 E JOHNSON AVE. (509) 682-4037 | WATER SYSTEM STANDARD DETAIL
VERTICAL THRUST BLOCKING | DATE: APRIL 2026 | DETAIL #: 02 | SCALE: NTS

VERTICAL THRUST BLOCKING | SCALE: N.T.S. | 2

CITY OF CHELAN | 135 E JOHNSON AVE. (509) 682-4037 | WATER SYSTEM STANDARD DETAIL
RESTRAINED JOINT PIPE | DATE: APRIL 2026 | DETAIL #: 03 | SCALE: NTS

RESTRAINED JOINT PIPE | SCALE: N.T.S. | 3

AGENCY FUNDING SIGNAGE | SCALE: N.T.S. | 4

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CIVIL DETAILS - WATER

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DATE: JUNE 2026

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BID SET

GENERAL NOTES:

1. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE SPECIFICATIONS AND PROJECT DRAWINGS BY OTHER DISCIPLINES. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE STANDARD LISTED
2. THE GENERAL CONTRACTOR SHALL COORDINATE ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR ANCHORED, EMBEDDED OR SUPPORTED ITEMS. NOTIFY THE ARCHITECT / ENGINEER OF ANY DISCREPANCIES.
3. METHODS, PROCEDURES AND SEQUENCES OF CONSTRUCTION ARE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING AND IMPLEMENTING THE NECESSARY PRECAUTIONS TO MAINTAIN AND ENSURE THE INTEGRITY OF THE STRUCTURE AT ALL STAGES OF CONSTRUCTION.
4. WHEN NOT SPECIFICALLY INDICATED ON THE STRUCTURAL DRAWINGS, THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING SLEEVE AND BLOCK-OUT REQUIREMENTS FOR PENETRATIONS PRIOR TO FABRICATION OR ERECTION OF THE STRUCTURE. PENETRATIONS OF STRUCTURAL MEMBERS ARE SUBJECT TO APPROVAL BY THE ENGINEER. THE CONTRACTOR IS ALSO RESPONSIBLE FOR DETERMINING ANCHORAGE AND HANGER REQUIREMENTS REQUIRED FOR SUPPORTING EQUIPMENT, FINISHES, UTILITIES, ETC. NOT INDICATED ON THE STRUCTURAL DRAWINGS.
5. THE STRUCTURAL DRAWINGS GOVERN THE WORK FOR STRUCTURAL FEATURES, UNLESS OTHERWISE NOTED. DIMENSIONS SHOWN ON PLANS AND DETAILS ARE TO GOVERN THE STRUCTURAL WORK. DIMENSIONAL CONFLICTS IN THE DOCUMENTS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
6. FOR ADDITIONAL INFORMATION NOT COVERED IN THESE GENERAL NOTES, REFER TO THE PROJECT SPECIFICATIONS. IN CASE OF CONFLICT BETWEEN THE GENERAL NOTES, SPECIFICATIONS, AND DRAWINGS, THE MOST STRINGENT REQUIREMENTS AS DETERMINED BY THE ENGINEER WILL GOVERN.

REINFORCED CONCRETE :

1. MIXING, TRANSPORTING, PLACING AND TESTING OF CONCRETE IS TO BE DONE IN ACCORDANCE WITH ACI 301.
2. THE SLUMP AT POINT OF PLACEMENT IS NOT TO EXCEED 4"+/-1" AND THE WATER/CEMENT RATIO IS NOT TO EXCEED 0.45. IF ADDITIONAL SLUMP (UP TO 8") IS DESIRED FOR PUMPING, A SUPER-PLASTICIZER ADMIXTURE MAY BE ADDED.
3. CONCRETE EXPOSED TO WEATHER AND FREEZE/THAW SHALL BE AIR ENTRAINED FROM 5.5% ± 1.5% IN ACCORDANCE WITH ACI RECOMMENDATIONS. AIR ENTRAINING ADMIXTURE SHALL CONFORM TO ASTM C260.
4. CONCRETE TO BE NORMAL WEIGHT CONCRETE (150 PCF) WITH MINIMUM 28 DAY COMPRESSIVE STRENGTH (F'c) OF 4000 PSI AND CEMENT CONFORMING TO ASTM C 150, TYPE I OR II.
5. REINFORCEMENT: DEFORMED BARS: ASTM A 615/A 615M, GRADE 60
6. SPLICES (LAPS) OF REINFORCING BARS SHALL BE CLASS 'B' TENSION LAPS PER ACI 318-19 UNLESS NOTED OTHERWISE. REFER TO THE MINIMUM LAP SPLICES OF REINFORCING BARS IN TENSION SCHEDULE.
7. PROVIDE ADEQUATE CONCRETE COVER IN ACCORDANCE WITH THE REQUIREMENTS AS SET FORTH BY ACI 318.
8. REINFORCEMENT IS TO BE SECURELY HELD IN PLACE WHILE PLACING CONCRETE. IF REQUIRED, ADDITIONAL BARS, STIRRUPS, OR CHAIRS WILL BE PROVIDED BY THE CONTRACTOR TO FURNISH SUPPORT FOR ALL BARS WHERE NECESSARY DURING CONSTRUCTION.
9. GROUT ALL PIPING AND PRECAST CONCRETE JOINTS THOROUGHLY ON BOTH THE INTERIOR AND EXTERIOR SURFACES.

FIBER REINFORCED POLYMER :

1. FIBER REINFORCED POLYMER (FRP MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTALLATION REQUIREMENTS AND THE APPROVED DESIGN CALCULATIONS.
2. SURFACE PREP FOR THE FRP LAYOUT SHALL BE IN ACCORDANCE TO MANUFACTURER RECOMMENDATION
3. FRP FIBERS SHALL BE ORIENTED IN THE DIRECTION SHOWN ON THE PLANS TO PROVIDE THE REQUIRED STRENGTHENING.
4. ADHESIVES, RESINS, AND PRIMERS SHALL BE COMPATIBLE WITH THE FRP SYSTEM AND SHALL BE INSTALLED WITHIN THE MANUFACTURER'S SPECIFIED TEMPERATURE AND MOISTURE LIMITS.
5. FRP MATERIALS SHALL BE PROTECTED FROM MECHANICAL DAMAGE, ULTRAVIOLET EXPOSURE, AND FIRE WHERE REQUIRED.
6. FIELD MODIFICATIONS TO THE FRP LAYOUT OR INSTALLATION SHALL NOT BE MADE WITHOUT APPROVAL FROM THE ENGINEER OF RECORD.

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CHECKED	C. MORAN
APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

GENERAL STRUCTURAL NOTES

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DATE:	JUNE 2026

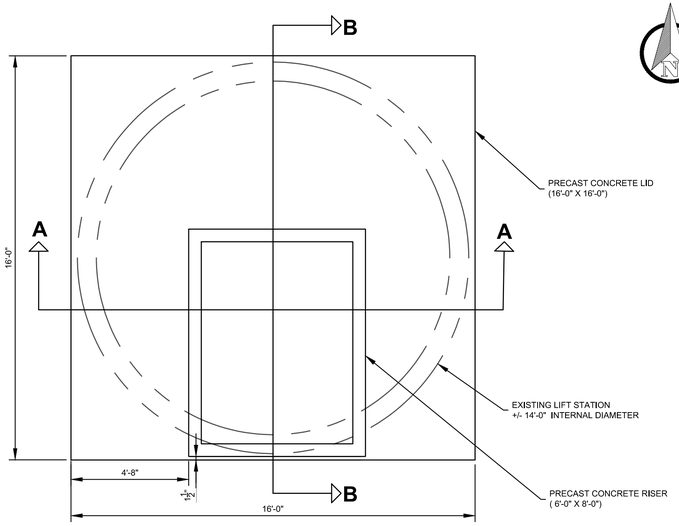
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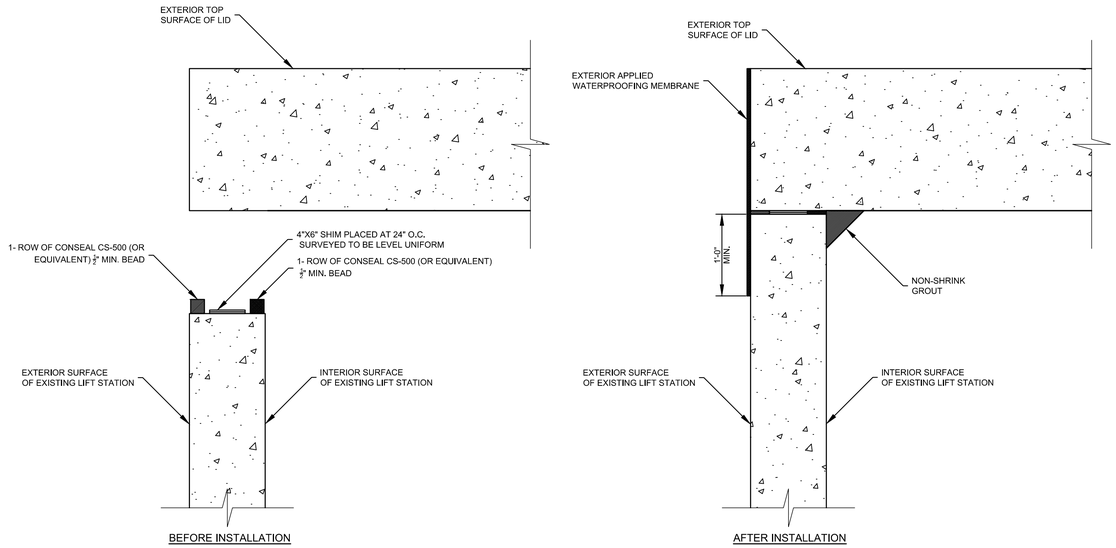
NOTE:

1. DIMENSIONS SHOWN ON THE PLAN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD AND ADJUST AS NECESSARY BASED ON THE DEMOLITION PLAN.
2. REFER TO THE MECHANICAL DRAWING SHEETS FOR DETAILS NOT PROVIDED.



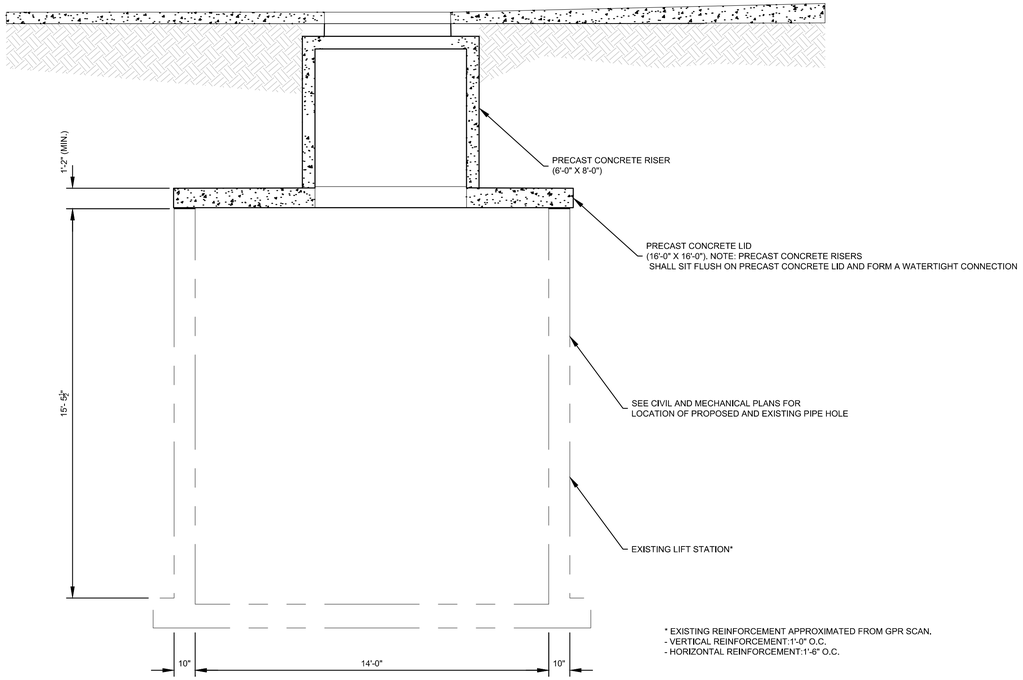
1 LIFT STATION PLAN VIEW

SCALE:1" = 2'-0"



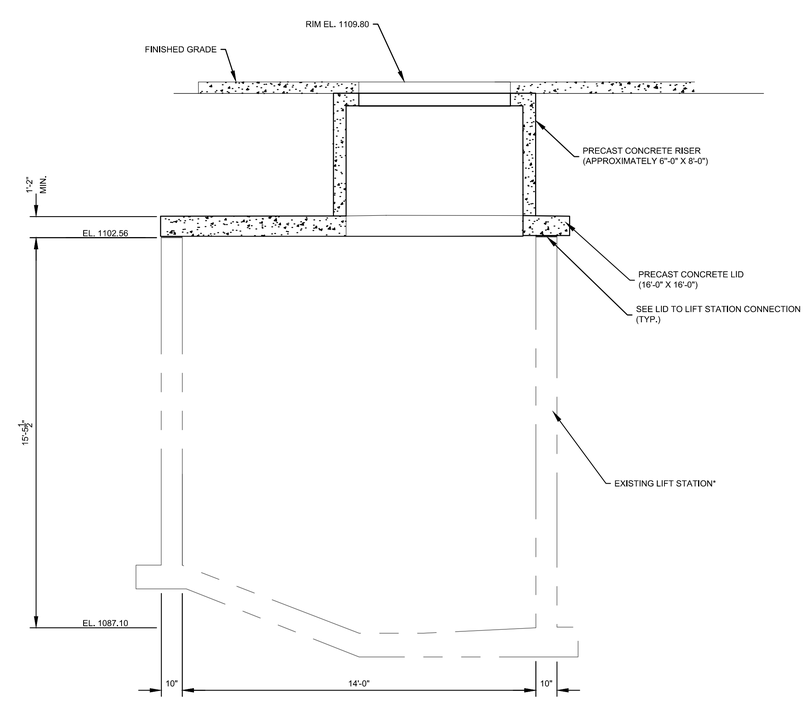
4 LID TO LIFT STATION CONNECTION DETAIL

SCALE: NTS



2 LIFT STATION ELEVATION VIEW (A-A)

SCALE:1" = 2'-0"



3 LIFT STATION ELEVATION VIEW (B-B)

SCALE:1" = 2'-0"

COLIN A. MORAN
STATE OF WASHINGTON
06-17-2026
24033982
REGISTERED
PROFESSIONAL ENGINEER

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SPOKANE, WA 99224
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NO.	DATE	REVISION	BY

BORDER SIZE	22"x34"
DESIGNED	A. DEO
DRAWN	A. DEO
CHECKED	C. MORAN
APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

WET WELL CONVERSION DETAILS

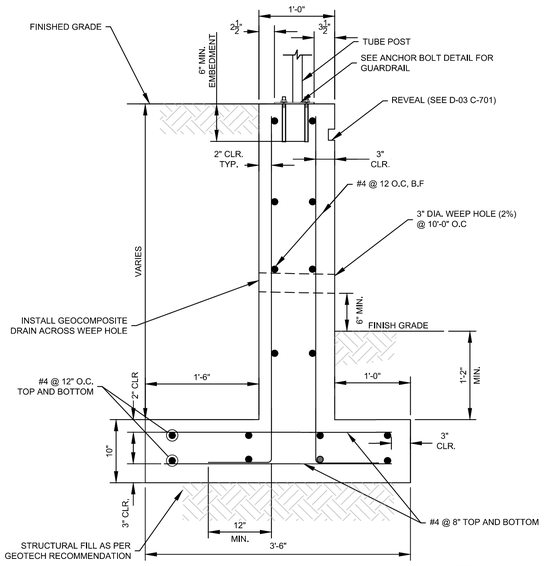
ATTENTION:
0 1/2
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JOB NO:	A-240217
DATE:	JUNE 2026

S100

BID SET

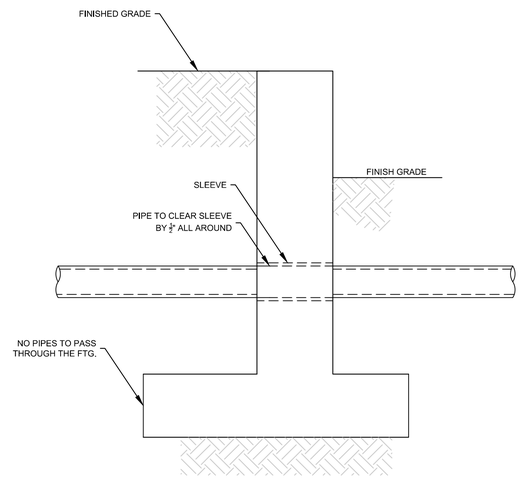
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NOTES:
1. REFER TO SHEET C100 FOR RETAINING WALL LOCATIONS
2. REFER TO CIVIL DETAIL FOR CHAMFERS AND FINISHES.
3. REFER TO C200 FOR WALL ELEVATIONS.

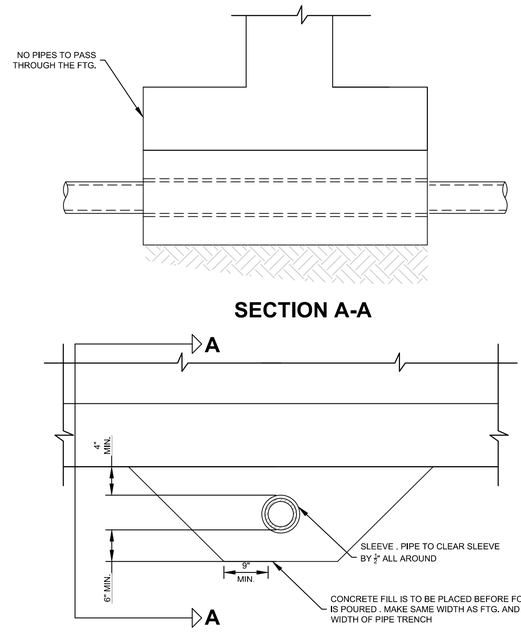
1 RETAINING WALL TYPICAL SECTION

SCALE:1" = 1'-0"



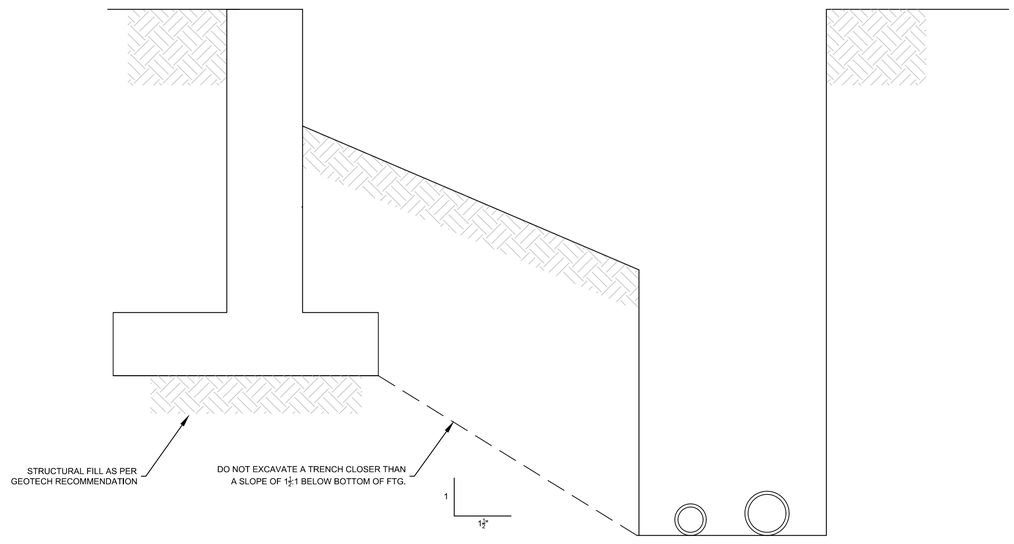
2 TYPICAL PIPE THRU CONCRETE FOUNDATION

SCALE: NTS



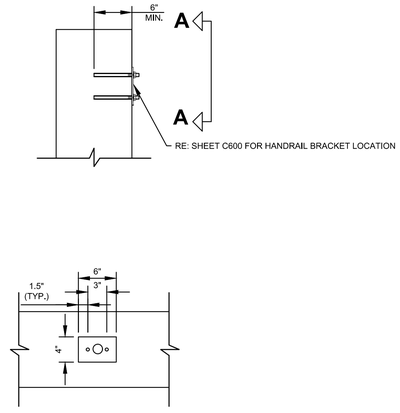
3 TYPICAL PIPE PASSING BELOW WALL FOOTING

SCALE: NTS



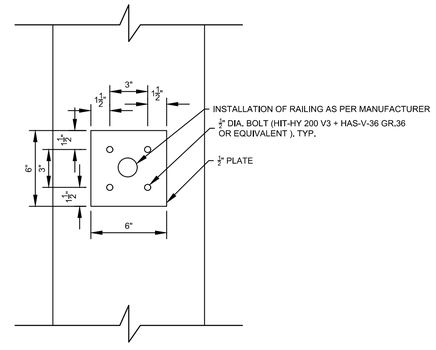
4 TYPICAL TRENCH PARALLEL TO FOUNDATION

SCALE: NTS



5 ANCHOR BOLT DETAIL FOR HANDRAIL BRACKET

SCALE: NTS



6 ANCHOR BOLT DETAIL FOR GUARDRAIL/ HANDRAIL

SCALE: NTS

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APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

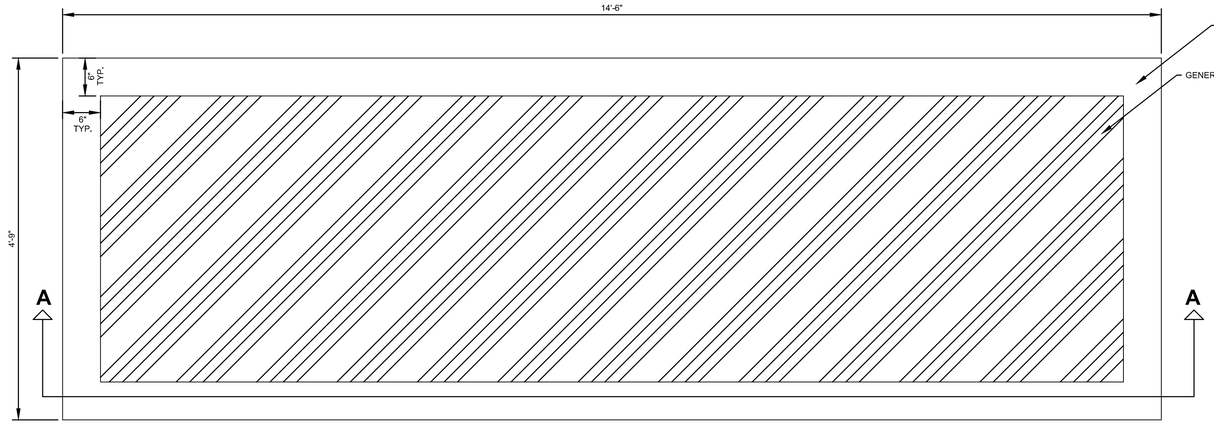
RETAINING WALL DETAILS

ATTENTION:
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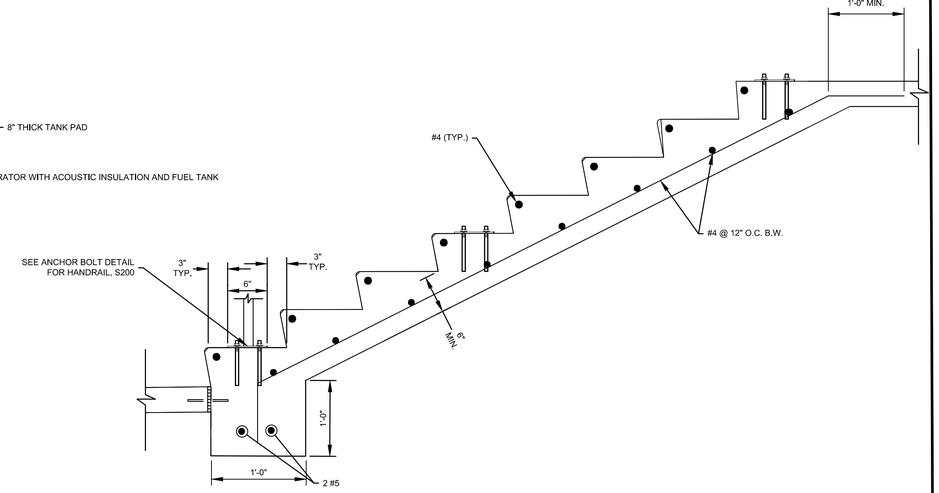
S200

BID SET



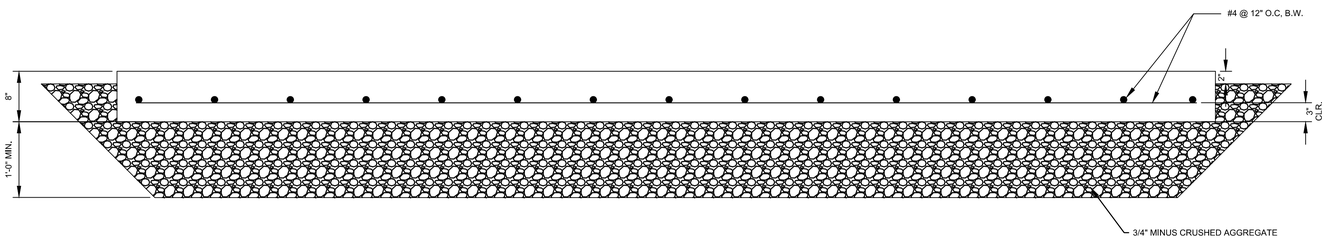
1 GENERATOR PAD PLAN

SCALE:1" = 1'-0"



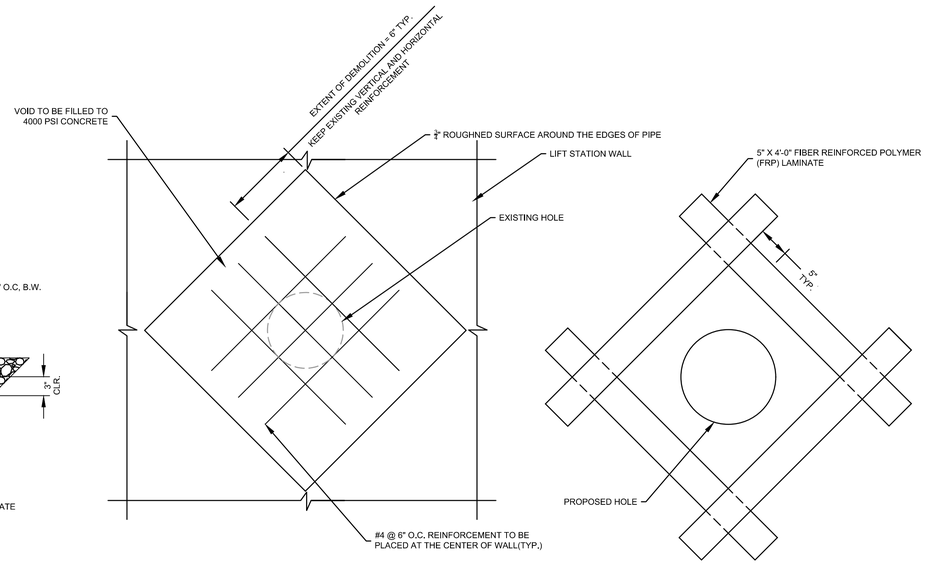
2 STAIR DETAIL

SCALE:1" = 1'-0"



3 SECTION A-A

SCALE:1" = 1'-0"



4 TYPICAL WALL OPENING INFILL DETAIL

SCALE: NTS

5 TYPICAL PROPOSED OPENING DETAIL

SCALE: NTS

NOTES:
1. PLACE FRP LAMINATES BEFORE DRILLING HOLE.
2. PREPARE EXISTING CONCRETE SURFACE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

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APPROVED	X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

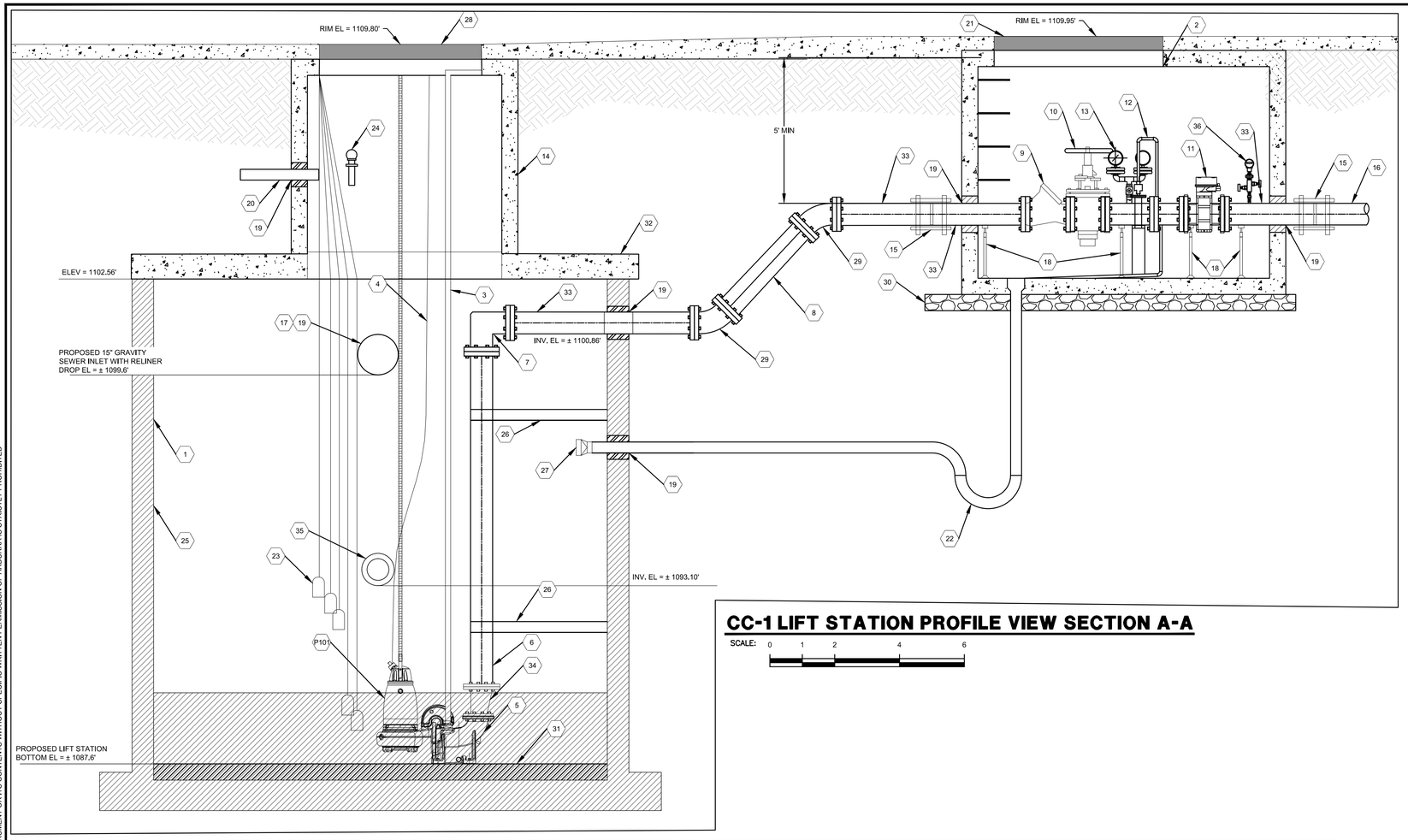
STRUCTURAL DETAILS

ATTENTION:
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DATE:	JUNE 2026

S300

BID SET



CC-1 LIFT STATION PROFILE VIEW SECTION A-A

SCALE: 0 1 2 4 6

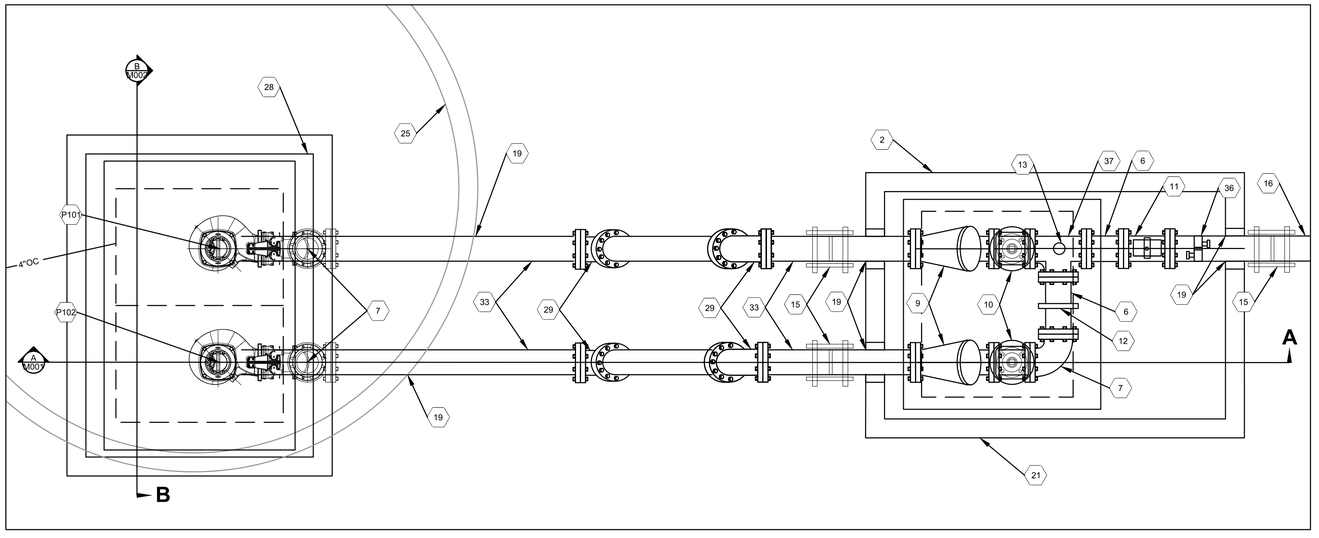
TOP ELEV	1102.56	ft			
BOTTOM ELEV	1087.60	ft			
DIAMETER	14.00	ft			
VOL PER FT DEPTH	1151.5	gal/ft			
FULL DEPTH	14.96	ft			
FULL VOLUME	17,226	gal			
CYCLE DEPTH	2.50	ft			
CYCLE VOLUME	2,879	gal			
PUMPING RATE	1,209	gpm			
MAX. STARTS/HOUR	6.3	times/hr.			
FUNCTION	**ELEV**	**VOL IN (GAL)**	**VOL REM. (GAL)**	**% FULL**	**DIST FROM BTM (FT)**
TOP/OVERFLOW LEVEL	1102.56	17,226	0	100.0%	14.96
INFLUENT PIPE INVERT	1099.60	13,817	3,408	80.2%	12.00
HIGH-LEVEL ALARM	1093.70	7,024	10,202	40.8%	6.10
LAG PUMP ON	1093.20	6,448	10,778	37.4%	5.60
LEAD PUMP ON	1092.20	5,297	11,929	30.7%	4.60
PUMPS OFF	1089.70	2,418	14,808	14.0%	2.10
LOW-LEVEL ALARM	1089.60	2,303	14,923	13.4%	2.00
BOTTOM OF WETWELL	1087.60	0	17,226	0.0%	0.00

PUMPS

P101 P102 FLYGT MODEL NP 3153 MT 3~ 433 SUBMERSIBLE PUMPS, 20 HP, 60 HZ, 460 V, 3-PH PUMP INCLUDING:
- INDIVIDUAL PUMPS CAPABLE OF DELIVERING 1,209 GPM AT48' TDH.

KEYNOTES

1. EXISTING 14' DIAMETER CONCRETE WET WELL
2. PROPOSED 9' X 6' (INTERIOR DIMENSIONS) PRECAST CONCRETE VALVE VAULT
3. PROPOSED 3" STAINLESS STEEL GUIDE RAIL FOR PUMP REMOVAL INCLUDE MOUNTING BRACKETS AND BRACES.
4. PROPOSED 21' STAINLESS STEEL HOIST CHAIN WITH STAINLESS STEEL SHACKLE AT EACH END FOR EACH PUMP. MIN. 6,000LB STRENGTH.
5. PROPOSED 8" CAST IRON PUMP DISCHARGE ELBOW AND MOUNTING BASE ASSEMBLY WITH EPOXY SET SANITARY SEWER ANCHOR BOLTS VERIFY SIZE AND MODEL WITH PUMP MANUFACTURER.
6. PROPOSED 8" FL D.I. SPOOL, LENGTH TO BE DETERMINED IN THE FIELD.
7. PROPOSED 8" FLXFL D.I. 90° ELBOW
8. PROPOSED 8" PEXPE D.I. SPOOL
9. PROPOSED 8" CHECK VALVE,LEVER AND WEIGHT OR FLYGT BALL OR CHECK VALVE TYPE 5087.
10. PROPOSED 8" FL D.I. AMERICAN FLOW RESILIENT WEDGE SEAT GATE VALVE PART #2500-1 WITH OPERATING HANDWHEEL
11. PROPOSED 8" FLOW METER. FLOW METER SHALL BE ENDRESS + HAUSER PROMAG W400. SEE SHEET I006 AND SECTION 407112 FOR DETAIL.
12. PROPOSED 1" MANUAL AIR RELEASE VALVE ASSEMBLY. ROUTE PIPING TO FLOOR DRAIN. SECURE PIPING TO VAULT WALL.
13. PROPOSED PRESSURE SWITCH AND PRESSURE GAUGE. SEE SHEET I006 AND SPECIFICATIONS FOR DETAIL.
14. PROPOSED 6'X8' (INTERIOR DIMENSIONS) PRECAST CONCRETE RISER SET ON 16'X16' PRECAST CONCRETE WET WELL LID. VERIFY HEIGHT IN FIELD.
15. PROPOSED 8" ROMAC MACRO HP COUPLING ADAPTER.
16. PROPOSED 8" D.I. FORCE MAIN. SEE SHEET C400 FOR CONTINUATION.
17. NEW 15" PVC GRAVITY SEWER MAIN. INLET WITH 15" RELINER INSIDE DROP OR EQUAL.
18. PROPOSED PIPE SUPPORT
19. CONTRACTOR SHALL CORE PIPE PENETRATIONS OF BOTH EXISTING AND PROPOSED STRUCTURES ONSITE. CONTRACTOR TO FIELD VERIFY PIPE INVERT ELEVATIONS PRIOR TO CORING. PIPE PENETRATIONS SHALL UTILIZE LINK SEAL, CONSEAL, OR APPROVED EQUAL TO ENSURE PROPER WATERTIGHT SEAL (TYP). COORDINATE WITH STRUCTURAL PLANS.
20. PROPOSED ODOR CONTROL PIPE. SEE SHEET C400 FOR CONTINUATION.
21. PROPOSED HEAVY DUTY H20 RATED ALUMINUM SAFE HATCH HALLIDAY PRODUCTS 048059KBDX WITH 48"X59" CLEAR OPENING AND X1S RETRO SAFETY GRATE OR APPROVED EQUAL. HATCH SHALL BE CAST IN CONCRETE PAVEMENT SET FLUSH WITH FINISHED GRADE.
22. PROPOSED 6"Ø CAST IRON FLOOR DRAIN, P-TRAP & 4" PVC DRAIN TO WET WELL SLOPED AT 2% MIN
23. PROPOSED FLOAT LEVEL SWITCH. SEE SHEET I006 FOR INSTALLATION DETAIL.
24. PROPOSED RADAR LEVEL TRANSMITTER. SEE SHEET I005 FOR INSTALLATION DETAIL.
25. APPLY SPRAYROQ COATING AND PERFORM GROUT INJECTION ON ALL INTERIOR WET WELL CONCRETE SURFACES (EXISTING AND NEW). SURFACE PREPARATION AND COATING REQUIREMENTS SHALL COMPLY WITH SPECIFICATION SECTION 099500. COMPLETE ALL COATING WORK PRIOR TO INSTALLATION OF NEW PIPING AND EQUIPMENT.
26. PROPOSED PIPE BRACE
27. PROPOSED 6" CHECK VALVE, TIDEFLEX "CHECKMATE" OR "TF-1" W/STAINLESS STEEL CLAMP OR APPROVED EQUAL
28. PROPOSED HEAVY DUTY H20 RATED ALUMINUM SAFE HATCH HALLIDAY PRODUCTS 074053KBDX WITH 74"X53" CLEAR OPENING AND X1S RETRO SAFETY GRATE OR APPROVED EQUAL. HATCH SHALL BE CAST IN CONCRETE PAVEMENT SET FLUSH WITH FINISHED GRADE.
29. PROPOSED 8" RJXRJ D.I. 45 BEND
30. PROPOSED 6" OF COMPACTED CSBC.
31. PROPOSED WET WELL CONCRETE FILL FOR PUMP BASES.
32. PROPOSED 16'X16' PRECAST CONCRETE LID. SET ON EXISTING 14' DIAMETER WET WELL. SEE STRUCTURAL PLANS.
33. PROPOSED 8" FLXPE D.I. SPOOL. LENGTH TO BE DETERMINED IN THE FIELD.
34. PROPOSED 6"X8" FLXFL REDUCER
35. REMOVE THE EXISTING INFLOW PIPE WITHIN THE STRUCTURE BACK TO FLUSH WITH THE INTERIOR WALL SURFACE. CAP AND FILL THE REMAINING PIPE SEGMENT WITH WATERTIGHT, NON-SHRINK GROUT (OR APPROVED EQUAL), APPLY SPRAYROQ COATING AFTER REPAIR OF EXISTING INFLUENT LINE.
36. PROPOSED PRESSURE TRANSMITTER. SEE SHEET I006 FOR DETAIL.
37. 8"X8"X6" FL D.I. TEE



PROPOSED CC-1 LIFT STATION SITE PLAN

SCALE: 0 1 2 4 6

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

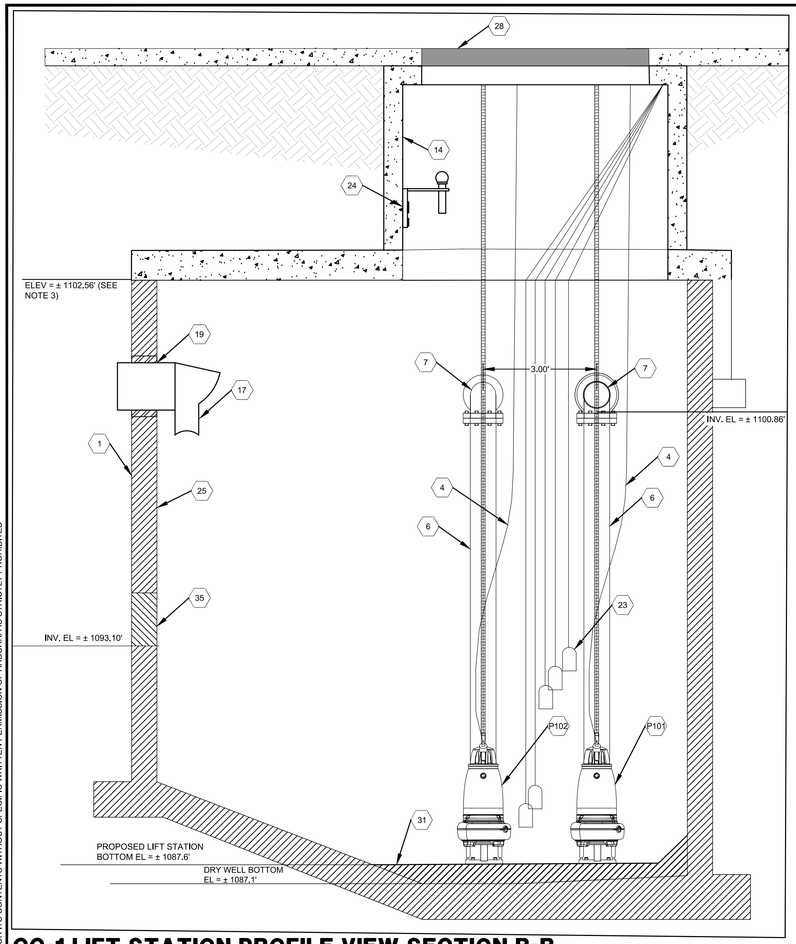
LIFT STATION MECHANICAL PLAN

ATTENTION:
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DATE: JUNE 2026

M001

BID SET



CC-1 LIFT STATION PROFILE VIEW SECTION B-B

SCALE: 0 1 2 4 6

TOP ELEV	1102.56	ft			
BOTTOM ELEV	1087.60	ft			
DIAMETER	14.00	ft			
VOL PER FT DEPTH	1151.5	gal/ft			
FULL DEPTH	14.96	ft			
FULL VOLUME	17,226	gal			
CYCLE DEPTH	2.50	ft			
CYCLE VOLUME	2,879	gal			
PUMPING RATE	1,209	gpm			
MAX. STARTS/HOUR	6.3	times/hr.			
FUNCTION	**ELEV**	**VOL IN (GAL)**	**VOL REM. (GAL)**	**% FULL**	**DIST FROM BTM (FT)**
TOP/OVERFLOW LEVEL	1102.56	17,226	0	100.0%	14.96
INFLUENT PIPE INVERT	1099.60	13,817	3,408	80.2%	12.00
HIGH-LEVEL ALARM	1093.70	7,024	10,202	40.8%	6.10
LAG PUMP ON	1093.20	6,448	10,778	37.4%	5.60
LEAD PUMP ON	1092.20	5,297	11,929	30.7%	4.60
PUMPS OFF	1089.70	2,418	14,808	14.0%	2.10
LOW-LEVEL ALARM	1089.60	2,303	14,923	13.4%	2.00
BOTTOM OF WETWELL	1087.60	0	17,226	0.0%	0.00

PUMPS

(P101) (P102) FLYGT MODEL NP 3153 MT 3~ 433 SUBMERSIBLE PUMPS, 20 HP, 60 HZ, 460 V, 3-PH PUMP INCLUDING:
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KEYNOTES

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8. PROPOSED 8" PEXPE D.I. SPOOL
9. PROPOSED 8" FL FLYGT BALL CHECK VALVE TYPE 5087
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22. PROPOSED 6"Ø CAST IRON FLOOR DRAIN. P-TRAP &" PVC DRAIN TO WET WELL SLOPED AT 2% MIN
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36. PROPOSED PRESSURE TRANSMITTER, SEE SHEET I006 FOR DETAIL.
37. 8"X8"X8" FL D.I. TEE

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BORDER SIZE 22"x34"
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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

LIFT STATION MECHANICAL PLAN SECTIONS

ATTENTION:
0 1/2
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JOB NO: A-240217
DATE: JUNE 2026

M002

BID SET

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SEE SHEET C101

EXISTING DRIVE

CAMPBELL'S RESORT

THE LANDING HOTEL

WEST ALLEY

EAST ALLEY

EXISTING TRANSFORMER

EXISTING TRANSFORMER

EXISTING TREES

CONSTRUCTION LIMITS LINE

CITY OF CHELAN ESTABLISHED 1902

3 C701 RAMP / RAIL SECTION

PARK

EXISTING STAIRS / LANDINGS

EXISTING LANDING

LAKE CHELAN

CONSTRUCTION LIMITS LINE

KEYNOTE SCHEDULE

CODE	DESCRIPTION	DETAIL
01 GENERAL		
01-01	INSTALL TRASH & RECYCLING RECEPTACLE AS SPECIFIED, SURFACE MOUNT PER DETAIL & MANUFACTURER RECOMMENDATIONS (3 TOTAL TRASH / 3 TOTAL RECYCLE)	2/L400
01-02	INSTALL BIKE RACK AS SPECIFIED AND PER DETAIL & MANUFACTURER RECOMMENDATIONS (2 TOTAL)	1/L400
01-03	INSTALL 36"X48" UPRIGHT EXHIBIT STANDS FOR INTERPRETIVE SIGNAGE AS SPECIFIED. INSTALL PER MANUFACTURERS RECOMMENDATIONS (3 TOTAL) *PANEL BOARD CONTENT TO BE PROVIDED BY CITY AND COORDINATED WITH MANUFACTURER FOR DESIGN OF ACTUAL PANELS	5/L400
01-04	INSTALL 24"X24" PEDESTAL DISPLAY FOR INTERPRETIVE SIGNAGE AS SPECIFIED - INSTALL PER MANUFACTURERS RECOMMENDATIONS (2 TOTAL),*PANEL BOARD CONTENT TO BE PROVIDED BY CITY AND COORDINATED WITH MANUFACTURER FOR DESIGN OF ACTUAL PANELS	6/L400
01-05	INSTALL 6' BENCH PER AS SPECIFIED & PER DETAIL & MANUFACTURER RECOMMENDATIONS (9 TOTAL)	3/L400
01-06	LIFT STATION ACCESS HATCH - SEE CIVIL	
01-07	GENERATOR LOCATION - SEE CIVIL / ELECTRICAL PLANS	
01-08	INTER-LUX RUBBER 3D RECESSED LIGHTING - SEE ELECTRICAL PLANS, R1', R1.5', R2'	4/L400
01-09	AREA LIGHT / POLE - SEE ELECTRICAL PLANS (TYP)	
01-10	ELECTRICAL PULLBOX - SEE ELECTRICAL PLANS	
01-11	POTENTIAL PUBLIC ART LOCATION. OWNER PROVIDED CONTRACTOR INSTALLED (TYP)	
01-12	CONTROL LOCATION - SEE CIVIL / ELECTRICAL PLANS	
01-13	EMBEDDED ARCHITECTURAL SILICON BRONZE LETTERS - SEE CIVIL SITE PLAN	

0 2.5 5 10 20

STATE OF WASHINGTON — JOSEPH — EXP — LICENSED LANDSCAPE ARCHITECT

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

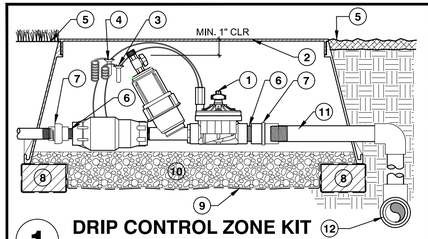
SITE FURNISHINGS PLAN

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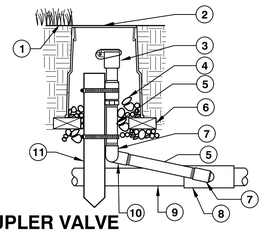


1. REMOTE CONTROL VALVE
2. IRRIGATION VALVE BOX
3. WATERPROOF CONNECTORS (2)
4. 18"-24" COILED WIRE TO CONTROLLER
5. FINISH GRADE (TURF/MULCH)
6. SCH. 80 CLOSE NIPPLE, MATCH SIZE TO VALVE
7. SCH 40 PVC THREADED UNIONS
8. BRICK SUPPORTS (4)
9. FILTER FABRIC - WRAP TWICE AROUND BRICK SUPPORTS
10. 3/4" WASHED CRUSHED ROCK, 4" MIN. DEPTH
11. IRRIGATION LATERAL
12. MAINLINE LATERAL AND FITTINGS

NOTES:
1. INSTALL VALVE BOXES IN AREA OF LOW VISIBILITY, BUT EASY ACCESS FOR MAINTENANCE.
2. WHEN PRACTICAL, INSTALL 6-12 INCHES FROM HARD SURFACES FOR EASE OF ACCESS.
3. VALVE BOXES WHICH ARE CUT AND/OR MODIFIED TO ACCOMMODATE POORLY LOCATED LATERAL LINES, MAINLINES OR VALVES WILL NOT BE ACCEPTED.
4. DO NOT MAKE CUT (S) FOR COMPONENTS FROM THE TOP LID OR RING OF THE VALVE BOX.
5. PRIOR TO INSTALLATION OF AUTOMATIC FLUSH VALVE, CONTRACTOR TO MANUALLY FLUSH SYSTEM AND VERIFY NO DEBRIS IS PRESENT.

1 DRIP CONTROL ZONE KIT

NTS

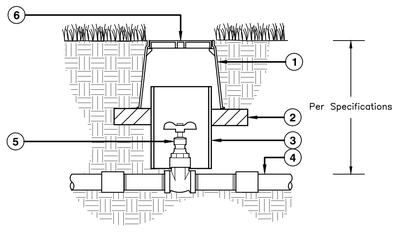


1. FINISH GRADE / TOP OF MULCH
2. VALVE BOX WITH COVER. GREEN IN COLOR UNLESS OTHERWISE SPECIFIED. FLUSH WITH FINISH GRADE
3. QUICK COUPLER VALVE. 2"-3" CLEAR FROM LID TO COVER
4. 3" DEPTH OF 3/4" WASHED GRAVEL. EXTEND 6" BEYOND BOX IN ALL DIRECTIONS
5. PVC SCH 80 NIPPLE
6. BRICK SUPPORT (2)
7. PVC SCH 40 STREET ELL
8. PVC SCH 40 TEE OR ELL
9. PVC MAINLINE
10. PVC SCH 40 ELL
11. 2"X2" REDWOOD STAKE WITH STAINLESS STEEL GEAR CLAMP OR EQUAL SUPPORT SYSTEM

NOTES:
1. INSTALL VALVE BOXES IN AREA OF LOW VISIBILITY, BUT EASY ACCESS FOR MAINTENANCE.
2. WHEN PRACTICAL, INSTALL 6-12 INCHES FROM HARD SURFACES FOR EASE OF ACCESS.
3. VALVE BOXES WHICH ARE CUT AND/OR MODIFIED TO ACCOMMODATE POORLY LOCATED LATERAL LINES, MAINLINES OR VALVES WILL NOT BE ACCEPTED.
4. DO NOT MAKE CUT (S) FOR COMPONENTS FROM THE TOP LID OR RING OF THE VALVE BOX.
5. PRIOR TO INSTALLATION OF AUTOMATIC FLUSH VALVE, CONTRACTOR TO MANUALLY FLUSH SYSTEM AND VERIFY NO DEBRIS IS PRESENT.

2 QUICK COUPLER VALVE

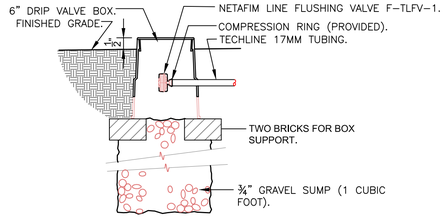
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1. 10" DIA. ROUND VALVE BOX. GREEN.
2. PAVING BRICK SUPPORT (1 OF 3)
3. 6" PVC PIPE EXTENSION, LENGTH AS REQUIRED
4. PVC MAINLINE
5. BALL VALVE (UNDER 2.5") OR GATE VALVE WITH CROSS TOP (OVER 2.5"). STAINLESS STEEL OR OTHER RELATED FOR DIRECT BURIAL. SIZE THE SAME AS MAINLINE.
6. SET BOX FLUSH TO GRADE

3 ISOLATION VALVE

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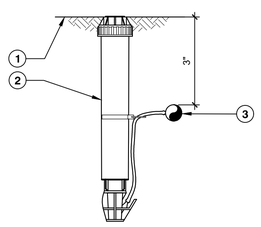


4 NETAFIM TECHLINE FLUSH VALVE

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NW.PRO-N.DRIVE-240217-34

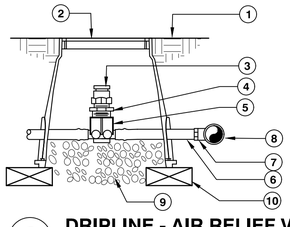
1. FINISH GRADE/TURF
2. OPERATION INDICATOR, RAIN BIRD MODEL: OPERIND, OR APPROVED EQUAL
3. SUB-SURFACE DRIPLINE, AS SPECIFIED



NOTES:
1. INSERT BARB TRANSFER FITTING DIRECTLY INTO DRIPLINE TUBING.
2. VAN NOZZLE SHALL BE SET TO CLOSED.

5 DRIPLINE OPERATION INDICATOR

NTS

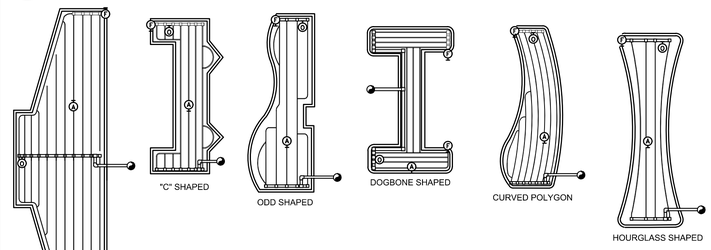


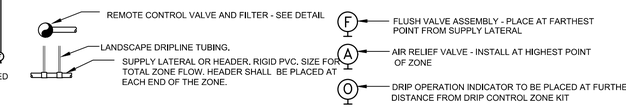
1. FINISH GRADE
2. SUBTERRANEAN EMITTER BOX WITH LID. 6.5" MIN., DIAMETER AT TOP OF BOX
3. AIR RELIEF VALVE, RAINBIRD ARV050 OR APPROVED EQUAL. TO BE INSTALLED AT HIGH POINTS IN DRIP ZONE
4. 1/2" X 3/4" PVC REDUCER BUSHING
5. BARB X FEMALE THREADED CONNECTOR
6. BLANK DRIPLINE TUBING
7. BARB X MALE THREADED CONNECTOR
8. PVC TEE CONNECTED TO PVC HEADER
9. 3" MIN. DEPTH OF 3/4" WASHED GRAVEL
10. BRICK 1 OF 2

NOTES:
1. EMITTER BOX LID SHALL BE FLUSH WITH FINISH GRADE.
2. NO CUTS OR OTHER MODIFICATIONS SHALL BE MADE TO THE TOP OF THE EMITTER BOX.

6 DRIPLINE - AIR RELIEF VALVE

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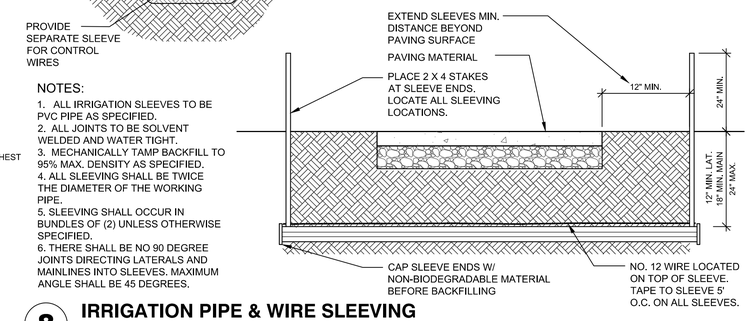


- (F) FLUSH VALVE ASSEMBLY - PLACE AT FARTHEST POINT FROM SUPPLY LATERAL
- (A) AIR RELIEF VALVE - INSTALL AT HIGHEST POINT OF ZONE
- (O) DRIP OPERATION INDICATOR TO BE PLACED AT FURTHEST DISTANCE FROM DRIP CONTROL ZONE KIT

NOTES:
1. CENTER FEED LAYOUT SHOULD BE USED WHEREVER POSSIBLE TO ALLOW FOR MORE EVEN FLOWS AND THE INCREASE IN SIZE OF THE ZONE.
2. SEE MANUFACTURER DRIPLINE DESIGN INSTALLATION AND MAINTENANCE GUIDE FOR ADDITIONAL INFORMATION.
3. 2 INCH MIN. - 4 INCH MAX. OFFSET FROM ALL PIPING TO ADJACENT HARDSCAPE.
4. PLACE TIE DOWN STAKES AT MAXIMUM THREE FEET OFFSETS.
5. AT FITTINGS WHERE THERE IS A CHANGE IN DIRECTION SUCH AS TEES OR ELBOWS, USE TIE DOWN STAKES ON EACH LEG OF THE CHANGE IN DIRECTION.
6. DISTANCE BETWEEN LATERAL ROWS AND EMITTER SPACING SHALL BE BASED UPON SOIL TYPE, PLANT MATERIAL, AND CHANGES IN ELEVATION. SEE MANUFACTURER INSTALLATION GUIDE FOR SUGGESTED SPACING GUIDES.
7. LENGTH OF DRIPLINE SHALL NOT EXCEED THE MAXIMUM LENGTH SHOWN BY THE MANUFACTURER INSTALLATION GUIDE.
8. WHEN USING 17 MM INSERT FITTINGS WITH A DESIGN PRESSURE OVER 50 PSI, IT IS RECOMMENDED THAT STAINLESS STEEL CLAMPS BE INSTALLED ON EACH FITTING.

7 DRIPLINE LAYOUT

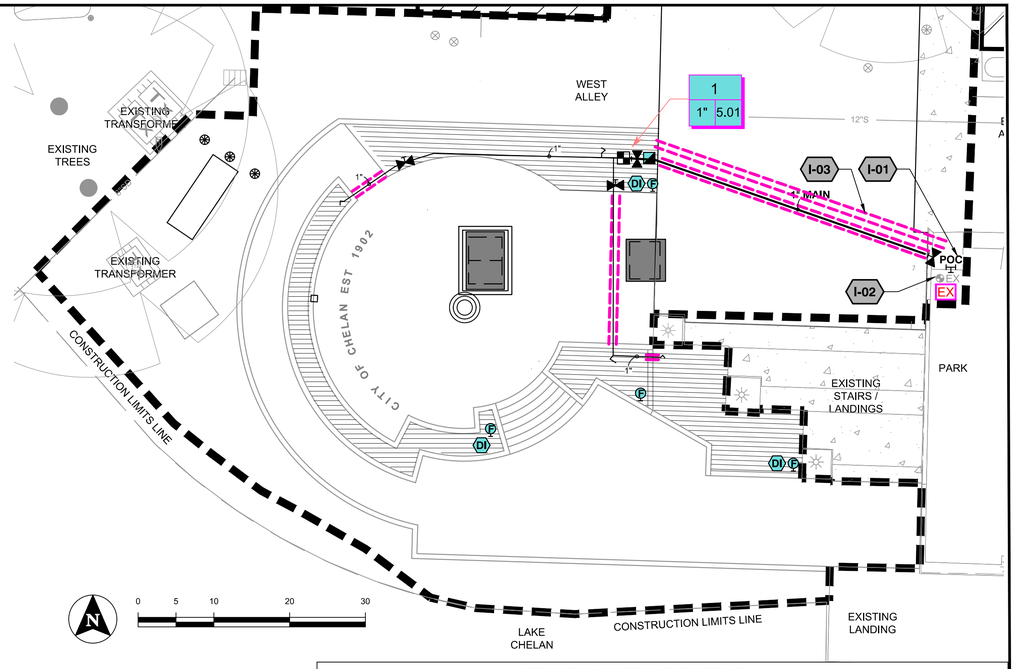
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NOTES:
1. ALL IRRIGATION SLEEVES TO BE PVC PIPE AS SPECIFIED.
2. ALL JOINTS TO BE SOLVENT WELDED AND WATER TIGHT.
3. MECHANICALLY TAMP BACKFILL TO 95% MAX. DENSITY AS SPECIFIED.
4. ALL SLEEVING SHALL BE TWICE THE DIAMETER OF THE WORKING PIPE.
5. SLEEVING SHALL OCCUR IN BUNDLES OF (2) UNLESS OTHERWISE SPECIFIED.
6. THERE SHALL BE NO 90 DEGREE JOINTS DIRECTING LATERALS AND MAINLINES INTO SLEEVES. MAXIMUM ANGLE SHALL BE 45 DEGREES.

8 IRRIGATION PIPE & WIRE SLEEVING

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KEYNOTE SCHEDULE

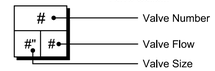
CODE	DESCRIPTION
IRRIGATION	
I-01	CONNECT TO EXISTING MAINLINE / WIRING THAT SUPPLIES THE PARK
I-02	'EX' INDICATES EXISTING REMOTE CONTROL VALVE, TO REMAIN.
I-03	INSTALL SPARE SLEEVE FOR FUTURE IRRIGATION USE

IRRIGATION MATERIALS SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	RAIN BIRD LFV-100 1" 1IN. LOW FLOW DV VALVE	1
(F)	NETAFIM TLFV-1 AUTOMATIC FLUSH VALVE, WITH INSERT INLET	4
(DI)	RAIN BIRD OPERIND DRIP SYSTEM OPERATION INDICATOR, STEM RISES 6IN. FOR CLEAR VISIBILITY WHEN DRIP SYSTEM IS CHARGED TO A MINIMUM OF 20PSI. INCLUDES 16IN. OF 1/4IN. DISTRIBUTION TUBING WITH CONNECTION FITTING PRE-INSTALLED.	3
	AREA TO RECEIVE DRIPLINE RAIN BIRD XFCV-06-18 XFCV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 3.5 PSI CHECK VALVE. 0.6 GPH EMITTERS AT 18" O.C. DRIPLINE LATERALS SPACED AT 18" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. GREAT FOR ELEVATION CHANGE. SPECIFY XF INSERT FITTINGS.	752.7 LF

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY
	RAIN BIRD 44-LRC 1" 1IN. BRASS QUICK-COUPLING VALVE, WITH CORROSION-RESISTANT STAINLESS STEEL SPRING, LOCKING THERMOPLASTIC RUBBER COVER, AND 2-PIECE BODY.	1
	ISOLATION VALVE COPPER BALL VALVE	4
EX	EXISTING CONTROLLER - BY OWNER UTILIZE EXISTING CONTROLLER AND SALVAGED VALVE WIRING TO RUN NEW DRIP VALVE IN PLAZA.	1
POC	POINT OF CONNECTION 1" CONNECT TO MAINLINE DOWNSTREAM OF EXISTING VALVES IN PARK	1
	IRRIGATION LATERAL LINE: PVC CLASS 200 1"	76.2 LF
	IRRIGATION MAINLINE: PVC CLASS 200 1"	44.9 LF
	PIPE SLEEVE: PVC SCHEDULE 80	125.8 LF

Valve Callout



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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

IRRIGATION PLAN

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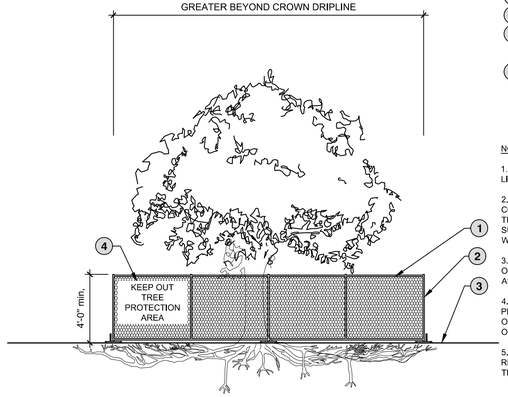
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PLANT SCHEDULE

SYMBOL	COMMON NAME	BOTANICAL NAME	SIZE	CONTAINER	MATURE SIZE	QTY	REMARKS
TREES							
	ROCKY MOUNTAIN MAPLE	ACER GLABRUM	2" CAL.	B&B	20'X15'	2	ZONE 2 — RIPARIAN TRANSITION ZONE
SHRUBS							
	KELSEY'S DWARF RED TWIG DOGWOOD	CORNUS SERICEA 'KELSEYI'	2 GAL.	POT	3'X4'	10	ZONE 1 - RIPARIAN EDGE
	CREEPING MAHONIA	MAHONIA REPENS	2 GAL.	POT	2'X3'	11	ZONE 2 — RIPARIAN TRANSITION ZONE & ZONE 3 - UPLAND BUFFER
	GOLD STAR BUSH CINQUEFOIL	POTENTILLA FRUTICOSA 'GOLD STAR'	2 GAL.	POT	2'X3'	8	ZONE 2 — RIPARIAN TRANSITION ZONE & ZONE 3 - UPLAND BUFFER
PERENNIALS							
	COMMON YARROW	ACHILLEA MILLEFOLIUM	1 GAL.	POT	2'X2'	9	ZONE 2 — RIPARIAN TRANSITION ZONE & ZONE 3 - UPLAND BUFFER
	WESTERN COLUMBINE	AQUILEGIA FORMOSA	1 GAL.	POT	2'X2'	8	ZONE 2 — RIPARIAN TRANSITION ZONE & ZONE 3 - UPLAND BUFFER
	SISKIYOU WOOLLY SUNFLOWER	ERIOPHYLLUM LANATUM 'SISKIYOU'	1 GAL.	POT	1'X2'	6	ZONE 1 - RIPARIAN ZONE
	WESTERN BLUE IRIS	IRIS MISSOURIENSIS 'ROCKY MOUNTAIN'	1 GAL.	POT	1,5'X1,5'	8	ZONE 1 - RIPARIAN ZONE
SYMBOL	COMMON NAME	BOTANICAL NAME				QTY	REMARKS
MULCHES							
	SOIL PEP MULCH	FINE BARK MULCH				665 SF	3" DEPTH
ROCK MULCHES							
	CRUSHER FINES	3/8-1/4" MINUS				163 SF	3" DEPTH
	10" TO 3" STREAMBED COBBLE	LARGE RIVER ROCK				966 SF	PLACE 14"–18" DEEP OVER GEOTEXTILE; NO FINES.

DEMOLITION SCHEDULE

CODE	DESCRIPTION	DETAIL
D-101	PRESERVE AND PROTECT EXISTING TREE PER DETAIL & SPECIFICATIONS	1/L300



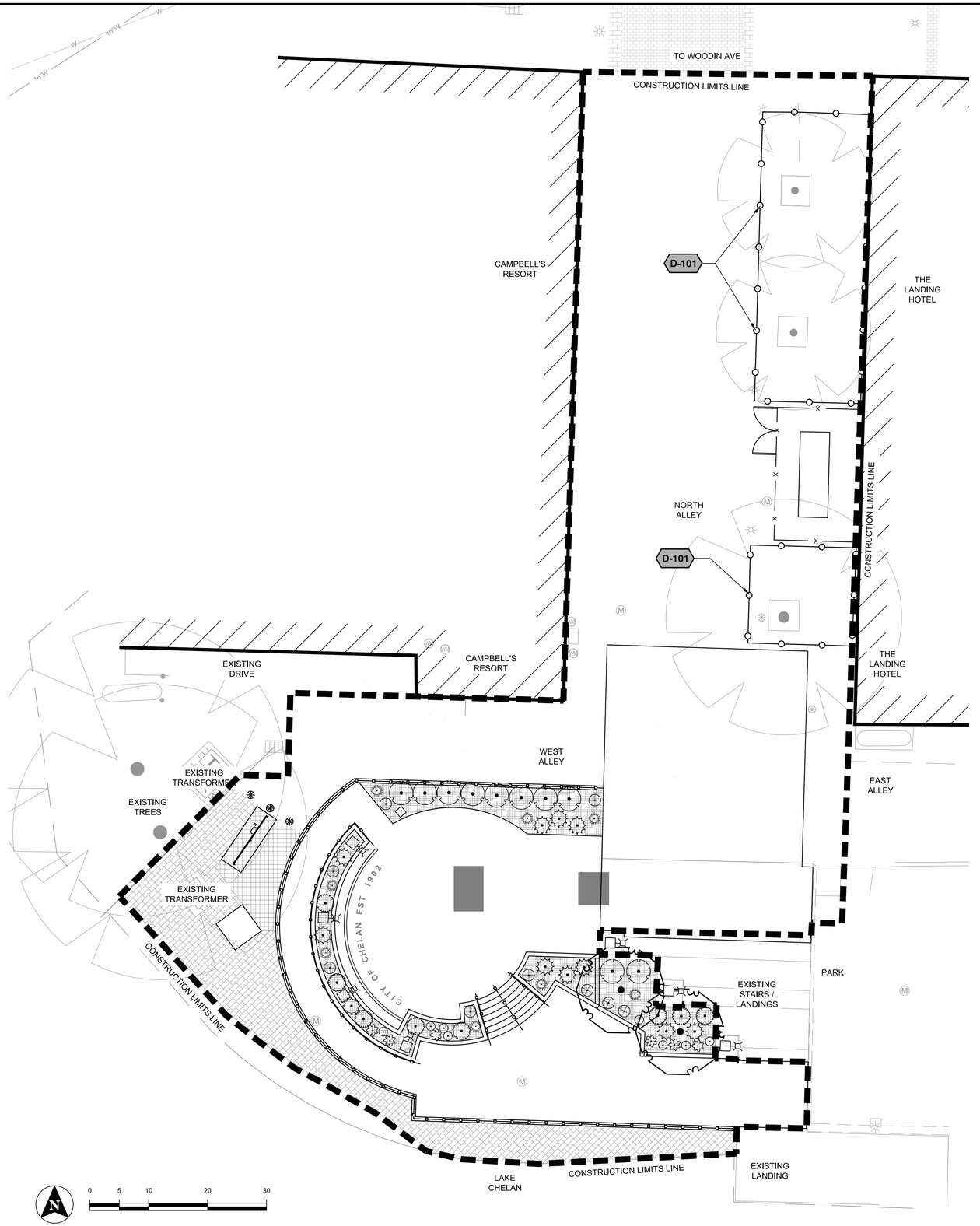
1. CHAINLINK FENCING
2. POST AT 10' MAX. O.C.
3. MAINTAIN EXISTING GRADE WITH THE TREE PROTECTION FENCE UNLESS OTHERWISE INDICATED ON PLANS.
4. APPROX. 8.5"X11" SIGN, LAMINATED AND ATTACHED TO FENCE.

NOTES:

1. ADDITIONAL TREE REQUIREMENTS MAY BE LISTED IN SPECIFICATIONS, IF APPLICABLE.
2. IF EXISTING IRRIGATION IS DISRUPTED DURING CONSTRUCTION, CONTRACTOR SHALL ENSURE TREE(S) IS RECEIVING AT LEAST 1" OF SUPPLEMENTAL IRRIGATION IN THE FORM OF HAND WATERING OR OTHER ONCE A WEEK.
3. CONTRACTOR SHALL HAND REMOVE WEEDS AND OTHER DEBRIS FROM THE INSIDE OF THE FENCED AREA DURING CONSTRUCTION.
4. CONTRACTOR SHALL MONITOR PROTECTED PLANTS FOR INSECT AND DISEASE AND NOTIFY OWNER'S REPRESENTATIVE IF INFESTATIONS OCCUR.
5. ALL TREE PROTECTION MATERIAL SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR AT THE END OF THE CONSTRUCTION PERIOD.

1 TREE PROTECTION DETAIL-CHAINLINK

NTS



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PLANTING PLAN

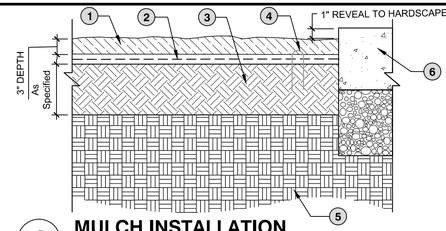
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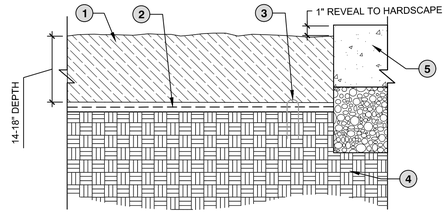
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1. MULCH, TYPE PER PLANS AND NOTES.
2. WEED BARRIER FABRIC. TYPE PER NOTES. OVERLAP SEAMS 12" MIN.
3. TOPSOIL AND SOIL AMENDMENTS AS SPECIFIED
4. FABRIC STAPLE. PLACE TO ANCHOR FABRIC INTO SOIL WITHIN 6" OF ALL OVERLAPPING EDGES. PLACE AT 3' O.C.
5. SUBSOIL
6. HARDSCAPE (SIDEWALK, CURBING, EDGING, ETC) WHEN OCCURS

1 MULCH INSTALLATION

NTS

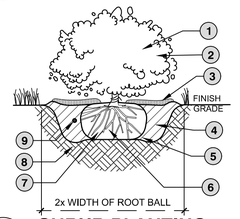


1. MULCH, TYPE PER PLANS AND NOTES.
2. WEED BARRIER FABRIC. TYPE PER NOTES. OVERLAP SEAMS 12" MIN.
3. FABRIC STAPLE. PLACE TO ANCHOR FABRIC INTO SOIL WITHIN 6" OF ALL OVERLAPPING EDGES. PLACE AT 3' O.C.
4. SUBSOIL
5. HARDSCAPE (SIDEWALK, CURBING, EDGING, ETC) WHEN OCCURS

NOTES: PLACE LARGE RIVER ROCK 14-18" DEEP OVER WEED BARRIER FABRIC, NO FINES

2 LARGE RIVER ROCK - MULCH INSTALLATION

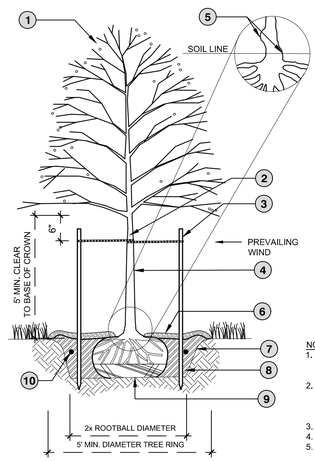
NTS



1. REMOVE ALL TAGS, FLAGGING, AND OTHER NON BIODEGRADABLE MATERIAL FROM SHRUB IMMEDIATELY AFTER INSTALLATION. PRUNING IS ONLY RECOMMENDED TO REMOVE BROKEN, DEAD OR DAMAGED BRANCHES
2. CONSTRUCT 2" EARTH BERM TO FORM A WATER RETENTION BASIN. FILL WITH MULCH AS SPECIFIED
3. 3" DEEP MULCH PER PLANS OVER ENTIRE BED. DO NOT COVER CROWNS OF PLANTS
4. PRIOR TO MULCHING, ADD TOPSOIL AND SOIL AMENDMENTS AS SPECIFIED AROUND ROOT BALL IN 6" LIFTS TO BRACE SHRUB. DO NOT OVER COMPACT. WHEN THE PLANTING HOLE IS BACKFILLED, WATER GENTLY TO SETTLE SOIL. WATER TWICE MORE WITHIN THE FIRST 24 HOURS
5. ROOT BALL SHALL REST ON UNDISTURBED OR RECOMPACTED SUBSOIL
6. IF BALLED AND BURLAPPED, REMOVE ALL WIRE BASKET, ROPE, TWINE, NAILS FROM TOP 1/3 OF ROOT BALL. BE CAREFUL TO KEEP ROOT BALL INTACT. IF PRESENT, SYNTHETIC BURLAP SHALL BE COMPLETELY REMOVED FROM ROOT BALL
7. IF SHRUB IS CONTAINER GROWN, HAND LOOSEN ROOTS AWAY FROM GROWING MEDIA TO HELP PREVENT GIRDLING ROOTS
8. EXISTING SUBSOIL
9. COMMERCIAL FERTILIZER TABLET, AS SPECIFIED, FOR EACH SHRUB

3 SHRUB PLANTING

NTS

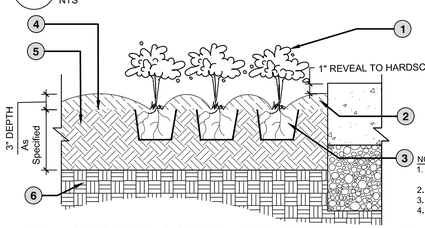


1. REMOVE ALL TAGS, FLAGGING, AND OTHER NON BIODEGRADABLE MATERIAL FROM TREE IMMEDIATELY AFTER INSTALLATION. REMOVE DEAD / DAMAGED BRANCHES BY PRUNING TO INTERNATIONAL SOCIETY OF ARBORICULTURE STANDARDS. IMPROPERLY PRUNED TREES, AS DETERMINED BY LANDSCAPE ARCHITECT, SHALL BE REMOVED AND REPLACED IMMEDIATLEY AT NO ADDITIONAL COST TO OWNER.
2. REMOVE ANY TREE WRAP / TRUNK PROTECTION IMMEDIATELY AFTER INSTALLATION.
3. 2"x2"x8' CEDAR STAKE, DO NOT PENETRATE ROOTBALL, STAKES SHALL BE SET PARALLEL TO PREVAILING WIND DIRECTION.
4. NON ABRASIVE, "CHAINLOCK" OR EQUAL TREE TIE MATERIAL, WRAP TIE AROUND THE TREE TRUNK AND STAKES USING EITHER THE STANDARD OR FIGURE EIGHT METHOD. SECURE TIES TO THE STAKES WITH GALVANIZED NAILS OR STAPLE TO PREVENT LOOSENING. TIE SHOULD INCLUDE JUST ENOUGH SLACK FOR TRUNK GROWTH AND SLIGHT MOVEMENT.
5. ROOT FLARE / COLLAR (SWELLING AT SOIL LINE WHERE STEM TISSUE TRANSITIONS INTO ROOT TISSUE) TO BE AT FINISH GRADE, WHEN PRESENT, BUD POINT(MAJOR CROOK IN THE TRUNK JUST ABOVE THE SOIL LINE) TO BE APPROX. 1.5" ABOVE FINISH GRADE.
6. MULCH LAYER, KEEP 2" AWAY FROM TRUNK, ALL MULCH RINGS IN LAWN AREAS SHALL BE WOOD MULCH.
7. SCARIFY EDGE OF PLANTING PIT.
8. BACKFILL WITH APPROVED TOPSOIL AND SOIL AMENDMENTS. BACKFILL IN 6" LIFTS, SETTLE WITH WATER PRIOR TO EACH LIFT. TAMP LIGHTLY. DO NOT OVER COMPACT.
9. SET ROOTBALL ON UNDISTURBED SUBSOIL.
10. COMMERICAL SLOW RELEASE FERTILIZER TABLET PER MANUFACTURER DOSEAGE

NOTES:
1. REMOVE ALL BURLAP, TWINE, AND WIRE BASKET FROM THE TOP 2/3 OF ROOTBALL. REMOVE ALL NAILS, TIES, AND PLASTIC FROM ROOTBALL. SYNTHETIC BURLAP SHALL BE COMPLETELY REMOVED.
2. TREE STAKING SHALL BE AT THE OPINION OF THE CONTRACTOR, HOWEVER, THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT ALL TREES ARE PLANTED AND STAND PLUMB THROUGHOUT THE TERM OF THE WARRANTY. ALL STAKING SHALL BE REMOVED AT THE END OF THE WARRANTY PERIOD.
3. CONTRACTOR TO VERIFY EXISTING UTILITY LOCATIONS PRIOR TO STAKE INSTALLATION.
4. CONTRACTOR SHALL DETERMINE IF LOCAL SITE CONDITIONS REQUIRE 3-STAKE OPTION.
5. WATER TREE THOROUGHLY WITHIN FOUR HOURS OF PLANTING. REPEAT TWICE IN THE FIRST 24 HOURS AFTER PLANTING.

4 DECIDUOUS TREE PLANTING

NTS



1. GROUNDCOVER / PERENNIAL PLANTING PER PLAN
2. MULCH PER PLANS, 3" DEPTH OVER ENTIRE BED, DO NOT COVER CROWNS OF PLANTS
3. CAREFULLY SPLIT ALL ROOT BOUND ROOTS WITH 3 EQUAL SPACED VERTICAL CUTS
4. WEED BARRIER FABRIC INSTALLED PER PLANS AND SPECIFICATIONS.
5. INSTALL TOPSOIL AND SOIL AMENDMENTS AND TILL AS SPECIFIED
6. SUBSOIL

NOTES:
1. PLANTING PIT / TRENCH SHALL BE DUG DEEP ENOUGH TO ALLOW THE PLANT TO KEEP THE GROUND LINE THE SAME AS NURSERY LINE.
2. SET PLANTS IN ERECT, STABLE, UNIFORM POSITION.
3. WATER PLANTS THOROUGHLY WITHIN 4 HOURS AFTER INSTALLATION.
4. ALL GROUNDCOVER PLANTS SHALL BE PLANTED ON CENTER IN A TRIANGULAR PATTERN, UNLESS OTHERWISE SPECIFIED IN SCHEDULE.

5 GROUND COVER AND PERENNIAL PLANTING

NTS

STATE OF WASHINGTON
JOSHUA SCHMIDT
LICENSED LANDSCAPE ARCHITECT
EXP 10/26/2026
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NO.	DATE	REVISION	BY

BORDER SIZE	22"x34"
DESIGNED	JS
DRAWN	MP
CHECKED	JS/SA
APPROVED	MP

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

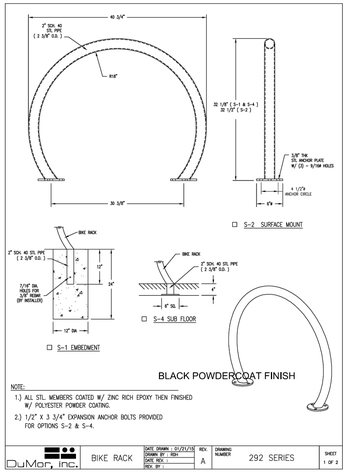
PLANTING DETAILS

ATTENTION:
0 1/2
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JOB NO:	A-240217
DATE:	JUNE 2026

L301

BID SET



1 BIKE RACK

NTS



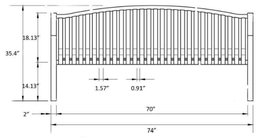
NOTES:
1. COLOR: BLACK ONYX
2. SURFACE MOUNT
3. LID TYPE: RAIN BONNET LID

2 DOUBLE CASSIDY TRASH / RECYCLE RECEPTACLE TWO 32-GALLON (64 GALLON TOTAL)

NTS

Specifications

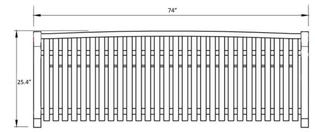
Steel Slat Arched Back Park Bench



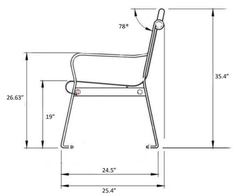
Front View

Length	Width	Height	Seat height	Steel slats
74"	25.4"	35"	19"	Width: 1.57" Thickness: 0.177" Space in between: 0.91"

Material: Cold rolled carbon steel
Finish: Powder coating
Fasteners: Stainless steel
Seat Steel Slats: 7 Gauge
Bench End Steel: 0.4" thickness



Top View

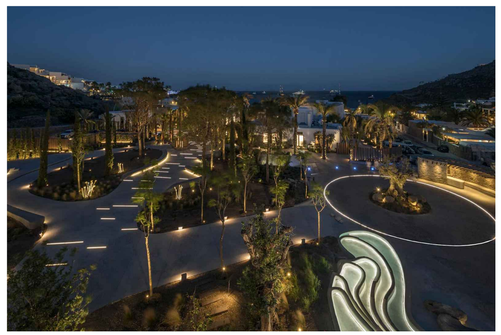


End View

NOTES:
1. COLOR: BLACK ONYX
2. SURFACE MOUNT
3. LENGTH: 6'

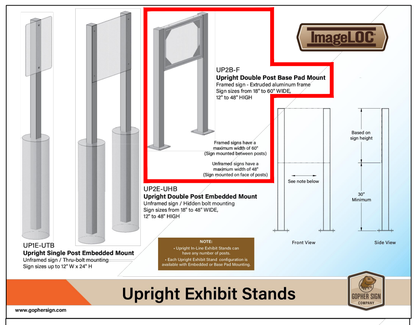
3 6' BENCH

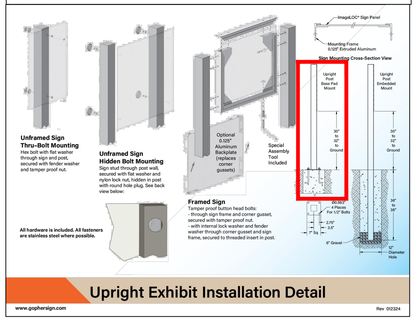
NTS



4 INTER-LUX RECESSED LIGHTING (PRECEDENT IMAGE - SEE ELECTRICAL PLANS)

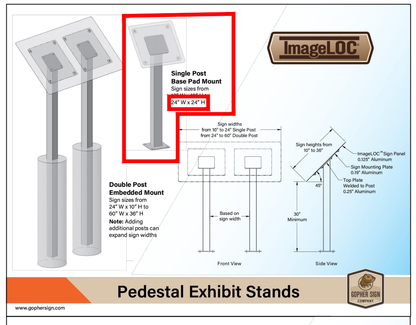
NTS

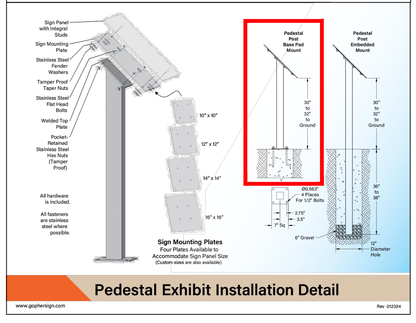




5 UPRIGHT EXHIBIT STAND

NTS





6 PEDESTAL DISPLAY STAND

NTS

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BORDER SIZE 22"x34"
DESIGNED JS
DRAWN MP
CHECKED JS/SA
APPROVED MP

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

SITE DETAILS

ATTENTION:
0 1/2
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DATE: JUNE 2026

L400

BID SET

PLAN SYMBOLS

- FUSED DISCONNECT
  DETAILS AS INDICATED ON ONE-LINE DIAGRAM/SCHEMATICS
- NON-FUSED DISCONNECT
  DETAILS AS INDICATED ON ONE-LINE DIAGRAM/SCHEMATICS
- STARTER
  DETAILS AS INDICATED ON ONE-LINE DIAGRAM/SCHEMATICS
- LINEAR LIGHT FIXTURE, 2' X 4'
  TYPE AS INDICATED
- LINEAR STRIP FIXTURE, 1' X 4'
  TYPE AS INDICATED
- PENDANT OR RECESSED DOWN LIGHT FIXTURE
  TYPE AS INDICATED
- WALL MOUNTED LIGHT FIXTURE
  TYPE AS INDICATED
- SITE POLE LIGHT FIXTURE
  TYPE AS INDICATED
- PC — PHOTOELECTRIC SENSOR (PHOTOCELL)
- EXIT SIGN
  ARROWS INDICATE DIRECTION OF EGRESS
- EMERGENCY LIGHT FIXTURE
- COMBINATION EXIT/EMERGENCY LIGHT FIXTURE
- LIGHT SWITCH
- DUPLEX RECEPTACLE
- QUADRAPLEX RECEPTACLE
- 240V RECEPTACLE
- 480V RECEPTACLE
- M — MOTOR
- T — THERMOSTAT
- TELEPHONE/DATA OUTLET, AS INDICATED
- INSTRUMENT
- EQUIPMENT RACK
- ANTENNA, TYPE AS INDICATED
- EARTH GROUND CONNECTION
- GROUND ROD
- GROUND TEST WELL
- GROUNDBAR
- GROUNDING BOND TYPE CONNECTION METHOD
  EXOTHERMIC (CADWELD)
  BOLTED MECHANICAL
- XXX — CABLE CALLOUT TAG, REFER TO SCHEDULE FOR DETAILS
- ELECTRICAL HOMERUN CIRCUITING TAG
- CABLE TRAY, TYPE AND SIZE AS INDICATED

NOTE: THIS IS A STANDARD LEGEND, THEREFORE, NOT ALL SYMBOLS ARE USED ON THIS PROJECT.

DIAGRAM SYMBOLS

- CIRCUIT BREAKER
- DRAWOUT CIRCUIT BREAKER
- DRAWOUT CIRCUIT BREAKER, >600V
- FULL VOLTAGE NON-REVERSING STARTER
- FULL VOLTAGE TWO SPEED, OR REVERSING, STARTER
- LINE REACTOR
- M — ELECTRICAL SERVICE METER
- K## — KIRK KEY
- POWER DISTRIBUTION TRANSFORMER,
  RATINGS AND CHARACTERISTICS AS INDICATED
- CURRENT TRANSFORMER
- VOLTAGE TRANSFORMER
- FUSED DISCONNECT SWITCH
  RATINGS AND CHARACTERISTICS AS INDICATED
- NON-FUSED DISCONNECT SWITCH
  RATINGS AND CHARACTERISTICS AS INDICATED
- N E — TRANSFER SWITCH (MANUAL OR AUTOMATIC AND AS NOTED)
  RATINGS AND CHARACTERISTICS AS INDICATED
- XXX — PANELBOARD, MAIN LUG ONLY
  RATINGS AND CHARACTERISTICS AS INDICATED
- XXX — PANELBOARD, MAIN CIRCUIT BREAKER
  RATINGS AND CHARACTERISTICS AS INDICATED
- ## — MOTOR, HP AS INDICATED
- FUSE

SCHEMATIC SYMBOLS

- DUPLEX RECEPTACLE
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- LIMIT SWITCH, NORMALLY OPEN
- LIMIT SWITCH, NORMALLY CLOSED
- PRESSURE SWITCH, NORMALLY OPEN
- PRESSURE SWITCH, NORMALLY CLOSED
- FLOAT SWITCH, NORMALLY OPEN
- FLOAT SWITCH, NORMALLY CLOSED
- FLOW SWITCH, NORMALLY OPEN
- FLOW SWITCH, NORMALLY CLOSED
- TORQUE SWITCH, NORMALLY OPEN
- TORQUE SWITCH, NORMALLY CLOSED
- TEMPERATURE SWITCH, NORMALLY OPEN
- TEMPERATURE SWITCH, NORMALLY CLOSED
- NORMALLY OPEN, TIMED TO CLOSE CONTACT
- NORMALLY CLOSED, TIMED TO OPEN CONTACT
- NORMALLY CLOSED, TIMED TO CLOSE CONTACT
- NORMALLY OPEN, TIMED TO OPEN CONTACT
- SV — SOLENOID VALVE
- XX — RELAY COIL, (M=MOTOR CONTACTOR, CR=CONTROL RELAY, AR=ALARM RELAY, TD=TIME DELAY RELAY)
- INDICATOR LIGHT, A=AMBER, R=RED, G=GREEN
- MOMENTARY CONTACT PUSHBUTTON
- MOMENTARY BREAK PUSHBUTTON OR RESET
- EMERGENCY LOCKOUT SWITCH. LOCKABLE IN THE OFF POSITION
- ON OFF XO — MAINTAINED CONTACT ON-OFF SWITCH
- 480V / 120V — CONTROL POWER TRANSFORMER

BREAKER DETAIL LEGEND

DETAIL NO. 1

5KV
52 1200A
49KA

A 5KV CLASS MEDIUM-VOLTAGE, DRAWOUT, VACUUM OR AIR INSULATED CIRCUIT BREAKER WITH A 1,200 AMPERE FRAME. BREAKER HAS A 49,000 AMPERE MAXIMUM FAULT CURRENT INTERRUPTING RATING.

DETAIL NO. 2

50A / 3P

A LOW VOLTAGE FIXED MOUNTED MOLDED CASE 3-POLE CIRCUIT BREAKER WITH A 50 AMPERE TRIP RATING.
TRIP UNIT IS NON-ADJUSTABLE THERMAL-MAGNETIC TYPE.

DETAIL NO. 3

1000AT / 1200AF
LSIG

A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 1200 AMPERE FRAME AND A 1000 AMPERE TRIP RATING.
TRIP UNIT IS LONG-TIME, SHORT-TIME, INSTANTANEOUS, GROUND FAULT.

DETAIL NO. 4

MCP / 3P
S1

A NEMA SIZE 1 COMBINATION FVNR MAGNETIC STARTER

LIGHT FIXTURE AND SWITCH LEGEND

LP-01: 3
X X

LP-01:3 INDICATES ELECTRICAL PANEL AND CIRCUIT

UPPERCASE LETTER - INDICATES FIXTURE TYPE, REFER TO FIXTURE SCHEDULE

LOWERCASE LETTER - INDICATES SWITCHING GROUP

3 a — INDICATES A THREE-WAY SWITCH CONTROLLING LIGHT FIXTURES ASSOCIATED WITH SWITCHING GROUP "a"

CIRCUIT IDENTIFICATION LEGEND

XX-01: #	IDENTIFIES CIRCUIT "#" FED FROM ELECTRICAL PANEL XX-01
2#8, #8GND	A QUANTITY OF TWO NO. 8 AWG CONDUCTORS AND ONE NO.8 GROUNDING CONDUCTOR
4PR#16TSP	A TOTAL OF FOUR #16/2 TWISTED SHIELDED PAIR CABLES
1CAT6 BLUE	ONE BLUE CATEGORY 6 TWISTED PAIR STRUCTURED CABLE
12S SM OS2 F/O	12-STRAND SINGLE-MODE OUTSIDE PLANT FIBER OPTIC CABLE

CONDUIT/CONDUCTOR LEGEND

- GROUNDING CONDUCTOR
- EXPOSED OR OVERHEAD CONDUIT
- CONCEALED CONDUIT
- EE — UNDERGROUND DIRECT BURIED CONDUIT
- E — UNDERGROUND CONCRETE ENCASED ELECTRICAL DUCT BANK
- UE — UNDERGROUND ELECTRIC, TYPICALLY FOR UTILITY
- OH — EXPOSED OVERHEAD WIRE, TYPICALLY FOR UTILITY

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CHECKED SR
APPROVED AAR

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ELECTRICAL SYMBOLS LEGEND

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DATE: JUNE 2026

E001

BID SET

ABBREVIATIONS

A	AMPERAGE
ACU	AIR CONDITIONING UNIT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
BFM	BLOWER FILTER MOTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CPT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER CONTROL
CU	CONDENSING UNIT/COPPER
DS	DISCONNECT SWITCH
EHU	ELECTRIC HEATER UNIT
ETM	TIME METER EACH WAY
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
FLA	FULL LOAD AMPERAGE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
G, GND	GROUND
GAL	GALVANIZED
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
HD	HOT DIPPED GALVANIZED
HG	HOSPITAL GRADE
HOA	HAND OFF AUTOMATIC
IC	INTERRUPTING CAPACITY
IG	ISOLATED GROUND
INST	INSTANTANEOUS
JB	JUNCTION BOX
K	KEY INTERLOCK
KS	KEY SWITCH
KVA	KILOVOLT-AMPERE
KW	KILOWATT
LC	LIGHTING CONTACTOR
LCP	LOCAL CONTROL PANEL
LTG	LIGHTING
LV	LOW VOLTAGE
M	MOTOR (ELECTRIC)
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CIRCUIT PROTECTOR
MSC	MANUFACTURE SUPPLIED CABLE
MV	MEDIUM VOLTAGE
MLO	MAIN LUGS ONLY
MPC	MINI POWER CENTER
MPZ	MINI POWER ZONE
MRP	MOTOR RELAY PROTECTION
N	NEUTRAL GROUNDED CONDUCTOR
NC	NORMALLY CLOSED
NF	NON-FUSED
NO	NORMALLY OPEN
OC	OVERCURRENT
OCPD	OVERCURRENT PROTECTION DEVICE
OV	OVERVOLTAGE
PB	PUSHBUTTON
PC	PHOTOCELL
PH, Ø	PHASE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PMT	PAD MOUNTED TRANSFORMER
PMGR	PAD MOUNTED SWITCHGEAR
PT	POTENTIAL TRANSFORMER
PTT	PUSH TO TEST
PVC	POLYVINYL CHLORIDE
PWR	POWER
R	RELAY
REV	REVERSE
REQ'D	REQUIRED
RGS	RIGID GALVANIZED STEEL
RLY	RELAY
RVNR	REDUCED VOLTAGE NON-REVERSING
RV	REDUCE VOLTAGE
RVR	REVERSING
RVSS	REDUCE VOLTAGE SOLID STATE
RTU	ROOF TOP UNIT
SCR	SECURITY CARD READER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SE	SERVICE ENTRANCE
SF	SUPPLY FAN
SPD	SURGE PROTECTIVE DEVICE
SS	STAINLESS STEEL
SWGR	SWITCHGEAR
S	SWITCH
T	THERMOSTAT
TB	TERMINAL BOX
TD	TIME DELAY
TP	TWISTED PAIR
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
UV	UNDERVOLTAGE
V	VOLT
VF	VARIABLE FREQUENCY
VFD	VARIABLE FREQUENCY DRIVE
VT	VOLTAGE TRANSFORMER
W	WIRE
WP	WEATHER PROOF
XFMR	TRANSFORMER

GENERAL NOTES

1. ENTIRE INSTALLATION SHALL BE IN ACCORDANCE WITH THE FOLLOWING CODES AND STANDARDS:
   1.1. NFPA 70, NATIONAL ELECTRICAL CODE.
   1.2. NFPA 101 LIFE SAFETY CODE.
2. CONTRACTOR SHALL VERIFY ALL EQUIPMENT DIMENSIONS, CLEARANCES AND MOUNTING REQUIREMENTS AGAINST IN-FIELD CONDITIONS.
3. CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES WITH ALL AFFECTED DISCIPLINES AND/OR CLIENT OPERATIONS TEAMS PRIOR TO ORDERING, DELIVERING AND INSTALLING OF MATERIALS.
4. EQUIPMENT SHOWN ON CONTRACT DOCUMENTS REPRESENTS TYPICAL SIZES AND LAYOUTS BASED ON AVAILABLE VENDOR DATA AT THE TIME OF DESIGN. ACTUAL EQUIPMENT DIMENSIONS MAY VARY DEPENDING ON THE SELECTED MANUFACTURER. ANY DISCREPANCIES BETWEEN THE SHOP DRAWINGS, BID DOCUMENTS AND ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.
5. EQUIPMENT PAD SIZES, CONDUIT ROUTES, STRUCTURAL ELEMENTS AND ACCESS REQUIREMENTS MUST BE REVIEWED DURING SUBMITTAL AND COORDINATED WITH THE AFFECTED DISCIPLINES. ADJUSTMENTS REQUIRED DUE TO COORDINATION OVERSIGHTS, FIELD MEASUREMENTS OR EQUIPMENT SUBSTITUTIONS SHALL BE MADE BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. FAILURE TO PERFORM COORDINATION AS NOTED DOES NOT CONSTITUTE A BASIS FOR A CHANGE ORDER.
6. ALL ELECTRICAL CIRCUITS SHALL INCLUDE A GREEN GROUNDING CONDUCTOR SIZED PER NEC.
7. CONDUIT AND DEVICE LOCATIONS ARE SHOWN FOR POINT-TO-POINT PURPOSES ONLY, CONTRACTOR SHALL FIELD LOCATE OR ROUTE AS REQUIRED.
8. ALL CONDUIT SHALL BE INSTALLED PARALLEL AND PERPENDICULAR TO BUILDING STRUCTURE.
9. ALL PANEL SCHEDULES SHALL BE RETYPED AND LAMINATED TO REFLECT UP TO DATE CONDITIONS. TRACE EXISTING CIRCUITS. ALL PANEL LEGENDS SHALL INDICATE THE PANELS. SOURCE PANEL AND ITS LOCATION.
10. ELECTRICAL EQUIPMENT AND DEVICES SHALL BE PROVIDED WITH PHENOLIC NAMEPLATES. ALL NAMEPLATES SHALL BE MECHANICALLY FASTENED WITH S.S. SCREWS OR RIVETS. THE USE OF ADHESIVE NAMEPLATES SHALL NOT BE ALLOWED.
11. CONTRACTOR SHALL MAINTAIN A SET OF PRINTS AND MARK-UP DURING CONSTRUCTION TO REFLECT "AS-BUILT" CONDITIONS. PRINTS SHALL BE DELIVERED TO THE ENGINEER UPON COMPLETION OF THE PROJECT AS A COMPLETE SET OF RECORD DRAWINGS. IN ADDITION, THE CONTRACTOR SHALL PROVIDE ELECTRONIC COPIES OF ALL UPDATED "AS-BUILT" DRAWINGS IN AUTOCAD .DWG FORMAT.
12. ALL MANUFACTURER SUPPLIED STARTER PANELS SHALL BE EQUIPPED WITH INTEGRAL MAIN BREAKER AND MAIN DISCONNECT.
13. CONDUIT RUNS SHALL NOT EXCEED 270 DEGREES OF TOTAL BENDS BETWEEN PULL POINTS.
14. PROVIDE CONDUIT EXPANSION FITTINGS AS CONDUIT CROSSES BUILDING EXPANSION JOINTS.
15. ALL SUPPORTING AND FASTENING DEVICES SHALL BE 316 STAINLESS STEEL.
16. CONTRACTOR MAY COMBINE HOMERUNS TO 120V PANELBOARD CIRCUIT PER NEC. COMBINING MORE THAN THREE 120V CIRCUIT WILL NOT BE ALLOWED WITHOUT SUBMITTING NEC DERATING CALCULATIONS.
17. ALL RECEPTACLE BRANCH CIRCUITS OVER 75' IN LENGTH SHALL USE #10 AWG CONDUCTOR (FOR VOLTAGE DROP).
18. CONTRACTOR SHALL PROVIDE 2 SPARE FUSES FOR EACH FUSE INSTALLED INCLUDING ALL EQUIPMENT AND CONTROLS.
19. CONTROL AND POWER CONDUITS SHALL BE SEPARATED BY 12" MIN. AND SHALL BE IN SEPARATE JUNCTION BOXES AND DUCT BANKS. MAINTAIN 12" SEPARATION BETWEEN DUCT BANKS.
20. INSTALLATION OF THE NEW FACILITIES WILL REQUIRE FILED COORDINATION WITH PLANT OPERATIONS TO PERMIT MAINTENANCE OF OPERATION DURING CONSTRUCTION. DURATION OF POWER OUTAGES SHALL BE MINIMUM REQUIRED FOR SAFE INSTALLATION AND SHALL BE SCHEDULED WITH AND APPROVED BY THE OWNER.
21. THE CONTRACTOR SHALL TAKE PRECAUTIONS TO AVOID EXISTING UNDERGROUND UTILITIES INCLUDING PROCESS PIPING, WATER LINES, CHEMICAL FEED PIPING, ELECTRICAL CONDUITS. HAND EXCAVATION SHALL BE REQUIRED IN CONGESTED AREAS WHERE THE EXACT LOCATION OF ALL UTILITIES IS UNKNOWN. LOCATIONS SHOWN FOR THE EXISTING UNDERGROUND UTILITIES ARE APPROXIMATE ONLY. NOT ALL OF THE EXISTING UNDERGROUND UTILITIES ARE SHOWN. FIELD ADJUST LOCATIONS OF THE NEW FACILITIES TO ACCOMMODATE THE EXISTING SITE CONDITIONS AND UNDERGROUND UTILITIES.
22. CONTRACTOR SHALL COORDINATE WITH THE OWNER TO DETERMINE IF A LIGHTNING PROTECTION SYSTEM IS REQUIRED. IF IT IS DETERMINED THAT A LIGHTNING PROTECTION SYSTEM IS WITHIN THE SCOPE OF THIS PROJECT, PROVIDE A UL 96A MASTER LABEL LIGHTNING PROTECTION SYSTEM INCLUDING GROUND RODS AT EACH LIGHTNING PROTECTION SYSTEM DOWN CONDUCTOR. INTERCONNECT EACH SYSTEMS GROUND RODS WITH A CONTINUOUS #4/0 COPPER TINNED COUNTERPOISE LOOP.
23. CONTRACTOR SHALL PROVIDE A GROUNDING SYSTEM AS REQUIRED BY THE NEC AND IEEE GREEN BOOK. THE INSTALLED GROUNDING SYSTEM SHALL HAVE A RESISTANCE OF LESS THAN 5 OHMS TO GROUND. PROVIDE A CONTINUOUS #4/0 TINNED COPPER GROUNDING SYSTEM.
24. IF ITEM IS PROPOSED FROM OTHER THAN FIRST NAMED MANUFACTURER AND WILL REQUIRE ADDITIONAL ENGINEERING TO INCORPORATE INTO DRAWINGS, I.E., ADDITIONAL I/O, DIFFERENT OR ADDITIONAL BREAKERS, LARGER CONDUCTOR SIZE OR ADDITIONAL CONDUCTORS, LARGER OR ADDITIONAL CONDUIT(S). CONTRACTOR SHALL BE REQUIRED TO PAY FOR ALL ADDITIONAL ENGINEERING CHARGES AND ADDITIONAL EQUIPMENT, MATERIAL COST, ETC.
25. NAMEPLATES ON ELECTRICAL EQUIPMENT SHALL HAVE P&ID TAG NUMBER AS WELL AS DESCRIPTION OF LOAD BEING SERVED AND EQUIPMENT TAG NUMBER AS A MINIMUM. EQUIPMENT BEING SERVED SHALL HAVE IDENTICAL TAG AS ELECTRICAL GEAR AND BREAKER NOTATION WHICH IS SERVING EQUIPMENT.
26. REFER TO HVAC DRAWINGS FOR THE LOCATIONS OF 120 VOLT UNIT HEATER THERMOSTATS AND PROVIDE 3/4-IN C, 2#12 AND 1#12 GND BETWEEN EACH HEATER AND ITS RESPECTIVE CONTROL THERMOSTAT. INTERCONNECTION WIRING BETWEEN HVAC COMPONENTS SHALL BE BY THE HVAC CONTRACTOR.
27. ENCLOSURE AND CONTROL PANELS SHALL BE THE FOLLOWING:
   27.1. INDOOR AIR CONDITIONED NON-PROCESS AREAS SHALL BE NEMA 12 WITH NO VENTILATION TO THE OUTSIDE. MAY BE NEMA 1 IN A CLEAN ROOM WITH CARBON FILTERS.
   27.2. INDOOR PROCESS AREAS SHALL BE NEMA 4X, 316 STAINLESS STEEL.
   27.3. ALL ENCLOSURES INSTALLED OUTDOORS SHALL BE OF NON-PLASTIC CONSTRUCTION AND UL LISTED FOR WET LOCATION USE. ANY NEMA RATINGS CALLED OUT ON DRAWINGS SHALL BE FOLLOWED.
   27.4. ALL CONTROL PANELS SHALL BE UL-508A AND COMPLY WITH ARTICLE 409 OF THE NEC. ALL CONTROL PANELS IN DESIGNATED HAZARDOUS LOCATIONS OR CONTAINING WIRING WHICH IS HAZARDOUS LOCATIONS SHALL BE UL-698A.
   27.5. CONNECTIONS TO SCREW TYPE TERMINALS ONLY ALLOWED COMPRESSION TYPE TERMINAL ARE NOT AVAILABLE.
   27.6. ALL CONTROL CABINET WIRING TO THE PLC AND CONTROL DEVICES SHALL BE 16 AWG FOR ANALOG AND 16 AWG FOR DIGITAL AND TERMINATED WITH FERRULES.
   27.7. ALL CONTROL PANEL SUBMITTALS SHALL CONTAIN SLOTTED HINGED DUCT CALCULATIONS FOR CONDUCTOR FILL. ALL CONTROL PANEL SUBMITTALS SUBMITTED WITHOUT WIRE FILL CALCULATIONS SHALL BE RETURNED INCOMPLETE WITHOUT EVALUATIONS. NO DUCT SHALL CONTAIN MORE THAN 40% FILL BASED ON NEC WIRE FILL STANDARDS. CALCULATIONS SHALL INCLUDE ALL FILED CONDUCTORS DESIGNED TO ENTER THE PANEL IN FIELD TERMINATIONS PORTION OF THE THE PANEL. ALL CONTROL PANELS SHALL CONTAIN DESIGNATED DUCTS FOR INTERNAL WIRING AND A SEPARATE DUCT(S) FOR FIELD WIRING.
   27.8. ALL KEY INTERLOCKED SET (KIRK KEY) IF PART OF THE DESIGN, MUST BE INSCRIBED TO INDICATE SET LOCATIONS AND KEYED DIFFERENTLY TO PREVENT UNAUTHORIZED BREAKER COMBINATIONS. SPARE BREAKER INTERLOCKED KEYS MUST BE TIGHTLY CONTROLLED TO PREVENT UNAUTHORIZED BREAKER COMBINATIONS.
   27.9. PANEL DRAWINGS SHALL BE LAMINATED, ATTACHED TO THE DOOR AND IN COLOR. DRAWING SHALL BE PRINTED ON 8.5 X 11 IF 11 X17 IS TOO LARGE TO FIT ON THE DOOR. FULL SET OF ELECTRICAL DRAWINGS PRINTED WITH A LASER PRINTER AND IN COLOR SHALL BE INSERTED IN THE DOOR POCKET. INK JET IS NOT ACCEPTED.
   27.10. ALL CONTROL PANEL WITH A PLC/HMI/VFD SHALL BE EQUIPPED WITH A PANEL TEMPERATURE SENSOR. TEMPERATURE SENSOR SHALL BE CONNECTED TO SCADA WHERE APPLICABLE.

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CHECKED SR
APPROVED AAR

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

ELECTRICAL NOTES & ABBREVIATIONS

ATTENTION:
0 1/2
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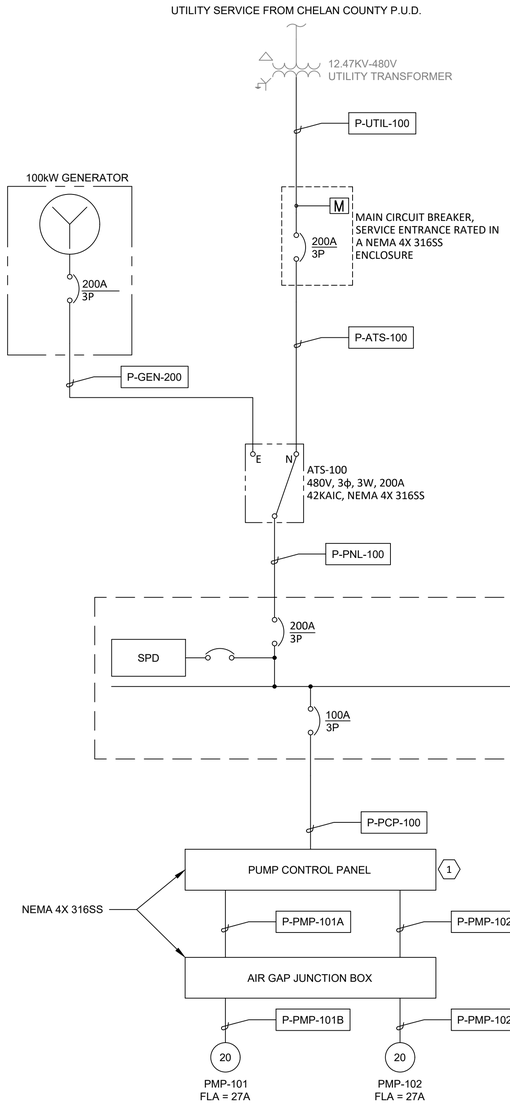
JOB NO: A-240217
DATE: JUNE 2026

E002

BID SET

LOAD TAG	LOAD NAME	LOAD				
		VOLTAGE	PHASE	HP	KVA	NEC FLA
P-PMP-100	PMP-101	460	3	20		27
P-PMP-101	PMP-102	460	3	20		27
P-XFMR-100	XFMR-100	460	1		15	31.3
CONNECTED LOAD		85.3				
TRANSFORMER RUNNING LOAD		58.3				
25% OF LARGEST LOAD		6.75				
MINIMUM SERVICE SIZE		92.05				

LOAD LIST



MODIFICATION ONE-LINE DIAGRAM

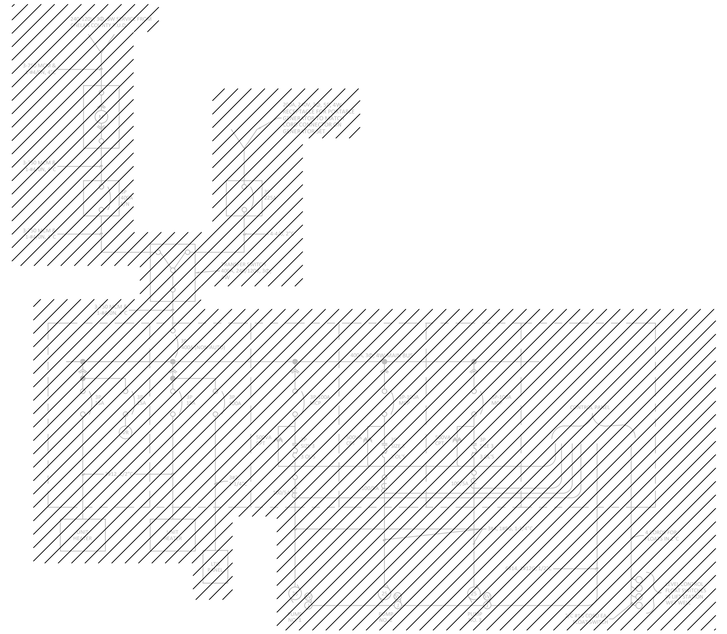
SCALE: N.T.S.

CABLE TAG	MAX CKT VOLTAGE	CONDUIT SIZE (INCH)	CONDUCTORS	FROM	TO
P-UTIL-100	480V	3"	4#4/0	UTILITY TRANSFORMER	SERVICE ENTRANCE SECTION
P-GEN-200	480V	3"	3#4/0,#4G	GEN-200	ATS-200
P-SP-200	480V	3"	CONDUIT ONLY	SPARE FROM GEN	ELECTRICAL RACK AREA
P-ATS-100	480V	3"	3#4/0,#4G	SERVICE ENTRANCE SECTION	ATS-200
P-PNL-100	480V	3"	3#4/0,#4G	ATS-200	PNL-100
P-PCP-100	480V	1-1/2"	3#1,#8G	PNL-100	PCP-100
P-PMP-101A	480V	1	MFR SUPPLIED	PCP-100	AIR GAP JUNCTION BOX
P-PMP-101B	480V	1	MFR SUPPLIED	AIR GAP JUNCTION BOX	PMP-101
P-PMP-102A	480V	1	MFR SUPPLIED	PCP-100	AIR GAP JUNCTION BOX
P-PMP-102B	480V	1	MFR SUPPLIED	AIR GAP JUNCTION BOX	PMP-102
P-XFMR-100	480V	1	2#8,#10G	PNL-100	XFMR-100
P-LP-100	240V	1-1/2"	3#2,#8G	XFMR-100	LP-100
P-LP-100-01	120V	1	2#12#12G	LP-100	BLW-100 STARTER
P-BLW-100	120V	1	2#12#12G	BLW-100 STARTER	BLW-100
P-LP-100-02	120V	1	2#12,#12G	LP-100	LIGHTING
P-LP-100-03	120V	1	2#12,#12G	LP-100	LCP-100
P-LP-100-04	120V	1	2#12,#12G	LP-100	RECEPTACLES
P-LP-100-05/07	120V	1	2#12,#12G	LP-100	GENERATOR WATER HEATER
P-LP-100-06	120V	1	2#12,#12G	LP-100	PHAROS LIGHTING CONTROLLER
P-LP-100-08	120V	1	2#12,#12G	LP-100	GFCI RECEPTACLE
P-LP-100-09/11	120V	1	2#12,#12G	LP-100	GENERATOR WINDING HEATER
P-LP-100-13	120V	1	2#12,#12G	LP-100	GENERATOR BATTERY CHARGER
P-INL-001	24V	1	2#12,#12G	PHAROS LIGHTING CONTROLLER	INTER-LUX LIGHTS

POWER CABLE SCHEDULE

CABLE TAG	CONDUIT SIZE (INCH)	CONDUCTORS	FROM	TO
C-GEN-200	1-1/2"	8#14,#14G	GEN-200	ATS-100
C-SP-200	1-1/2"	CONDUIT ONLY	SPARE FROM GEN	ELECTRICAL RACK AREA
C-ATS-200	1"	8#14,#14G	ATS-100	LCP-100
C-GEN-201	1-1/2"	12#14,#14G	GEN-200	LCP-100
C-FE-120	1"	MFR SUPPLIED	LCP-100	FE-120
C-LT-110A	1"	2#16TSP	LCP-100	AIR GAP JUNCTION BOX
C-LT-110B	1"	2#16TSP	AIR GAP JUNCTION BOX	LT-110
C-LS-110A	1-1/2"	MFR SUPPLIED	PCP-100	AIR GAP JUNCTION BOX
C-LS-110B	1-1/2"	MFR SUPPLIED	AIR GAP JUNCTION BOX	LS-110
C-PCP-100	1-1/2"	14#14,#14G	LCP-100	PCP-100
C-PMP-101A	1-1/2"	MFR SUPPLIED	PCP-100	AIR GAP JUNCTION BOX
C-PMP-101B	1-1/2"	MFR SUPPLIED	AIR GAP JUNCTION BOX	PMP-101
C-PMP-102A	1-1/2"	MFR SUPPLIED	PCP-100	AIR GAP JUNCTION BOX
C-PMP-102B	1-1/2"	MFR SUPPLIED	AIR GAP JUNCTION BOX	PMP-102
C-VFD-101A	1"	CAT6	LCP-100	VFD-101
C-VFD-101B	1"	2-CAT6	LCP-100	PCP-100
C-VFD-102A	1"	CAT6	LCP-100	VFD-102
C-VFD-102B	1"	2-CAT6	LCP-100	PCP-100
C-PSH-120	1"	2#14,#14G	PCP-100	PSH-120
C-PIT-120	1"	1#16TSP	LCP-100	PIT-120
C-ANT-100	1"	CAT6	LCP-100	ANTENNA

CONTROL CABLE SCHEDULE



DEMOLITION ONE-LINE DIAGRAM

SCALE: N.T.S.

KEY NOTES:

1. PROVIDE VFDS WITH HARMONIC MITIGATION AS REQUIRED TO ENSURE COMPLIANCE WITH IEEE 519. THE CONTRACTOR SHALL COORDINATE WITH THE VFD MANUFACTURER TO DETERMINE THE APPROPRIATE MITIGATION STRATEGY AND SHALL SUBMIT A HARMONIC ANALYSIS AND SUPPORTING CALCULATIONS DEMONSTRATING COMPLIANCE UNDER MAXIMUM OPERATING CONDITIONS.

PANELBOARD: LP-100			
MAIN BREAKER (AMPS):	80	ENCLOSURE UL RATING:	NEMA 4X 316SS
BUS RATING (AMPS):	100	MOUNTING:	RACK
L-L VOLTAGE (VOLTS):	240	AMPERE INTERRUPT RATING:	22 KAIC
L-N VOLTAGE (VOLTS):	120	FED FROM:	XFMR-100

NOTES	LOAD DESCRIPTION	LOAD (VOLT AMPS)		BREAKER AMPS/ POLES	CIRCUIT NO	CIRCUIT NO	BREAKER AMPS/ POLES	LOAD (VOLT AMPS)		LOAD DESCRIPTION	NOTES
		AΦ	BΦ					AΦ	BΦ		
	BLW-100 STARTER	1656		20/1	1	2	20/1	500		SITE LIGHTING	
	LCP-100		600	20/1	3	4	20/1		360	RECEPTACLES	
	GENERATOR WATER HEATER	750		20/2	5	6	20/1	180		PHAROS LIGHTING CONTROLLER	
			750		7	8	20/1		180	WEATHERPROOF GFCI RECEPTACLE	
	GENERATOR WINDING HEATER	750		20/2	9	10	20/1			SPARE	
			750		11	12	20/1			SPARE	
	GENERATOR BATTERY CHARGER	1200		20/1	13	14	20/1			SPARE	
	SPARE			20/1	15	16	20/1			SPARE	
	SPARE			20/1	17	18	20/1			SPARE	
	SPARE			20/1	19	20	20/1			SPARE	
	SPARE			20/1	21	22	20/1			SPARE	
	SPARE			20/1	23	24	20/1			SPARE	
	Total VA (Left Side)	4356	2100					680	540	Total VA (Right Side)	
	Total Connected VA	7676									
	Connected Amps	42									

NOTES

LP-100 PANEL SCHEDULE

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

ONE-LINE DIAGRAM & SCHEDULES

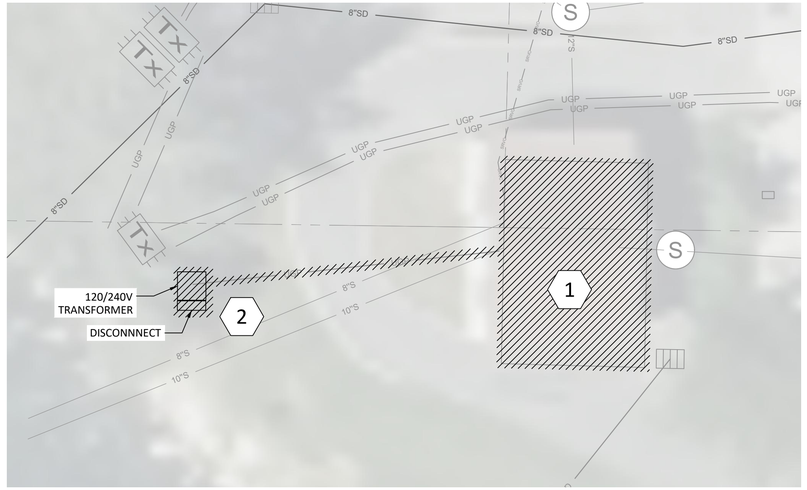
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JOB NO: A-240217
DATE: JUNE 2026

E003

BID SET

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ELECTRICAL DEMOLITION SITE PLAN

SCALE: 1/8" = 1'-0"

0 2.5' 5' 10'
SCALE: 1/8"=1'-0"

KEY NOTES:

1. DEMOLISH ALL EXISTING ELECTRICAL EQUIPMENT IN THE BUILDING. BUILDING WILL BE DEMOLISHED, REFER TO SHT D400, D401, D500, AND D600 FOR DETAILS.
2. REMOVE EXISTING DISCONNECT AND DRY-TYPE TRANSFORMER OUTSIDE OF THE BUILDING. RETURN EQUIPMENT TO CHELAN COUNTY PUD. COORDINATE WITH PUD PRIOR TO DEMOLITION.



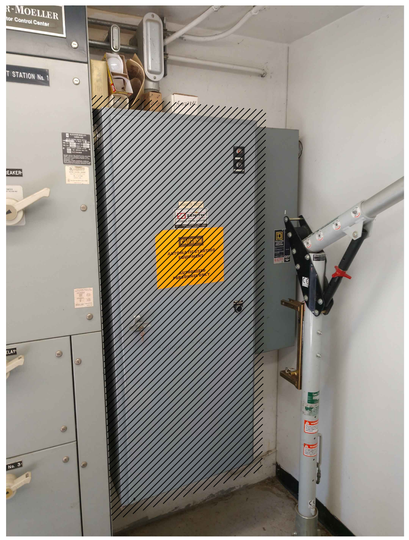
TRANSFORMER AND DISCONNECT DEMOLITION PICTURE



GENERATOR DEMOLITION PICTURE



MCC DEMOLITION PICTURE



ATS AND DISCONNECT DEMOLITION PICTURE



CONTROLS DEMOLITION PICTURE

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ELECTRICAL DEMOLITION SITE PLAN

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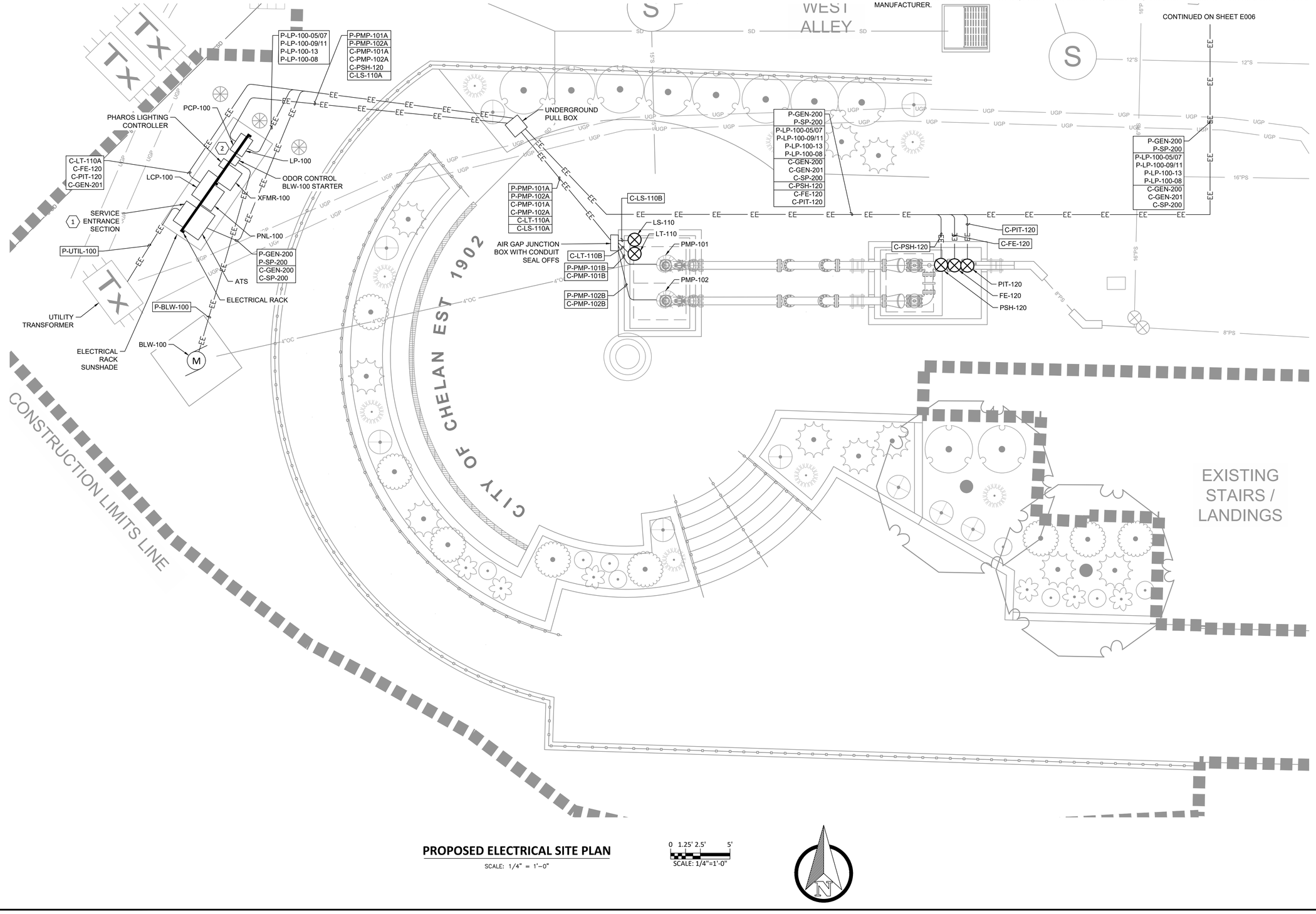
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E004

BID SET

KEY NOTES:

1. CONTRACTOR TO COORDINATE WITH UTILITY FOR SERVICE ENTRANCE SECTION INSTALLATION TO MEET UTILITY REQUIREMENTS.
2. PROVIDE OUTDOOR CONTROL PANEL WITH VFD WITH A PANEL-MOUNTED AIR CONDITIONING UNIT. AIR CONDITIONING UNIT SHALL BE SIZED BY THE PANEL MANUFACTURER BASED ON INTERNAL HEAT LOAD, AMBIENT DESIGN TEMPERATURE, SOLAR EXPOSURE, AND REQUIRED OPERATING TEMPERATURE OF THE VFD AND CONTROL COMPONENTS. UNIT SHALL BE OUTDOOR-RATED, MAINTAIN THE PANEL NEMA RATING, AND INCLUDE THERMOSTAT CONTROL, CONDENSATE MANAGEMENT, ALARM CONTACT, AND ALL REQUIRED ACCESSORIES. CONTRACTOR SHALL COORDINATE FINAL UNIT SELECTION, POWER REQUIREMENTS, MOUNTING, AND MAINTENANCE CLEARANCES WITH THE PANEL MANUFACTURER.



PROPOSED ELECTRICAL SITE PLAN

SCALE: 1/4" = 1'–0"

0 1.25' 2.5' 5'
SCALE: 1/4"=1'-0"

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ELECTRICAL PROPOSED SITE PLAN

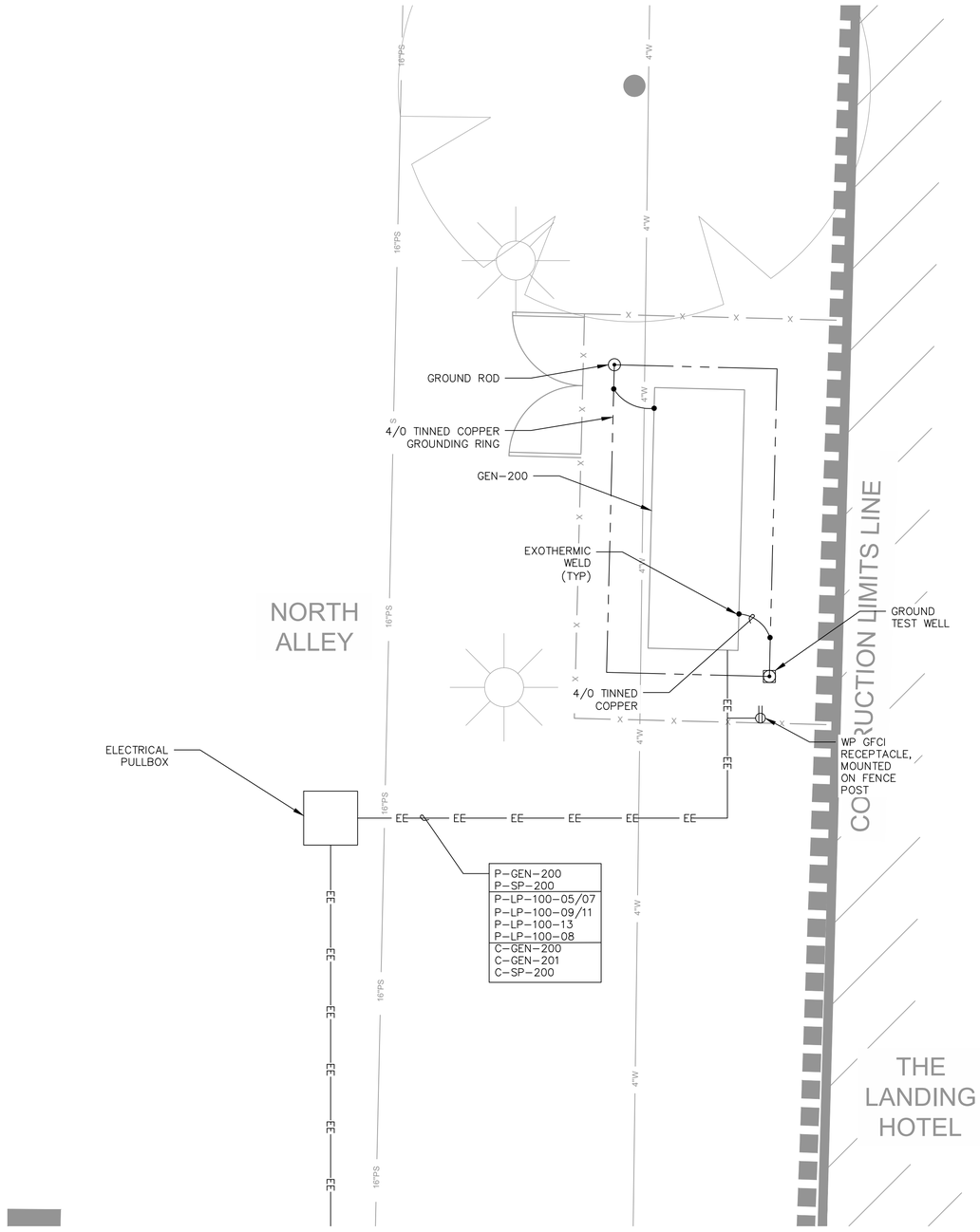
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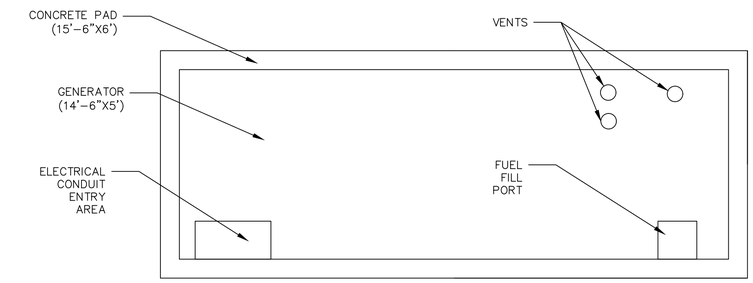
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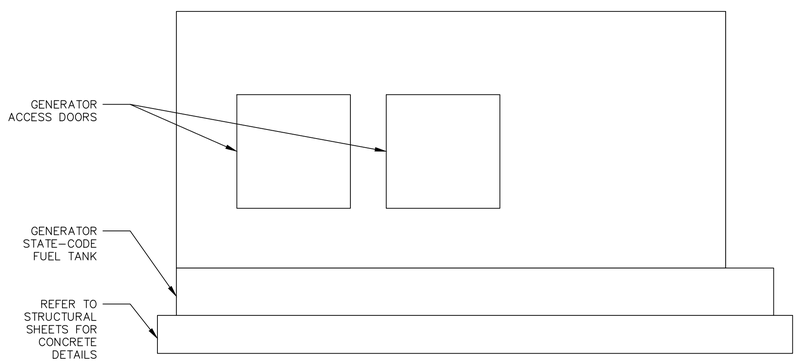
0 1.25' 2.5' 5'
SCALE: 1/4"=1'-0"



GENERATOR AND PAD DETAIL

SCALE: 1/2" = 1'-0"

0 1' 2' 4'
SCALE: 1/2"=1'-0"



GENERATOR AND PAD ELEVATION

SCALE: 1/2" = 1'-0"

0 1' 2' 4'
SCALE: 1/2"=1'-0"

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SPOKANE, WA 99224
PHONE: (509)-319-2580
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NO.	DATE	REVISION	BY

BORDER SIZE	22"x34"
DESIGNED	PT
DRAWN	PT
CHECKED	SR
APPROVED	AAR

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

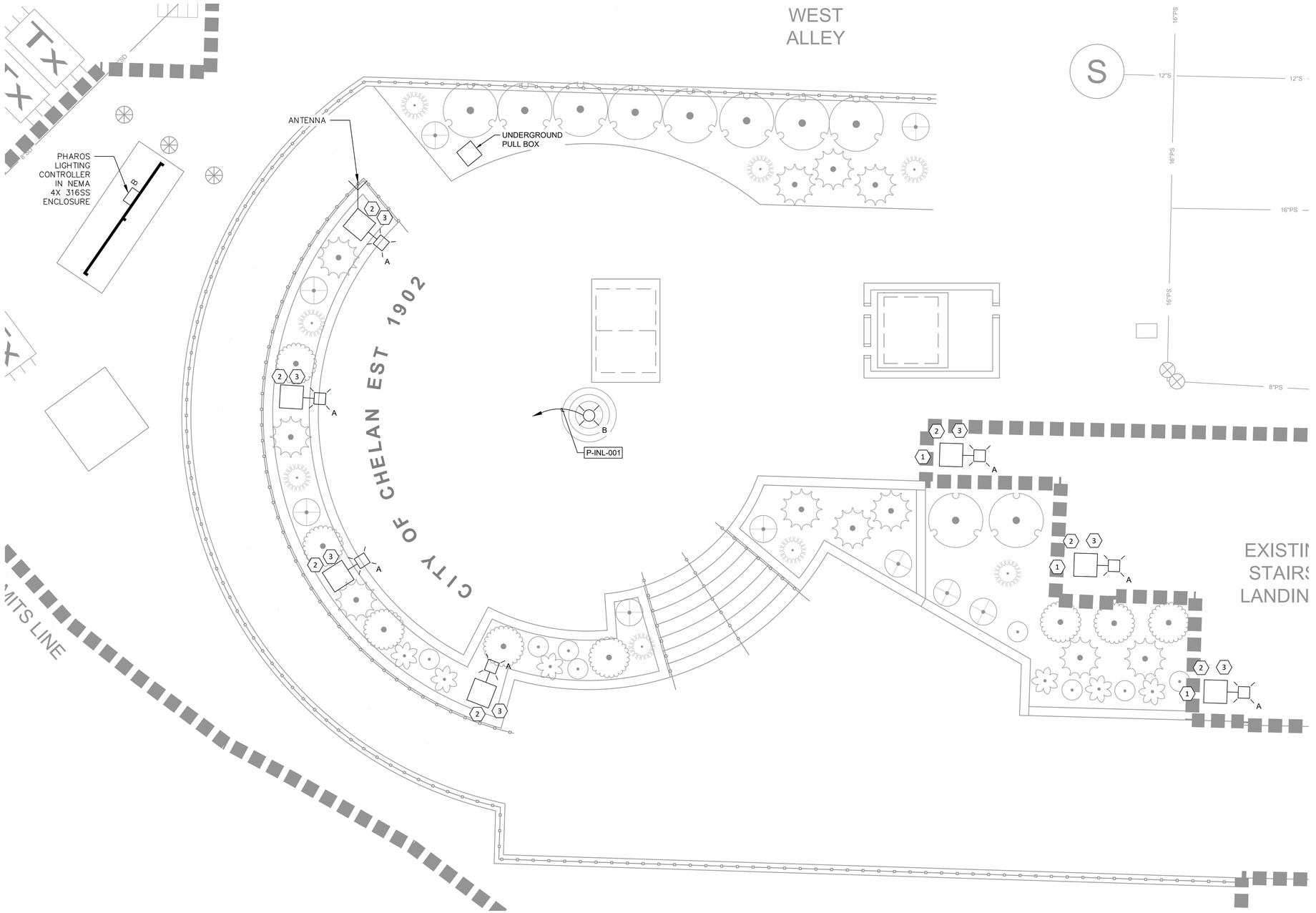
ELECTRICAL PROPOSED SITE PLAN II

ATTENTION:
0 1/2
IF THIS BAR DOES NOT MEASURE 1" ON 22x34 SHEET or 1/2" ON 11x17 SHEET, THEN DRAWING IS NOT TO SCALE

JOB NO:	A-240217
DATE:	JUNE 2026

E006

BID SET



LABEL	MANUFACTURER	CATALOG NO.	DESCRIPTION	LAMP	WATTAGE	VOLT
A	NLS LIGHTING	DMR-1 T5 32L 40 30K8 UNV PT3 SBK FSP211-20	LED MOUNTED EXTERIOR AREA LIGHTING WITH MOTION SENSING THAT DIMS LIGHTS WHEN NO MOVEMENT IS DETECTED	3000K INTEGRAL LED	70	120-277
B	INTER-LUX	RUB WH 3DPX 20 4-CVSPI R3 GE 99549 E82852 520-24060	FLEXIBLE RGBW LED EXTERIOR AREA LIGHTING	3000K INTEGRAL RGBW LED	6.6	24

LIGHTING SCHEDULE

LIGHTING PLAN

SCALE: 1/4" = 1'

0 1.25' 2.5' 5'
SCALE: 1/4"=1'-0"

KEY NOTES:

1. CONTRACTOR SHALL REPLACE THE EXISTING LIGHTING AT THE INDICATED LOCATIONS WITH NEW LIGHT POLES AS SHOWN ON THE LIGHTING SCHEDULE.
2. NEW LIGHT POLES SHALL MATCH THE EXISTING LIGHT POLES IN THE AREA. BASIS OF DESIGN MODEL: RSSP 12 5R 11G 9BC SGL SBK 3430 BABA.
3. POLE BASE COVERS SHALL MATCH THE EXISTING POLE BASE COVERS IN THE AREA. BASIS OF DESIGN MODEL: RBC-2 5R SBK.

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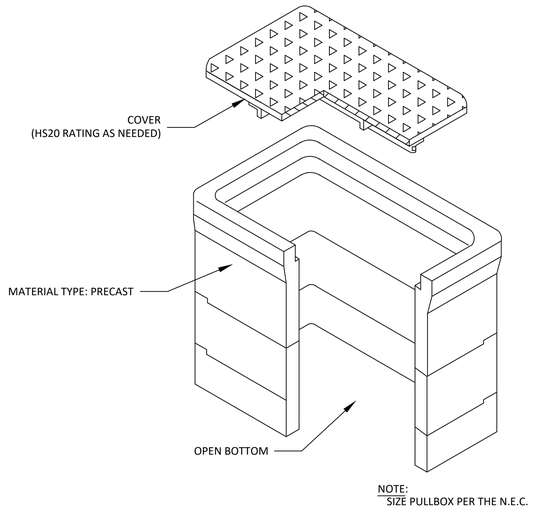
PROPOSED LIGHTING PLAN

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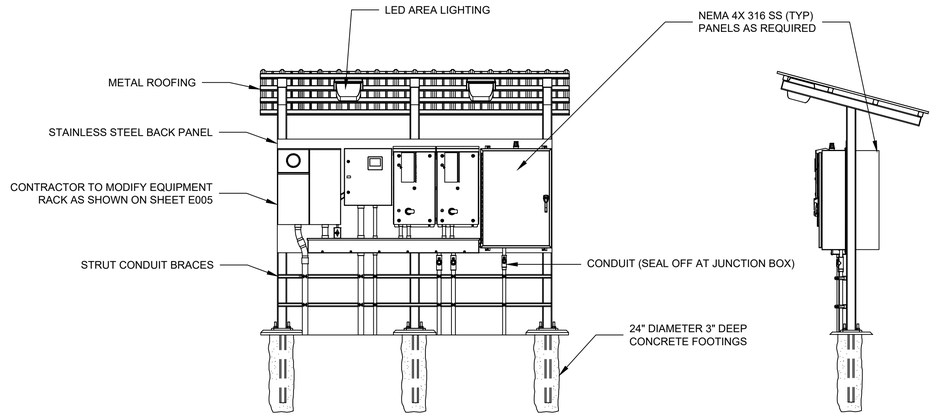
E007

BID SET



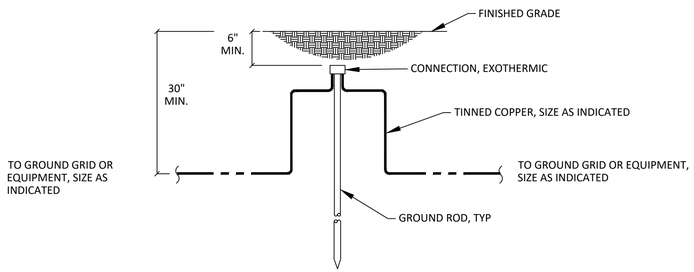
ELECTRICAL SITE PULLBOX DETAIL

SCALE: NTS



ELECTRICAL RACK DETAIL

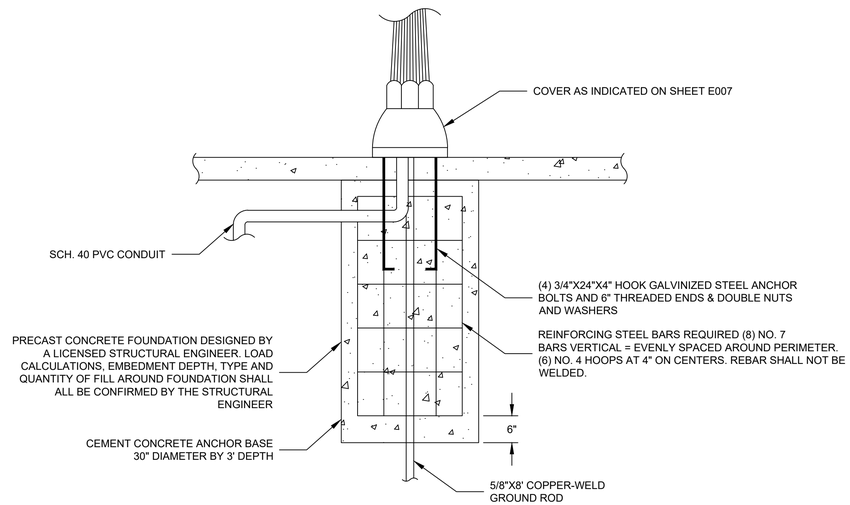
SCALE: NTS



NOTE:
CADWELD GROUND ROD SPLICE CONNECTION TO BE USED IN THE EVENT WHERE ADDITIONAL GROUND RODS ARE REQUIRED TO EXTEND ROD LENGTH BEYOND 10'. ELECTRICAL CONTRACTOR SHALL USE CADWELD CAT. NO. HDGBG-18 MOLD WITH CAT. NO. 2-200 WELD METAL (OR EQUAL).

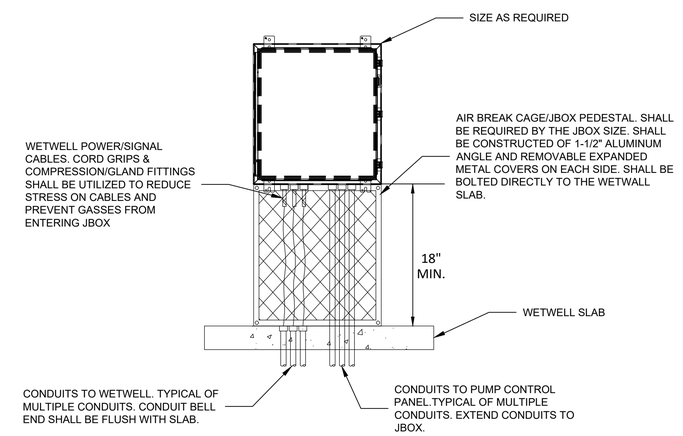
GROUND ROD DETAIL

SCALE: NTS



LIGHT POLE BASE DETAIL

SCALE: NTS



POWER & CONTROL AIR GAP JUNCTION BOXES

SCALE: NTS

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

ELECTRICAL DETAILS

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E008

BID SET

EQUIPMENT IDENTIFICATION DESCRIPTION

AABB-CC-DDEE

AA - BASIN OR DISTRICT
BB - AREA CODE
CC - FUNCTION CODE
DD - PROCESS SEQUENCE
EE - QUANTITY OF LIKE EQUIPMENT

PIPELINE IDENTIFICATION DESCRIPTION

SS"-MMMMM-PPP

SS" - PIPE SIZE (INCHES)
MMMMM - PIPELINE MATERIAL CODE
PPP - PROCESS CODE

PIPE MATERIAL CODE

CS	CARBON STEEL
DI	DUCTILE IRON PIPE
FRP	FIBER REINFORCED PIPE
GC	GROOVED CLASS
HDPE	HIGH DENSITY POLYETHYLENE
PVC	PVC
PVC40	SCHEDULE 40 PVC
PVC80	SCHEDULE 80PVC
SS	STAINLESS STEEL

PROCESS CODE

OC	ODOR CONTROL
RW	RAW WATER
RWP	RAW WATER PUMPING
RWS	RAW WATER STORAGE
SEP	SEPTAGE
SEW	SEWAGE
STS	STORM SEWER

PAGE CONNECTORS

XX
Y ZZZZ
AAA

XX - PROCESS CODE
Y - CONNECTOR DESIGNATION
ZZZZ - SHEET NUMBER
AAA - ORIGIN/DESTINATION DESCRIPTION

LINE SYMBOLS

- MAJOR PROPOSED PROCESS PIPING
- MINOR PROPOSED PROCESS PIPING
- MAJOR EXISTING PROCESS PIPING
- MAJOR FUTURE PROCESS PIPING
- ELECTRICAL OR ELECTRONIC SIGNAL
- SOFTWARE SIGNAL
- PNEUMATIC SIGNAL
- WIRELESS SIGNAL

PRIMARY ELEMENTS AND FITTINGS SYMBOLS

- MAGNETIC FLOWMETER
- ORIFICE PLATE
- ULTRASONIC FLOWMETER
- WEIR
- FLUME
- CAP
- COUPLING
- CONCENTRIC REDUCER
- BLIND FLANGE
- DIAPHRAGM SEAL

VALVES AND GATE SYMBOLS

- CHECK VALVE
- GATE VALVE
- GLOBE VALVE
- KNIFE VALVE
- PLUG VALVE

NETWORK SYMBOLS

- PLC - PROGRAMMABLE LOGIC CONTROLLER
- OEM CONTROLLER
- OIT - OPERATOR INTERFACE TERMINAL
- SA - SURGE ARRESTOR
- UPS - UNINTERRUPTIBLE POWER SUPPLY
- ESW - ETHERNET SWITCH
- HORN ANTENNA/RADIO

PUMP SYMBOLS

- M - ELECTRIC MOTOR
- SMP - SUBMERSIBLE PUMP

MEANINGS OF IDENTIFICATION LETTERS

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USERS CHOICE			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENCE OR DIFFERENTIAL			DEVIATION
E	VOLTAGE (EMF)		SENSOR OR PRIMARY ELEMENT		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, GAUGE, OR VIEWING DEVICE		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER		SCAN		
K	TIME OR TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	USER'S CHOICE				MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE OR TOTALIZE	INTEGRATE OR TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED OR FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION OR MECHANICAL ANALYSIS			VALVE, DAMPER, OR LOUVER	
W	WEIGHT OR FORCE		WELL OR PROBE		
X	UNCLASSIFIED	X AXIS	ACCESSORY DEVICES OR UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESSENCE	Y AXIS		AUXILARY DEVICES	
Z	POSITION, DIMENSION	Z AXIS OR SAFETY INSTRUMENTED SYSTEM		DRIVER, ACTUATOR, OR UNCLASSIFIED FINAL CONTROL ELEMENT	

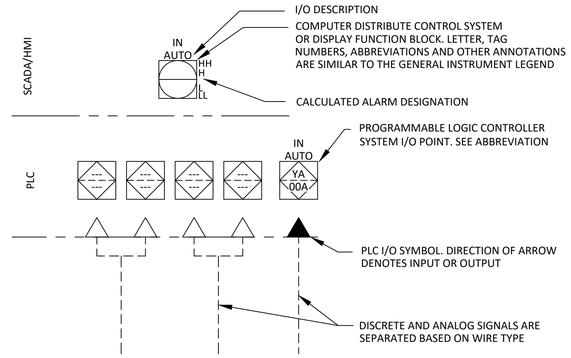
INSTRUMENT AND I/O ABBREVIATION DEFINITION

AAX	ANALYZER HORN
AAL	STROBE ALARM LIGHT
AE	ANALYZER SENSOR
AI	ANALYZER INDICATION
AIT	ANALYZER INDICATING TRANSMITTER
ASH	ANALYZER SWITCH HIGH
ASHH	ANALYZER SWITCH HIGH-HIGH
CB	CONTROL BLOCK REFERENCE (SCADA LEVEL)
DPG	DIFFERENTIAL PRESSURE GAUGE
DPI	DIFFERENTIAL PRESSURE INDICATOR (LED OR SCREEN)
FAL	FLOW ALARM LOW
FAH	FLOW ALARM HIGH
FC	FLOW CONTROLLER
FI	FLOW INDICATOR
FIC	FLOW INDICATING CONTROLLER
FE	PRIMARY FLOW ELEMENT/SENSOR
FG	FLOW SIGHT GAUGE
FIT	FLOW INDICATING TRANSMITTER
FQIT	FLOW TOTALIZING INDICATING TRANSMITTER
FSL	FLOW SWITCH LOW
FSH	FLOW SWITCH HIGH
FT	FLOW TRANSDUCER
FY	FLOW SIGNAL CONVERTER, REPEATER OR ISOLATOR
HIC	HAND INDICATING CONTROLLER
HMS	MOMENTARY PUSHBUTTON OR SELECTOR SWITCH
HS	HAND SWITCH
IE	CURRENT ELEMENT/SENSOR
IAH	CURRENT ALARM HIGH (MOTOR OVERLOAD)
ISH	CURRENT SWITCH HIGH
JA	POWER FAILURE
JI	POWER INDICATOR
JL	POWER INDICATING LIGHT
JIT	POWER INDICATING TRANSMITTER
KQI	TIME TOTALIZING INDICATOR
LE	PRIMARY LEVEL ELEMENT/SENSOR
LG	LEVEL SIGHT GAUGE
LI	LEVEL INDICATOR (LED OR SCREEN)
LIT	LEVEL INDICATING TRANSMITTER
LSL	LEVEL SWITCH LOW
LSH	LEVEL SWITCH HIGH
LT	LEVEL TRANSDUCER
LY	LEVEL SIGNAL CONVERTER, REPEATER OR ISOLATOR
MAH	MOISTURE ALARM HIGH
MSH	MOISTURE SWITCH HIGH
NI	STROKE POSITION SWITCH
NC	STROKE POSITION COMMAND
PE	PRIMARY PRESSURE ELEMENT/SENSOR
PG	PRESSURE GAUGE
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
PSL	PRESSURE SWITCH LOW
PSH	PRESSURE SWITCH HIGH
PT	PRESSURE TRANSDUCER
SI	SPEED INDICATION (LED OR SCREEN)
SC	SPEED CONTROL
SIT	SPEED INDICATING TRANSMITTER
SS	START-STOP SWITCH
SSL	SPEED SWITCH LOW
SSH	SPEED SWITCH HIGH
TAL	TEMPERATURE ALARM LOW
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH-HIGH
TDI	DIFFERENTIAL TEMPERATURE INDICATOR (LED OR SCREEN)
TE	TEMPERATURE SENSOR / RESISTANCE TEMPERATURE DETECTOR
TSL	TEMPERATURE SWITCH LOW
TSH	TEMPERATURE SWITCH HIGH
TSHH	TEMPERATURE SWITCH HIGH-HIGH
TI	TEMPERATURE INDICATOR (LED OR SCREEN)
TIT	TEMPERATURE INDICATING TRANSMITTER
UA	MULTIVARIABLE/COMMON ALARM/COMMON FAULT
UCR	RUN COMMAND
UCS	STOP COMMAND
VAH	VIBRATION ALARM HIGH
WAH	TORQUE ALARM HIGH
WAHH	TORQUE ALARM HIGH-HIGH
WE	PRIMARY WEIGHT SENSOR/LOAD CELL
WIT	WEIGHT INDICATING TRANSMITTER
XA	MOTOR FAIL ALARM
YA	GENERAL ALARM EVENT
YAS	EMERGENCY STOP ALARM
YI	EVENT INDICATION (LED OR SCREEN)
YIR	RUNNING INDICATION
YIS	STOPPED INDICATION
YL	EVENT INDICATING LIGHT
YLR	RUNNING INDICATING LIGHT
YLS	STOPPED INDICATING LIGHT
ZAC	POSITION ALARM CLOSED
ZAO	POSITION ALARM OPENED
ZI	POSITION INDICATOR
ZIC	CLOSED INDICATION
ZIO	OPEN INDICATION
ZSC	CLOSED POSITION SWITCH
ZSO	OPEN POSITION SWITCH
ZIT	POSITION INDICATING TRANSMITTER
ZT	POSITION TRANSMITTER

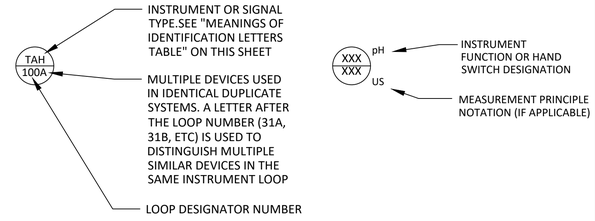
GENERAL INSTRUMENT SYMBOLS

- FIELD MONTED DISCRETE INSTRUMENTS/SIGNALS
- PILOT LIGHT
- DISCRETE INSTRUMENT MOUNTED ON FACE OF PRIMARY PANEL
- DISCRETE INSTRUMENT MOUNTED BEHIND OR INSIDE OF PRIMARY PANEL
- DISCRETE INSTRUMENT MOUNTED ON FACE OF LOCAL PANEL
- DISCRETE INSTRUMENT MOUNTED BEHIND OR INSIDE OF LOCAL PANEL
- PROGRAMMABLE LOGIC CONTROLLER SYSTEM I/O POINT. SEE ABBREVIATION
- HMI INDICATOR/PLC SIGNAL
- ANALOG INPUT
- ANALOG OUTPUT
- DIGITAL INPUT
- DIGITAL OUTPUT
- PULSE INPUT
- GENERAL CONTROL INTERLOCK FUNCTION

TYPICAL TAG NUMBERS AND DESIGNATION



INSTRUMENTATION SYMBOLOGY AND DESIGNATION



MEASUREMENT PRINCIPLE NOTATIONS

CON	CONDUCTANCE
DP	DIFFERENTIAL PRESSURE SENSING
FLN	FLOW NOZZEL
FLT	FLOW TUBE
GWR	GUIDE WAVE
RAD	RADAR
US	ULTRASONIC
VENT	VENTURI TUBE

POWER SUPPLY ABBREVIATIONS

AS	AIR SUPPLY
ES	ELECTRIC SUPPLY
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
SS	STEAM SUPPLY
WS	WATER SUPPLY
120V	120VAC
480V	480VAC

120V — POWER SUPPLY SOURCE LABEL USED ONLY WHERE NECESSARY TO HELP CLARIFY AN INSTRUMENT OR SYSTEM FUNCTION.

HAND SWITCH DESIGNATION

FR	FORWARD-REVERSE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LR	LOCAL-REMOTE
OCA	OPEN-CLOSE-AUTO
OOA	OPEN-OFF-AUTO
OOR	OPEN-OFF-REMOTE
OC	OPEN-CLOSE
OO	ON-OFF
OSC	OPEN-STOP-CLOSE
SS	START - STOP

NOTES:

1. IN GENERAL THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION STANDARD PRACTICE ANSI/ISA-5.1 (2022). SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATICS DRAWINGS HAVE BEEN OMITTED FROM THE P&ID DRAWINGS.
3. THIS IS GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
4. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS ONLY.

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DRAWN	A.TENTZE
CHECKED	A.RISTOW
APPROVED	J.BENDER

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

INSTRUMENTATION SYMBOLS, LEGENDS, AND ABBREVIATIONS

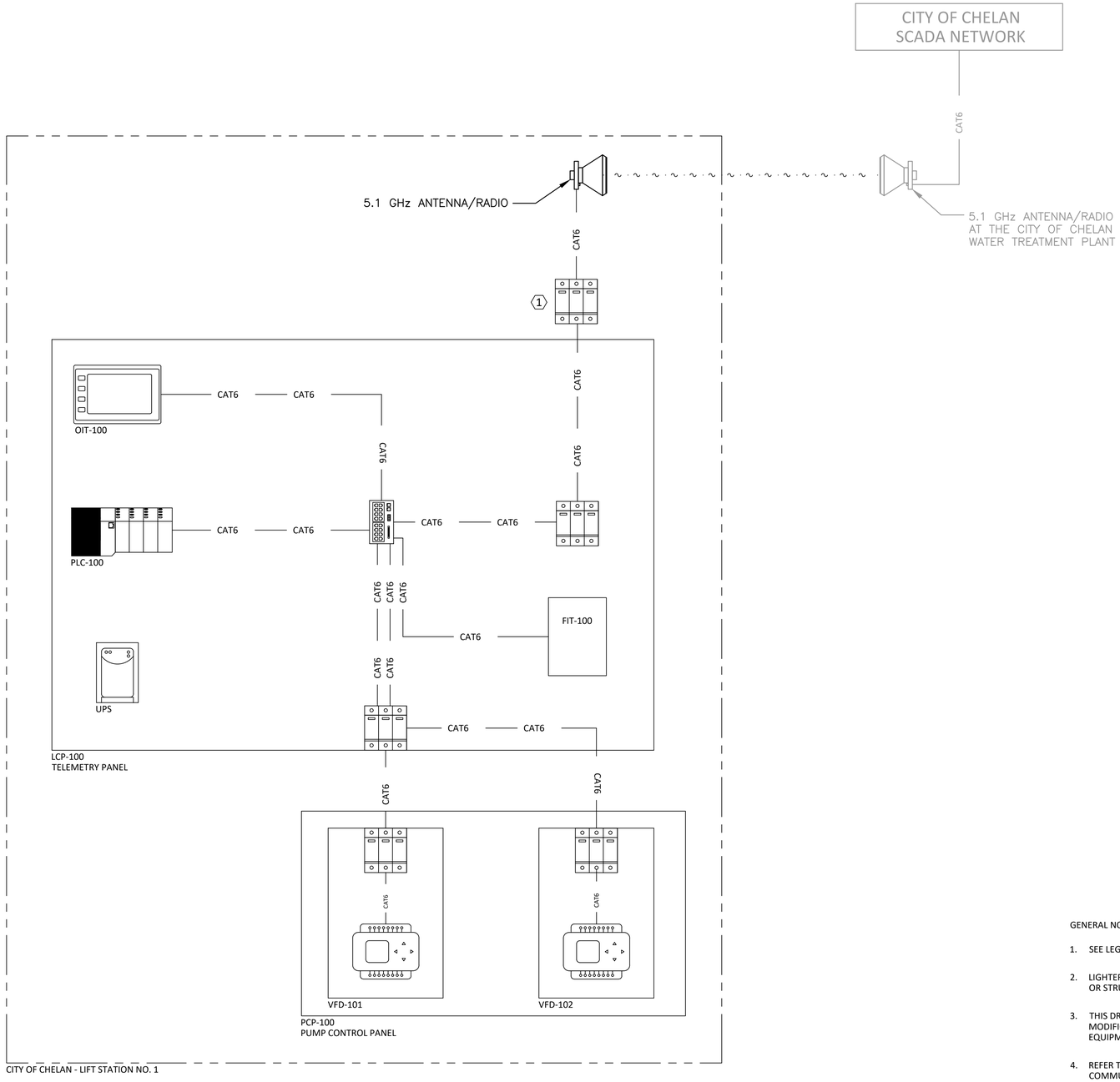
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I001

BID SET

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GENERAL NOTES:

1. SEE LEGEND AND ABBREVIATIONS ON DRAWING I001.
2. LIGHTER LINE WEIGHTS INDICATE EQUIPMENT, INSTRUMENT, PIPING OR STRUCTURES THAT ARE EXISTING OR REUSED.
3. THIS DRAWING IS SHOWN FOR REFERENCE TO SHOW THE MODIFICATIONS WITHIN THIS PROJECT. OTHER EXISTING EQUIPMENT AND INSTRUMENTATION MAY NOT BE SHOWN.
4. REFER TO SPECIFICATIONS 40 66 00 - NETWORK AND COMMUNICATION EQUIPMENT FOR FURTHER DETAILS.

KEYED NOTES "⬡"

1. THE EXTERNAL SURGE ARRESTOR SHALL BE MOUNTED TO THE RADIO POLE USING HOSE CLAMPS OR INSTALLED AT THE PULL BOX (IF APPLICABLE). THE SURGE ARRESTOR SHALL BE AN ALPU-F140 OUTDOOR GIGABIT ETHERNET PoE++.

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

CONTROL SYSTEM BLOCK DIAGRAM

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I002

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SCADA/HMI

TELEMETRY PANEL
LCP-100
PNL-100

FIELD PANELS

PROCESS

SCADA/HMI: LEVEL LI 110; COMM. LOST XA 100; LOW LEVEL CUTOFF LALL 110; H-H LEVEL LAHH 110; IN AUTO YI 101; RUNNING YIR 101; MOTOR FAIL XA 101; VFD FAULT UA 101; RUN CMD UCR 101; SPEED FDBK SI 101; SPEED SP SC 101; HIGH TEMP TAH 101; SEAL FAIL MAH 101; HIGH TEMP TAH 102; SEAL FAIL MAH 102; IN AUTO YI 102; RUNNING YIR 102; MOTOR FAIL XA 102; VFD FAULT UA 102; RUN CMD UCR 102; SPEED FDBK SI 102; SPEED SP SC 102; HIGH PRESS PAH 120; DISCH. FLOW FI 120; DISCH. PRESS PI 120; RTU AC POWER FAIL JA 100A; RTU DC POWER FAIL JA 100B; LOW BATT JA 100C; UPS FAILS YA 100; DOOR OPEN ZAO 100

PLC-100: LI 110; XA 100; LALL 110; LAHH 110; YI 101; YIR 101; XA 101; UA 101; UCR 101; SI 101; SC 101; TAH 101; MAH 101; TAH 102; MAH 102; YI 102; YIR 102; XA 102; UA 102; UCR 102; SI 102; SC 102; PAH 120; FI 120; PI 120; JA 100A; JA 100B; JA 100C; YA 100; ZAO 100

PNL-100: 24V— FIT 120; UPS; ZSO 100

PCP-100 CONTROL PANEL
480V —
HS 100 E-STOP
ETM 101
PUMP No. 1
HS 101 HOA
HS 101A RESET
YIR 101
TAH 101
MAH 101
UA 101
VFD-101
YLR 101
YLS 101
SI 101
UA 101
SC 101
I
PUMP No. 2
HS 102 HOA
HS 102A RESET
ETM 102
YIR 102
TAH 102
MAH 102
UA 102
VFD-102
YLR 102
YLS 102
SI 102
UA 102
SC 102
I
PAH 120

LT 110 RAD
LE 110 RAD
LSHH 110 HIHI
LSH 110 LAG
LSM 110 LEAD
LSL 110 OFF
LSLL 110 LWCO

SWM
N/A | N/A
SEWER MAIN
15"-PVC-SWM

8"-DI-SW
6"x8"
MSH 101
TSH 101
PMP-101
SUBMERSIBLE PUMP NO. 1
20 HP
1032 GPM @ 54.8 FT
MSH 102
TSH 102
PMP-102
SUBMERSIBLE PUMP NO. 2
20 HP
1032 GPM @ 54.8 FT

8" CKV-101? 8" PV-101
8" CKV-102 8" PV-102
METER VAULT
PSH 120
PG 120
FE 120
PIT 120
M
8"-DI-FM
FM
N/A | N/A
TO FORCE MAIN
6"-DI-SW
6" CKV-103

GENERAL NOTES

1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I001.
2. LIGHTER LINE WEIGHTS INDICATE EQUIPMENT, INSTRUMENT, PIPING, OR STRUCTURES THAT ARE EXISTING OR REUSED.
3. THIS DRAWING IS SHOWN FOR REFERENCE TO SHOW MODIFICATIONS WITHIN THIS PROJECT. OTHER EXISTING EQUIPMENT AND INSTRUMENTATION MAY NOT BE SHOWN.
4. IN CASE OF ANY DISCREPANCIES OR VARIANCES BETWEEN THE P&IDS AND THE MECHANICAL DRAWINGS, THE MECHANICAL DRAWINGS SHALL PREVAIL.
5. PROVIDE SURGE PROTECTION ON ANALOG CIRCUITS THAT RUN OUTDOORS.
6. PROVIDE INTRINSICALLY SAFE BARRIERS WITHIN CONTROL PANEL FOR CIRCUITS INTERFACING WITH HAZARDOUS AREAS.
7. CONTROL PANEL SHALL NOT INCLUDE OPENINGS THAT ALLOW OUTSIDE AIR TO ENTER THE PANEL.

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PHONE: (509)-319-2580
WWW.ARDURRA.COM

NO.	DATE	REVISION	BY

BORDER SIZE 22"x34"
DESIGNED F.PADRON
DRAWN A.TIENTZE
CHECKED A.RISTOW
APPROVED J.BENDER

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

P&ID - LIFT STATION NO. 1

ATTENTION:
0 1/2
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JOB NO: A-240217
DATE: JUNE 2026

I003

BID SET

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SCADA/HMI

TELEMETRY PANEL
LCP-100
PLC-100
PNL-100

FIELD PANELS

PROCESS

GEN IN AUTO YI 200 | RUNNING YIR 200 | E-STOP YAS 200 | FAULT UA 200 | GEN HIGH TEMP TAH 200 | FUEL LOW LEVEL LAL 200 | UTILITY POWER JI 200A | GEN POWER JI 200B | FAIL YA 200 | RUN CMD UCR 200

ENGINE GENERATOR ENCLOSURE

BATTERY AND CHARGER

GENERATOR CONTROL PANEL

HS 200 E-STOP

AUTOMATIC TRANSFER SWITCH

ATS-200

XA 200

GENERATOR FUEL TANK

LSL 200

GEN-200
480V - 50KW

GENERAL NOTES

1. SEE LEGEND AND ABBREVIATIONS ON DRAWINGS I001.
2. THIS DRAWING IS SHOWN FOR REFERENCE TO SHOW MODIFICATIONS WITHIN THIS PROJECT. OTHER EXISTING EQUIPMENT AND INSTRUMENTATION MAY NOT BE SHOWN.
3. IN CASE OF ANY DISCREPANCIES OR VARIANCES BETWEEN THE P&IDS AND THE MECHANICAL DRAWINGS, THE MECHANICAL DRAWINGS SHALL PREVAIL.
4. PROVIDE SURGE PROTECTION ON ANALOG CIRCUITS THAT RUN OUTDOORS.
5. PROVIDE INTRINSICALLY SAFE BARRIERS WITHIN CONTROL PANEL FOR CIRCUITS INTERFACING WITH HAZARDOUS AREAS.
6. CONTROL PANEL SHALL NOT INCLUDE OPENINGS THAT ALLOW OUTSIDE AIR TO ENTER THE PANEL.

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

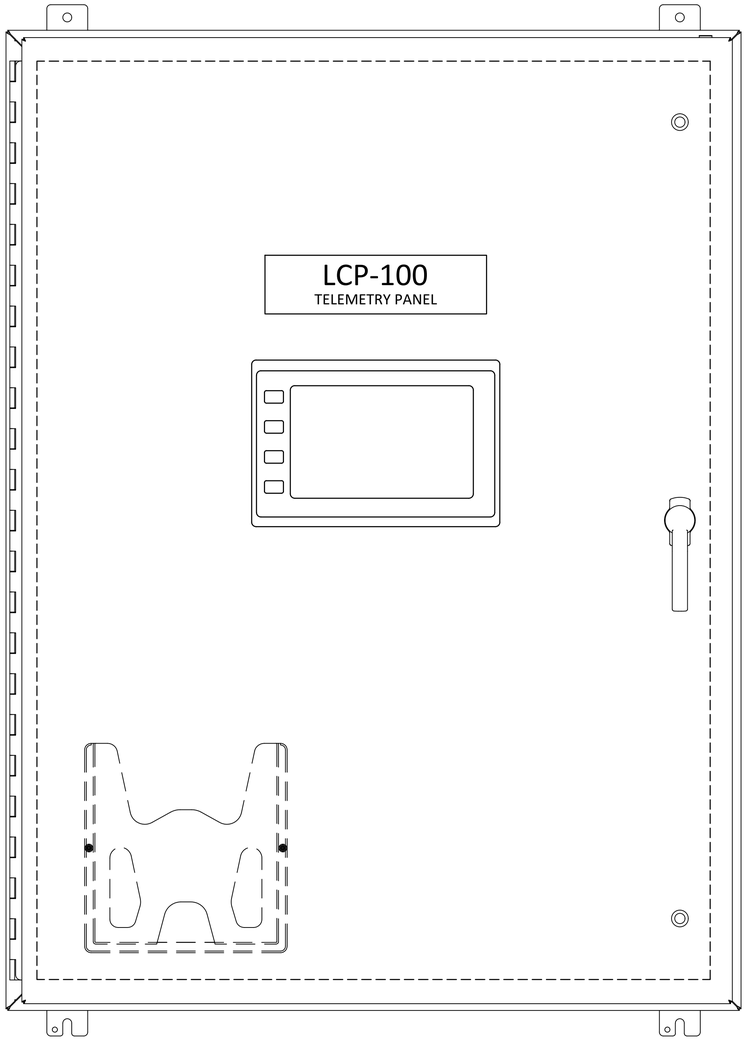
P&ID - BACKUP GENERATOR

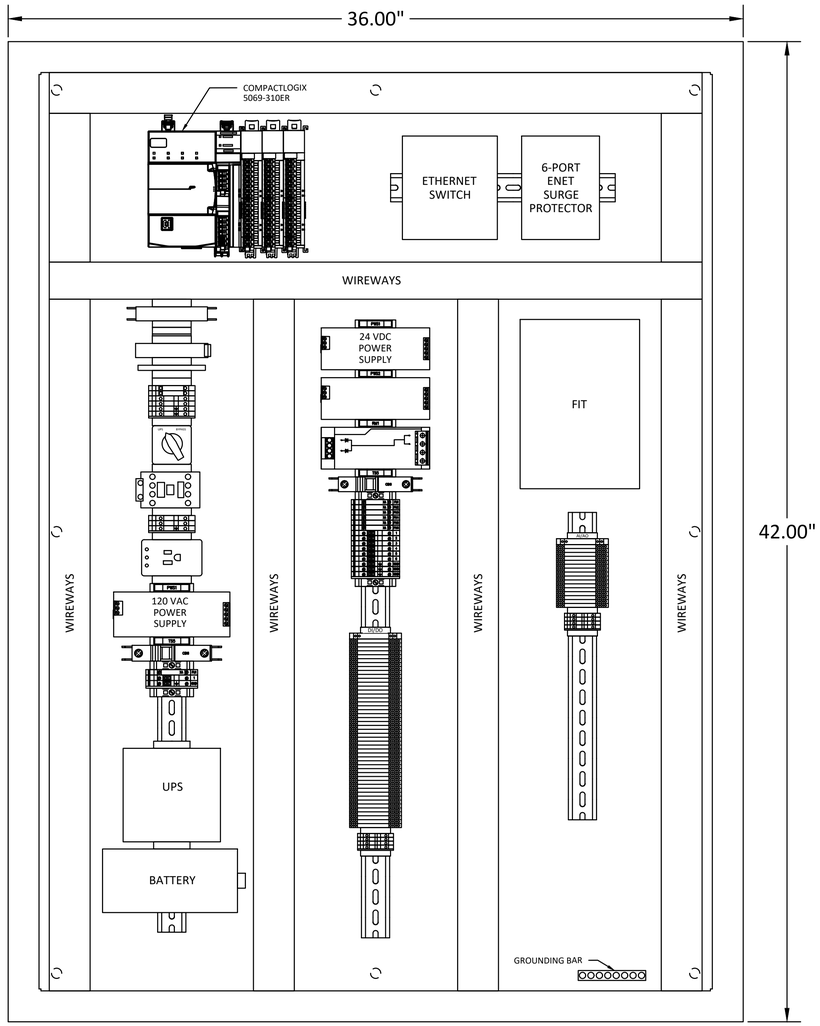
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DATE: JUNE 2026

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GENERAL NOTES

1. ENCLOSURE LAYOUT AND DIMENSIONS ARE SHOWN FOR CONCEPTUAL REFERENCE ONLY. THE CONTRACTOR SHALL COORDINATE FINAL PANEL SIZE, CONFIGURATION, AND COMPONENT ARRANGEMENT WITH THE APPROVED ENCLOSURE MANUFACTURER.
2. THE CONTRACTOR SHALL SUBMIT COMPLETE PANEL FABRICATION AND LAYOUT DRAWINGS, INCLUDING ALL REQUIRED HARDWARE AND ACCESSORIES, FOR ENGINEER REVIEW AND APPROVAL PRIOR TO MANUFACTURE.
3. FOR ADDITIONAL REQUIREMENTS, REFER TO THE FOLLOWING SPECIFICATION SECTIONS:
   - 40 63 43 - PROGRAMMABLE LOGIC CONTROLLER.
   - 40 66 00 - NETWORK AND COMMUNICATION EQUIPMENT.
   - 40 67 00 - CONTROL PANEL ENCLOSURES AND PANEL EQUIPMENT.
   - 40 67 63 - UNINTERRUPTIBLE POWER SUPPLY.

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BORDER SIZE	22"x34"
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CHECKED	A.RISTOW
APPROVED	J.BENDER

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

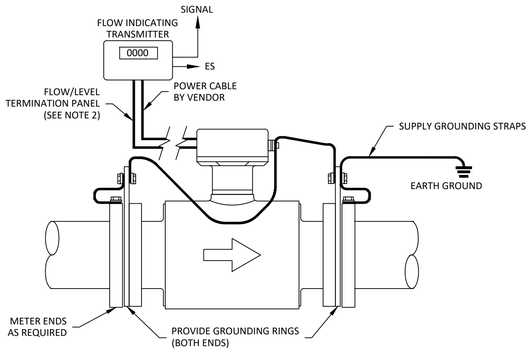
PROPOSED TELEMETRY PANEL LAYOUT

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I005

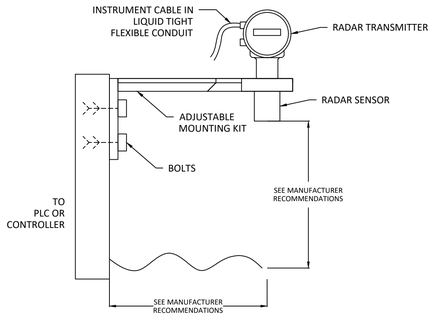
BID SET



NOTES:

1. FOR DETAILED SPECIFICATIONS REFER TO MAGNETIC FLOWMETER SPECIFICATIONS SECTION 40 71 13 OR 13511.
2. POWER SUPPLY TO MAGNETIC METER PRIMARY DEVICE AND TRANSMITTER TO BE FROM SAME SOURCE WITH RESPECT TO VOLTAGE, FREQUENCY AND PHASE.
3. INSTALLATION OF METERS SHALL PROVIDE FOR 5 PIPE DIAMETERS UPSTREAM AND 2 PIPE DIAMETERS DOWNSTREAM. OR AS SPECIFIED IN MANUFACTURER INSTALLATION MANUAL.
4. METER SHALL BE INSTALLED SO THAT IT CAN BE TAKEN OUT OF SERVICE FOR CALIBRATION AND/OR MAINTENANCE WITHOUT DISRUPTING ASSOCIATED PROCESS.
5. METER SHALL NOT BE LOCATED NEAR HEAVY INDUCTION EQUIPMENT (MIN 20 FEET)
6. CONTRACTOR SHALL INSTALL FLOWMETER COMPONENTS PER MANUFACTURER O&M INSTALLATION REQUIREMENTS.
7. FLOWMETER GROUNDING SHALL BE PER MANUFACTURER REQUIREMENTS.
8. ORIENT THE METER SO THAT THE ELECTRODES LIE IN PLANE PARALLEL TO FLOOR.
9. INSTALL AIR BLEED VALVES FOR METER MOUNTED HORIZONTALLY.
10. WALL MOUNT THE TRANSMITTER WITHIN SIGHT OF METER.
11. OUTDOOR INSTALLATIONS SHALL PROVIDE SUNSHIELD FOR TRANSMITTER.

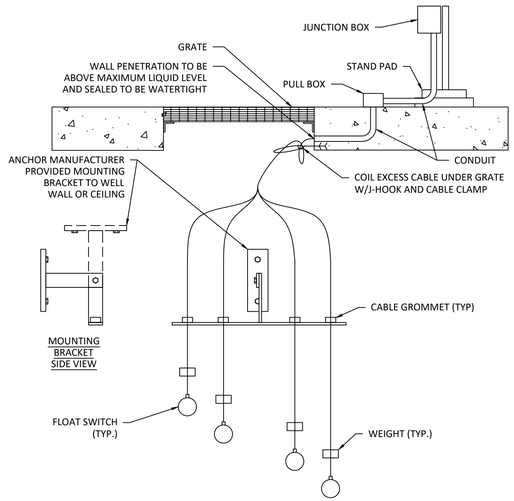
INSTALLATION DETAIL
1 / -
REMOTE DISPLAY ELECTROMAGNETIC FLOW METER
NTS



NOTES:

1. PROVIDE TEMPERATURE COMPENSATION FOR SENSOR PER MANUFACTURER RECOMMENDATIONS.
2. ADJUSTABLE MOUNTING KIT FROM MANUFACTURER TO BE USED FOR CANTILEVER INSTALLATIONS.
3. FLEXIBLE CONDUIT SHALL BE SECURED PER NEC REQUIREMENTS.

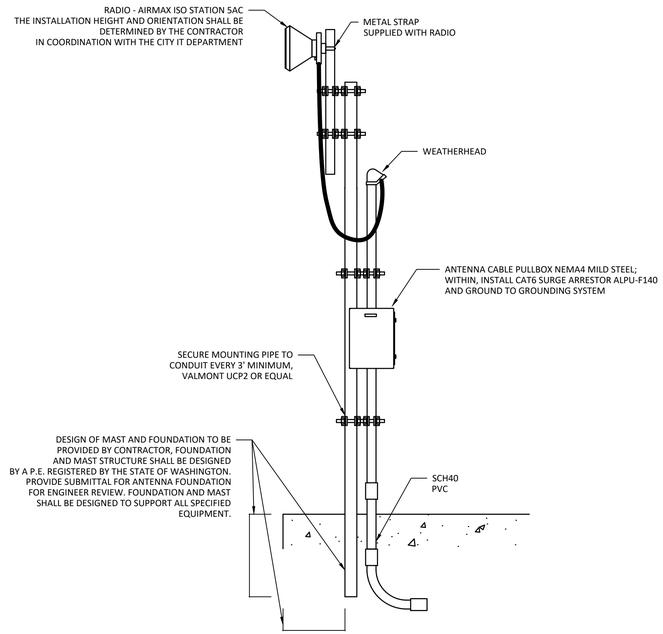
INSTALLATION DETAIL
2 / -
RADAR LEVEL TRANSMITTER
NTS



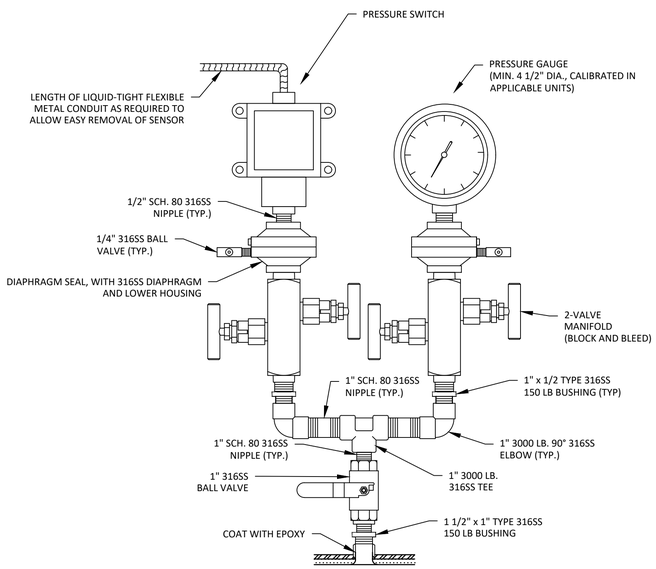
NOTES:

1. INSTRUMENT TAG TO BE AFFIXED IN A LOCATION ADJACENT TO THE INSTRUMENT WITH SELF TAPPING STAINLESS STEEL SCREWS, STAINLESS STEEL WIRE, OR STAINLESS STEEL CHAIN.
2. CONTRACTOR TO PROVIDE NEMA 4X 316SS FLOAT TERMINATION BOX SIZED ACCORDING TO NEC REQUIREMENTS. CONTRACTOR TO PROVIDE TERMINATION BLOCKS, LABELS FOR ALL CABLES AND WIRES, AND J-HOOK TO COIL EXTRA CABLE.
3. CONTRACTOR TO INSTALL CONDUIT BODIES (CONDULETS) AND ELECTRICAL FITTINGS AS REQUIRED TO FACILITATE CABLE PULLING AND FUTURE REPLACEMENT.
4. SPLICES AND TERMINATION SHALL BE IN A NON-HAZARDOUS AREA AND INTRINSICALLY SAFE RELAYS SHALL BE USED ON ALL FLOAT SWITCH CIRCUITS.
5. FLOAT WEIGHT MATERIAL SHALL BE POLYPROPYLENE (PP), POLYVINYL CHLORIDE (PVC), OR ZINC PLATED CAST IRON, AS APPROPRIATE FOR THE PROCESS APPLICATION. REFER TO SPECIFICATIONS FOR FURTHER DETAILS.
6. SEAL-OFF FITTING SHALL BE INSTALLED AFTER THE JUNCTION BOX.

INSTALLATION DETAIL
3 / -
BRACKET MOUNTED WEIGHTED LEVEL FLOATS
NTS



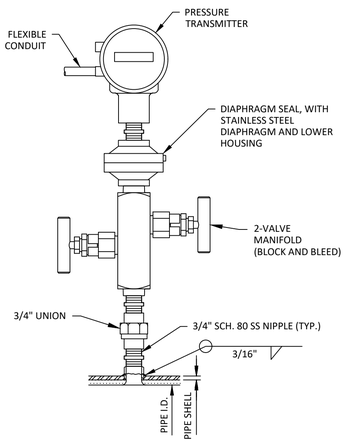
INSTALLATION DETAIL
4 / -
ANTENNA/RADIO POLE MOUNTED
NTS



NOTES:

1. ROTATE GAUGE AS REQUIRED TO ENSURE VISIBILITY FROM THE VAULT HATCH.

INSTALLATION DETAIL
5 / -
PRESSURE SWITCH AND PRESSURE GAUGE
NTS



NOTES:

1. CONNECTION TO PROCESS PIPE SHALL BE ON THE UPPER 45° AXIS OF THE PIPE OR THE SIDE OF THE PIPE TO PREVENT AIR POCKETS OR SEDIMENTATION FROM GATHERING IN THE LINE.

INSTALLATION DETAIL
6 / -
PRESSURE TRANSMITTER
NTS

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NO.	DATE	REVISION	BY

BORDER SIZE 22"x34"
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DRAWN A.TENTZE
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APPROVED J.BENDER

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

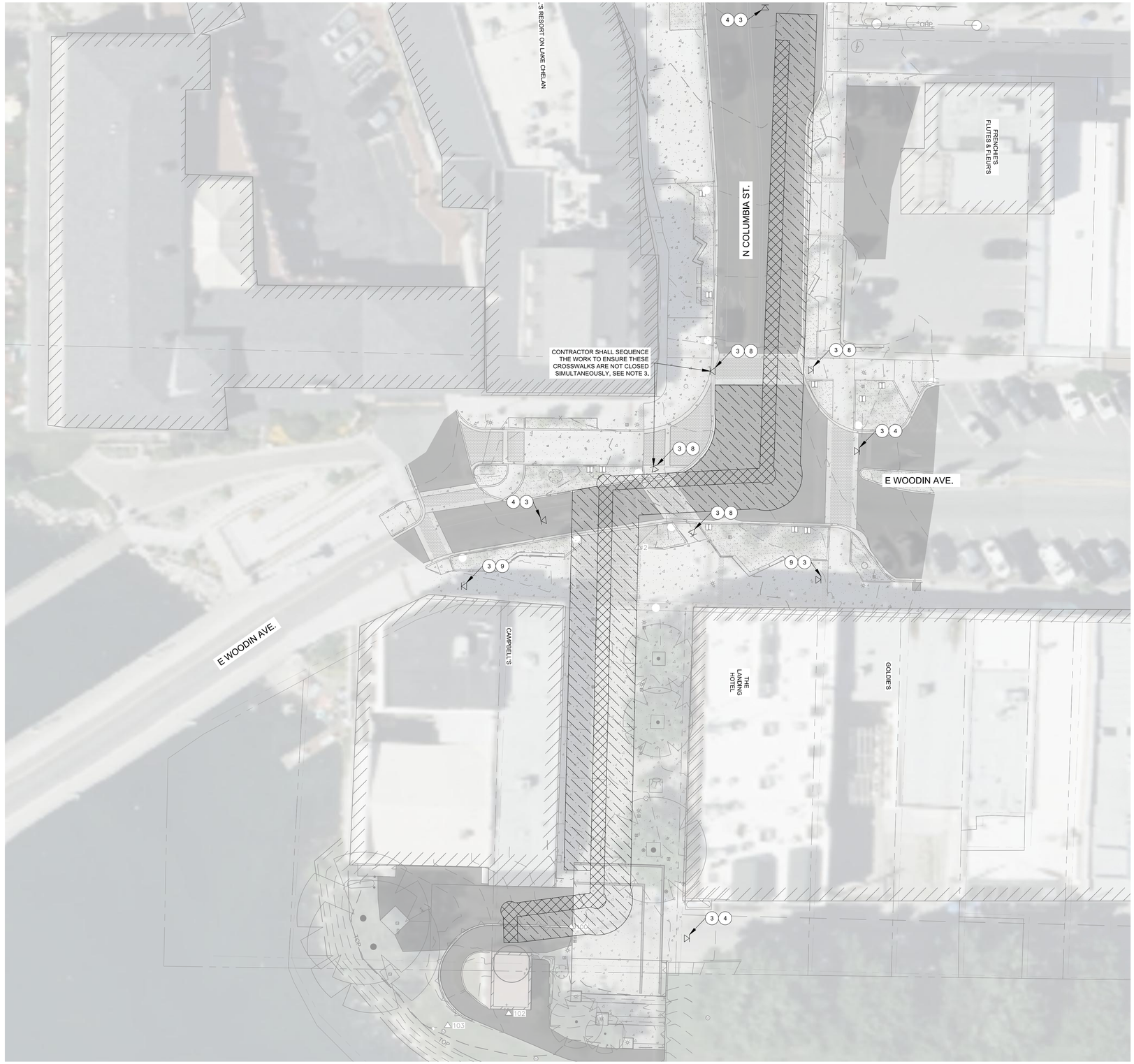
INSTRUMENTATION AND CONTROLS
INSTALLATION DETAILS

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TEMPORARY TRAFFIC CONTROL LEGEND:

- WORK AREA
- TRENCH
- TEMPORARY SIGN LOCATION

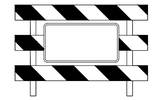
TEMP TRAFFIC CONTROL SIGNS:



1 W20-1 48"X48"



2 W20-3 48"X48"



3 TYPE III BARRICADE WITH MOUNTED SIGN



4 R11-2 48"X30"



5 M4-10R 48"X18"



6 M4-10 48"X18"



7 M4-10L 48"X18"



8 R9-9 24"X12"



9 R9-11 24"X12"

TEMPORARY TRAFFIC CONTROL GENERAL NOTES:

1. TRAFFIC CONTROL PLANS ARE INTENDED FOR IMPLEMENTATION DURING THE INSTALLATION OF THE GRAVITY SEWER MAIN REPLACEMENT IN COLUMBIA STREET AND WOODIN AVE. ROADWAY CLOSURES AND TRAFFIC CONTROL MEASURES ARE ONLY INTENDED FOR USE DURING THIS TIME. ROADS SHALL REMAIN OPEN DURING THE REMAINDER OF THE PROJECT DURATION.

2. TRAFFIC CONTROL MEASURES DEPICTED IN THE PLANS ARE CONCEPTUAL IN NATURE AND INTENDED TO IDENTIFY THE MINIMUM SITE-SPECIFIC TRAFFIC CONTROL MEASURES. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PREPARE SITE SPECIFIC AND SEQUENTIAL TRAFFIC CONTROL PLANS FOR REVIEW AND APPROVAL BY THE CITY OF CHELAN.

3. SIDEWALK CLOSURES SHOWN ON THESE PLANS ARE CONCEPTUAL IN NATURE. THE CONTRACTOR SHALL PROVIDE SEPARATE SITE-SPECIFIC PEDESTRIAN TRAFFIC CONTROL PLANS TO ACCOMMODATE SIDEWALK CLOSURES REQUIRED TO CONSTRUCT THE PROPOSED IMPROVEMENTS BASED ON FIELD CONDITIONS. SIDEWALK CLOSURES AND CROSSWALK CLOSURES SHALL BE PLANNED TO LIMIT PEDESTRIAN DETOUR PATHS.

4. ALL SIGNS SHALL COMPLY WITH MUTCD STANDARDS. SIGNS SHOWN ON PLANS ARE INTENDED TO DEPICT GENERAL INTENT. CONTRACTOR SHALL PROVIDE SITE SPECIFIC SIGNAGE ON THEIR SITE-SPECIFIC TRAFFIC CONTROL PLANS.

5. NO TEMPORARY ROADWAY TRAFFIC CONTROL SIGNAGE SHALL IMPEDE THE PEDESTRIAN TRAVELED WAY.

6. ANY REQUIRED REVISIONS TO THE WSDOT OWNED SIGNALS SHALL BE COORDINATED WITH WSDOT PRIOR TO REVISIONS. WSDOT REQUIRES A 20-CALENDAR DAY REVIEW PERIOD. FINAL PLANS MUST BE APPROVED BY THE CITY OF CHELAN.

0 10 20 40 60

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DRAWN X.XXX
CHECKED X. XXX
APPROVED X. XXX

CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

SITE TRAFFIC CONTROL

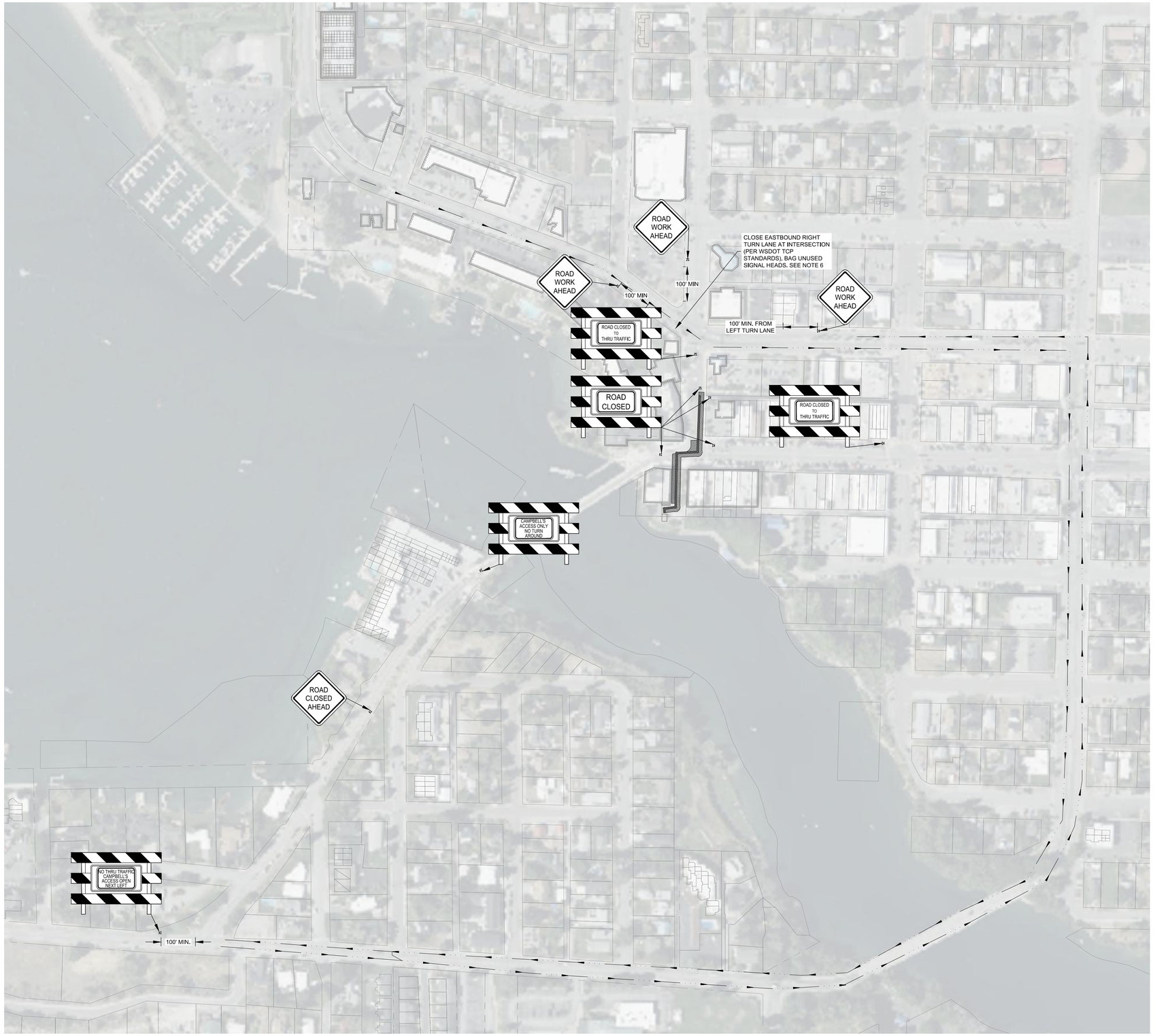
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TEMPORARY TRAFFIC CONTROL LEGEND:

- WORK AREA
- TRENCH
- TEMPORARY SIGN LOCATION
- DETOUR ROUTE

TEMP TRAFFIC CONTROL SIGNS:

1. ROAD WORK AHEAD — W20-1, 48"X48"
2. ROAD CLOSED AHEAD — W20-3, 48"X48"
3. TYPE III BARRICADE WITH MOUNTED SIGN
4. ROAD CLOSED — R11-2, 48"X30"
5. DETOUR — M4-10R, 48"X18"
6. DETOUR — M4-10, 48"X18"
7. DETOUR — M4-10L, 48"X18"
8. ROAD CLOSED TO THRU TRAFFIC — R11-4, 60"X30"
9. NO THRU TRAFFIC CAMPBELL'S ACCESS OPEN NEXT LEFT — CUSTOM SIGN, 60"X30"
10. CAMPBELL'S ACCESS ONLY NO TURN AROUND — CUSTOM SIGN, 60"X30"

TEMPORARY TRAFFIC CONTROL GENERAL NOTES:

1. TRAFFIC CONTROL PLANS ARE INTENDED FOR IMPLEMENTATION DURING THE INSTALLATION OF THE GRAVITY SEWER MAIN REPLACEMENT IN COLUMBIA STREET AND WOODIN AVE. ROADWAY CLOSURES AND TRAFFIC CONTROL MEASURES ARE ONLY INTENDED FOR USE DURING THIS TIME. ROADS SHALL REMAIN OPEN DURING THE REMAINDER OF THE PROJECT DURATION.
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0 75 150 300 450

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1/7/2026

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CITY OF CHELAN
LIFT STATION CC-1 UPGRADES

TRAFFIC CONTROL OVERVIEW

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PROJECT MANUAL

FOR

City of Chelan
Lift Station CC-1 Upgrade

Chelan, WA

17 June 2026

ARDURRA

Lift Station CC-1 Upgrade

City of Chelan

DESIGN PROFESSIONAL CERTIFICATION



Civil Engineer
Ardurra
Jake Bender, PE
WA State PE No. 20100361
Responsible for Divisions 00-43 except where indicated as prepared by others



Electrical/ Controls Engineer
Ardurra
Agata Ristow, PE
WA State PE No. 24034659
Responsible for Division 26 and Sections 406113 to 407800



Structural Engineer
Ardurra
Colin Moran, PE
WA State PE No. 24033928
Responsible for Division 03



Landscape Architect
Ardurra
Mark Puddy, PLA
WA State PLA No. 1608
Responsible for Division 320190.33, 323300, 3328400, 329000, 361414

City of Chelan

Division	Subsection	Description
00		**PROCUREMENT AND CONTRACTING REQUIREMENTS**
	0101	COVER
	0107	DESIGN PROFESSIONAL CERTIFICATION
	0110	TABLE OF CONTENTS
	1113	ADVERTISEMENT FOR BIDS
	2113	INSTRUCTIONS TO BIDDERS
	4143	BID FORM
	4300	BID BOND
	5100	NOTICE OF AWARD
	5200	CONTRACT AGREEMENT
	6113.13	PERFORMANCE BOND
	6113.16	PAYMENT BOND
	7200	GENERAL CONDITIONS
	7314	SUPPLEMENTARY CONDITIONS
	8501	CWSRF SPECIFICATION INSERT
	8504	NON-COLLUSION AFFIDAVIT
01		**GENERAL REQUIREMENTS**
	0410	PROJECT COORDINATION
	1000	SUMMARY
	1216	WORK SEQUENCE
	1217	TEMPORARY BYPASS PUMPING SYSTEM
	2000	MEASUREMENT AND PAYMENT
	2100	ALLOWANCES
	2300	ALTERNATES
	2500	SUBSTITUTION PROCEDURES
	3000	ADMINISTRATIVE REQUIREMENTS
	3216	CONSTRUCTION PROGRESS SCHEDULE
	3300	SUBMITTAL PROCEDURE
	4000	QUALITY REQUIREMENTS
	5000	TEMPORARY FACILITIES AND CONTROLS
	5726	DUST CONTROL
	6000	PRODUCT REQUIREMENTS
	7000	EXECUTION AND CLOSEOUT REQUIREMENTS
	7123	CONSTRUCTION SURVEYING
	7419	CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
02		**EXISTING CONDITIONS**
	2623	ASBESTOS ASSESSMENT
	2626.01	DRY PIT LEAD ASSESSMENT
	2626.02	BUILDING LEAD ASSESSMENT
	3200	GEOTECHNICAL ENGINEERING EVALUATION
	4100	DEMOLITION
	6100	SOIL AND GROUNDWATER MANAGEMENT PLAN
	8213.33	ASBESTOS ABATEMENT FOR UTILITIES

Division	Subsection	Description
03		**CONCRETE**
	2100	CONCRETE REINFORCING BAR
	3100	CONCRETE CAST IN PLACE
09		**FINISHES**
	9000	PAINTING AND COATING
	9500	CONCRETE REHABILITATION
26		**ELECTRICAL**
	0000	GENERAL ELECTRICAL PROVISIONS
	0519	LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
	0526	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
	0529	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
	0533.13	CONDUIT FOR ELECTRICAL SYSTEMS
	0533.16	BOXES FOR ELECTRICAL SYSTEMS
	0543	UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS
	0553	IDENTIFICATION FOR ELECTRICAL SYSTEMS
	0573	POWER SYSTEM STUDIES
	0800	COMMISSIONING OF ELECTRICAL SYSTEMS
	2213	LOW VOLTAGE DISTRIBUTION TRANSFORMERS
	2416	PANELBOARDS
	2726	WIRING DEVICES
	2816	ENCLOSED SWITCHES AND CIRCUIT BREAKERS
	2913	COMMON CONTROL PANEL REQUIREMENTS FOR EQUIPMENT
	2993	VARIABLE FREQUENCY MOTOR CONTROLLERS
	3213.13	DIESEL ENGINE DRIVEN GENERATOR SETS
	3623	AUTOMATIC TRANSFER SWITCHES
	4313	SURGE PROTECTIVE DEVICES FOR LOW VOLTAGE ELECTRICAL POWER CIRCUITS
	5000	LIGHTING
31		**EARTHWORK**
	0513	SOILS FOR EARTHWORK
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Owner: City of Chelan
50 State Route 150
Chelan, WA 98816

ADVERTISEMENT FOR BIDS

Sealed Bids for the construction of:
City of Chelan
Lift Station CC-1 Upgrade
Chelan, Washington
will be received, by **Owner**, either:

- Physically: to the office of **Chelan Public Works, 50 State Route 150, Chelan, WA 98816**,
- Digitally: to **Quest CDN VirtuBid (vBid).** See Quest CDN details below.

until **3:00 pm** local time on **Wednesday, July 15th**, **2026,** at which time the Bids received will be publicly opened and read.

The Project consists of the construction and modification of a public sewer lift station, including demolition of the existing CMU building and removal of all existing triplex lift station components. Work includes replacement of the gravity sewer, installation of a new precast valve vault, rehabilitation of the existing wet well, and installation of new duplex lift station equipment with associated electrical and control system upgrades. Additional improvements include installation of a new backup generator, construction of a new force main, water main installation, and storm drainage enhancements. Site work will include landscaping and general site improvements such as retaining walls, asphalt and concrete surfacing, stairs and handrails, fencing, irrigation, plantings, and other items necessary to complete the Work included in the Project.

Bids will be received for a single prime Contract. Bids shall be on a lump sum basis with alternatives and allowances as indicated in the Bid Form.

Information and Bidding Documents for the Project as well as online bidding features are available from the following website:

Quest CDN
www.questcdn.com
Reference Number: [10231239]

Prospective Bidders are urged to register with the designated website as a plan holder, even if Bidding Documents are obtained from a plan room or source other than the designated website in either electronic or paper format. The designated website will be updated periodically with addenda, online bidding capabilities (vBid) lists of registered plan holders, reports, and other information relevant to submitting a Bid for the Project. All official notifications, addenda, and other Bidding Documents will be offered only through the designated website. Contact QuestCDN Customer Support at 952-233-1632 or Support@questcdn.com for membership, digital download, or digital bidding (vBid) assistance. Neither Owner nor Engineer will be responsible for Bidding Documents, including addenda, if any, obtained from sources other than the designated website.

A **mandatory** pre-bid conference and site visit will be held at **9:00 am** local time on **Thursday, June 25th** at the **Chelan Public Works, 50 State Route 150, Chelan, WA 98816**. The last day for bid questions will be **Wednesday, July 8th.**

All prospective bidders are directed to the Instructions to Bidders for discussion of Bid policies, procedures, and requirements. The owner reserves the right to reject any and all Bids, to waive any and all informalities and to negotiate contract terms with the successful Bidder, and the right to disregard all non-conforming, non-responsive or conditional Bids.

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The Project is funded by Washington Department of Ecology's State Revolving Fund Loan. Prospective bidders are notified that the work under this Contract is funded in part by Federal Aid Funds. The Contractor will be required to comply with all applicable Federal and State Equal Employment Opportunity Laws and Regulations. To be eligible for award, the Contractor must agree to comply with the Affirmative Action Requirements, Prevailing Wage Rates (Davis Bacon and WA Prevailing Wage), and American Iron and Steel (AIS) requirements identified in the Contract Documents.

Owner: **City of Chelan**

By: **Travis Denham**

Title: **City Engineer**

Date: **Wednesday, June 17, 2026**

+ + END OF ADVERTISEMENT FOR BIDS + +

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INSTRUCTIONS TO BIDDERS

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ARTICLE 1 – **DEFINED TERMS**

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued and in which the bidding procedures are to be administered.

ARTICLE 2 – **COPIES OF BIDDING DOCUMENTS**

2.01 Complete sets of the Bidding Documents for the Project as well as online bidding features are available from the following website: Quest CDN www.questcdn.com Reference Number: [10231239]

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not authorize or confer a license for any other use.

2.04 Owner has established a Bidding Documents Website as indicated in the Advertisement to bid. Owner recommends that Bidder register as a plan holder with the Issuing Office at such website, and obtain a complete set of the Bidding Documents from such website. Bidders may rely that sets of Bidding Documents obtained from the Bidding Documents Website are complete, unless an omission is blatant. Registered plan holders will receive Addenda issued by Owner.

2.05 Electronic Documents

A. When the Bidding Requirements indicate that electronic (digital) copies of the Bidding Documents are available, such documents will be made available to the Bidders as Electronic Documents in the manner specified.

1. Bidding Documents will be provided in PDF (Portable Document Format) (.pdf). It is the intent of the Engineer and Owner that such Electronic Documents are to be exactly representative of the original copies of the documents. However, because the Owner and Engineer cannot totally control the transmission and receipt of Electronic Documents nor the Contractor's means of reproduction of such documents, the Owner and Engineer cannot and do not guarantee that Electronic Documents and reproductions prepared from those versions are identical in every manner to the original copies.

B. Unless otherwise stated in the Bidding Documents, the Bidder may use and rely upon complete sets of Electronic Documents of the Bidding Documents, described in Paragraph 2.03.A above. However, Bidder assumes all risks associated with differences arising from transmission/receipt of Electronic Documents versions of Bidding Documents and reproductions prepared from those versions and, further, assumes all risks, costs, and responsibility associated with use of the Electronic Documents versions to derive information that is not explicitly contained in printed paper versions of the documents, and for Bidder's reliance upon such derived information.

ARTICLE 3 – **QUALIFICATIONS OF BIDDERS**

3.01 To demonstrate Bidder's qualifications to perform the Work, after submitting its Bid and within five days of Owner's request, Bidder shall submit written evidence establishing its qualifications

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such as financial data, previous experience, present commitments, and the following additional information:

A. Evidence of Bidder's authority to do business in the state where the Project is located including evidence of Bond and Insurance.

B. Bidder's state contractor license number.

C. Subcontractor qualification information; according to Revised Code of Washington (RCW) Section 39.30.060. See Article 10 of Section 004143.

D. Provide the name, date and description of projects in which the bidder or the bidder's subcontractor constructed at least two (2) sewage lift stations within the past eight (8) years, and the following related information: the name of the agency awarding the contract; the name of the agency's contact person; the contact person's telephone number; and contract value.

E. Names, addresses, and telephone numbers of three (3) persons that the bidders successfully completed three (3) similar projects within the last eight (8) years. Ensure those persons are authorized to discuss with owner, confidential information attesting to the bidders competency to perform the proposed work.

F. List of at least three (3) similar projects within the last ten (10) years the Superintendent and Project Manager completed while maintaining the roles with the bidding company. Provide references that are authorized to discuss with owner, confidential information attesting to the Superintendent and Project Managers competency to perform the proposed work.

3.02 A Bidder's failure to submit required qualification information within the times indicated may disqualify Bidder from receiving an award of the Contract.

3.03 No requirement in this Article 3 to submit information will prejudice the right of Owner to seek additional pertinent information regarding Bidder's qualifications.

3.04 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

ARTICLE 4 – **SITE AND OTHER AREAS; EXISTING SITE CONDITIONS; EXAMINATION OF SITE; OWNER'S SAFETY PROGRAM; OTHER WORK AT THE SITE**

4.01 *Site and Other Areas*

A. The Site is identified in the Bidding Documents. By definition, the Site includes rights-of-way, easements, and other lands furnished by Owner for the use of the Contractor. Any additional lands required for temporary construction facilities, construction equipment, or storage of materials and equipment, and any access needed for such additional lands, are to be obtained and paid for by Contractor.

4.02 *Other Site-related Documents*

A. In addition to the documents regarding existing Site conditions referred to in Paragraph 5.01.D, the following other documents relating to conditions at or adjacent to the Site are known to Owner and made available to Bidders for reference. Topics included in each attachment are listed, but topics listed may not be exhaustive for the contents of any given attachment.

1. ATTACHMENT A – 1985 Chelan Lift Station CC-1 Upgrades
2. ATTACHMENT B – 2019 Chelan Lift Station CC-1 TOPO

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3. ATTACHMENT C – 2014 Chelan Lift Station CC-2 Upgrades

B. Digital copies of these other Site-related documents are available as Attachments at the end of this Project Manual.

C. Owner has not verified the contents of these other Site-related documents, and Bidder may not rely on the accuracy of any data or information in such documents. Bidder is responsible for any interpretation or conclusion Bidder draws from the other Site-related documents.

D. The other Site-related documents are not part of the Contract Documents.

E. Bidders are encouraged to review the other Site-related documents, but Bidders will not be held accountable for any data or information in such documents. The requirement to review and take responsibility for documentary Site information is limited to information in (1) the Contract Documents and (2) the Technical Data.

4.03 *Site Visit and Testing by Bidders*

A. Bidder shall conduct the Site visit during normal working hours (7:00 am to 4:00 pm Monday through Friday) by appointment with City of Chelan, 509-682-8030, and shall not disturb any ongoing operations at the Site.

B. Bidder is not required to conduct any subsurface testing, or exhaustive investigations of Site conditions.

C. On request, and to the extent Owner has control over the Site, and schedule permitting, the Owner will provide Bidder access to the Site to conduct such additional examinations, investigations, explorations, tests, and studies as Bidder deems necessary for preparing and submitting a successful Bid. Owner will not have any obligation to grant such access if doing so is not practical because of existing operations, security or safety concerns, or restraints on Owner's authority regarding the Site.

D. Bidder shall comply with all applicable Laws and Regulations regarding excavation and location of utilities, obtain all permits, and comply with all terms and conditions established by Owner or by property owners or other entities controlling the Site with respect to schedule, access, existing operations, security, liability insurance, and applicable safety programs.

E. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies.

4.04 *Owner's Safety Program*

A. Site visits and work at the Site may be governed by an Owner safety program. As the General Conditions (Document 007200) indicate, if an Owner safety program exists, it will be noted in the Supplementary Conditions (Document 007314).

4.05 *Other Work at the Site*

A. Reference is made to Article 8 of the Supplementary Conditions for the identification of the general nature of other work of which Owner is aware (if any) that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) and relates to the Work contemplated by these Bidding Documents. If Owner is party to a written contract for such other work, then on request, Owner will provide to each Bidder access to examine such contracts (other than portions thereof related to price and other confidential matters), if any.

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ARTICLE 5 – **BIDDER'S REPRESENTATIONS**

5.01 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and any data and reference items identified in the Bidding Documents;

B. visit the Site, conduct a thorough, alert visual examination of the Site and adjacent areas, and become familiar with and satisfy itself as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy itself as to all Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions (Document 007314), especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions (Document 007314), especially with respect to Technical Data in such reports and drawings;

E. consider the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs;

F. agree, based on the information and observations referred to in the preceding paragraph, that at the time of submitting its Bid no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder;

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work; and

J. agree that the submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 6 – **PRE-BID CONFERENCE**

6.01 A **mandatory** pre-Bid conference will be held at the time and location stated in the invitation or to bid. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are

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encouraged to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

6.02 Information presented at the pre-Bid conference does not alter the Contract Documents. Owner will issue Addenda to make any changes to the Contract Documents that result from discussions at the pre-Bid conference. Information presented, and statements made at the pre-bid conference will not be binding or legally effective unless incorporated in an Addendum.

ARTICLE 7 – **INTERPRETATIONS AND ADDENDA**

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Contact information and submittal procedures for such questions are as follows:

A. Preferred: Submit Questions using the Q&A feature within QuestCDN. Provide questions in the form of a list, and provide details necessary to understand questions, conflicts, errors, ambiguities, or discrepancies. Contact QuestCDN Customer Support at 952-233-1632 or Support@questcdn.com for assistance.

B. Alternatively: Email jbender@ardurra.com.

7.02 Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda delivered to all parties recorded as having received the Bidding Documents. Questions received less than three days prior to the date for opening of Bids may not be answered.

7.03 Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.04 Addenda may be issued to clarify, correct, supplement, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 – **BID SECURITY**

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **5** percent of Bidder's maximum Bid price (determined by adding the base bid and all alternates) and in the form of a certified check, bank money order, or a Bid bond (Document 004300) issued by a surety meeting the requirements of Paragraphs 6.01 and 6.02 of the General Conditions (Document 007200).

8.02 The Bid security of the apparent Successful Bidder will be retained until Owner awards the contract to such Bidder, and such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award, whereupon the Bid security will be released. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults.

8.03 The Bid security of other Bidders that Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Contract or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be released.

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8.04 Bid security of other Bidders that Owner believes do not have a reasonable chance of receiving the award will be released within seven (7) days after the Bid opening.

ARTICLE 9 – **CONTRACT TIMES**

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Contract Agreement (Document 005200).

ARTICLE 10 – **LIQUIDATED DAMAGES**

10.01 Provisions for liquidated damages, if any, are set forth in the Contract Agreement (Document 005200).

ARTICLE 11 – **SUBSTITUTE AND "OR-EQUAL" ITEMS**

11.01 The Contract for the Work, as awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents, without consideration of possible substitute or "or-equal" items. Wherever it is indicated in the project documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor, if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the "effective date of the Agreement." Substitutes and "or-equal" materials and equipment may be proposed by Contractor in accordance with Paragraphs 7.04 and 7.05 of the General Conditions (Document 007200) after the Effective Date of the Contract. Each such request shall include the Manufacturer's Certification for Compliance with AIS. Refer to the Manufacturer's Certification form provided in these construction Contract Documents. Any and all costs and work associated with verifications required to determine proof of substitutes and "or-equals" shall be the responsibility of the bidder at their own risk.

11.02 All prices that Bidder sets forth in its Bid shall be based on the presumption that the Contractor will furnish the materials and equipment specified or described in the Bidding Documents, as supplemented by Addenda. Any assumptions regarding the possibility of post-Bid approvals of "or-equal" or substitution requests are made at Bidder's sole risk.

ARTICLE 12 – **SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

12.01 The apparent Successful Bidder, and any other Bidder so requested, shall submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work at the time of Bid submittal (Article 10, Document 004143 Bid Form):

A. Electrical,

B. HVAC/Mechanical,

AND shall with the Bid submittal, submit to Owner a list of the Subcontractors or Suppliers proposed for the following portions of the Work:

C. Rebar Installation;

D. Traffic Control

If requested by Owner, such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, or other individual or entity. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to

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submit an acceptable substitute, in which case apparent Successful Bidder shall submit a substitute, Bidder's Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, or other individuals or entities. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to subsequent revocation of such acceptance as provided in Paragraph 7.06 of the General Conditions (Document 007200).

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

12.04 The Contractor shall not award work to Subcontractor(s) in excess of the limits stated in SC 7.06 (Document 007314).

12.05 Within 3 business days of bid opening and upon request Bidder shall indicate subcontractor intended to perform Programming.

ARTICLE 13 – **PREPARATION OF BID**

13.01 The Bid Form (Document 004143) is included with the Bidding Documents.

A. All blanks on the Bid Form shall be completed in ink and the Bid Form signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each section, bid item, alternate, adjustment unit price item, and unit price item listed therein.

B. If the Bid Form expressly indicates that submitting pricing on a specific alternate item is optional, and Bidder elects to not furnish pricing for such optional alternate item, then Bidder may enter the words "No Bid" or "Not Applicable."

13.02 A Bid must be submitted no later than the date and time prescribed and as indicated in the advertisement or invitation to bid.

A. Physical Bid Submission: Submit the Bid in an envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted) and the name and address of Bidder. Enclose the Bid security and other documents required to be submitted with the Bid as listed in the Bid Form. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED."

B. Digital Bid Submission: Submit digital Bid using Quest CDN Virtubid. Enclose the Bid security and other documents required to be submitted with the Bid as listed in the Bid Form (Document 004143).

13.03 A Bid by a corporation shall be executed in the corporate name by a corporate officer (whose title must appear under the signature), accompanied by evidence of authority to sign. The corporate address and state of incorporation shall be shown.

13.04 A Bid by a partnership must be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership must be shown.

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13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member or other authorized person and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by an authorized representative of each joint venturer in the manner indicated on the Bid Form (Document 004143). The official address of the joint venture shall be shown.

13.08 All names shall be printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form (Document 004143).

13.10 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located, or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, shall also be shown on the Bid Form (Document 004143).

ARTICLE 14 – **BASIS OF BID**

14.01 Base Bid with Alternates

A. Bidders shall submit a Bid on a lump sum basis for the base Bid and include a separate price for each alternate described in the Bidding Documents and as provided for in the Bid Form. The price for each alternate will be the amount added to or deleted from the base Bid if Owner selects the alternate.

B. In the comparison of Bids, alternates will not be considered.

ARTICLE 15 – **SUBMITTAL OF BID**

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form (Document 004143), and, if required, the Bid Bond Form (Document 004300). The unbound copy of the Bid Form (Document 004143) is to be completed and submitted with the Bid security and the other documents required to be submitted under the terms of Article 7 of the Bid Form (Document 004143).

15.02 A Bid shall be received no later than the date and time prescribed and at the place indicated in the advertisement or invitation to bid and shall be enclosed in a plainly marked package with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED." The Bidder is totally responsible for the mail or other delivery system delivering the Bid at the place and prior to the time indicated in the Advertisement for Bid (Document 001113). A mailed Bid shall be addressed to Owner at address in Article 1.01 of Bid Form (Document 004143).

15.03 Bids received after the date and time prescribed for the opening of bids, or not submitted at the correct location or in the designated manner, will not be accepted and will be returned to the Bidder unopened.

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ARTICLE 16 – **MODIFICATION AND WITHDRAWAL OF BID**

16.01 A Bid may be withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids. Upon receipt of such notice, the unopened Bid will be returned to the Bidder.

16.02 If a Bidder wishes to modify its Bid prior to Bid opening, Bidder must withdraw its initial Bid in the manner specified in Paragraph 16.01 and submit a new Bid prior to the date and time for the opening of Bids.

16.03 If within 24 hours after Bids are opened any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – **OPENING OF BIDS**

17.01 Bids will be opened at the time and place indicated in the advertisement or invitation to bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – **BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form (Document 004143), but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – **EVALUATION OF BIDS AND AWARD OF CONTRACT**

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner will reject the Bid of any Bidder that Owner finds, after reasonable inquiry and evaluation, to not be responsible. Owner also reserves the right to waive all minor informalities not involving price, time, or changes in the Work.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 Evaluation of Bids:

A. In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data, as may be requested in the Bid Form (Document 004143) or prior to the Notice of Award (Document 005300).

19.04 In evaluating whether a Bidder is responsible, Owner will consider the qualifications of the Bidder and may consider the qualifications and experience of Subcontractors and Suppliers proposed for those portions of the Work for which the identity of Subcontractors and Suppliers must be submitted as provided in the Bidding Documents.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders and any proposed Subcontractors Suppliers individuals, or entities to perform the Work in accordance with the contract Documents.

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19.06 If the Contract is to be awarded, Owner will award the Contract to the responsible Bidder whose Bid, conforming with all the material terms and conditions of the Instructions to Bidders, is lowest, price per the comparison of bids as set forth in this section.

19.07 To determine the apparent low bidder, **Bids will be compared on the basis of the Base Bid only**. Alternatives and allowances will not be considered in the comparison of bids. After determination of the Successful Bidder based on this comparative process and on the responsiveness, responsibility, and other factors set forth in these Instructions, the award may be made to said Successful Bidder on its Base Bid and any combination of its allowances or alternatives for which Owner determines funds will be available.

ARTICLE 20 – **BONDS AND INSURANCE**

20.01 Article 6 of the General Conditions (Document 007200), as may be modified by the Supplementary Conditions (Document 007314), sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the Contract Agreement (Document 005200) to Owner, it shall be accompanied by required bonds and insurance documentation.

20.02 Article 8, Bid Security, of these Instructions, addresses any requirements for providing bid bonds as part of the bidding process.

ARTICLE 21 – **SIGNING OF AGREEMENT**

21.01 When Owner issues a Notice of Award (Document 005100) to the Successful Bidder, it shall be accompanied by the unexecuted counterparts of the Contract Agreement (Document 005200) along with the other Contract Documents as identified in the Agreement. Within 15 days thereafter, Successful Bidder shall execute and deliver the required number of counterparts of the Agreement (and any bonds and insurance documentation required to be delivered by the Contract Documents) to Owner. Within ten days thereafter, Owner shall deliver one fully executed counterpart of the Contract Agreement (Document 005200) to Successful Bidder, together with printed and electronic copies of the Contract Documents as stated in Paragraph 2.02 of the General Conditions (Document 007200).

21.02 It is anticipated that this project will be funded in part by the Washington State Department of Ecology. Neither the State Of Washington nor any of its departments or employees are, or shall be, a party to this contract or any subcontract.

ARTICLE 22 – **FEDERAL REQUIREMENTS**

22.01 If the contract cost is in excess of $100,000, provisions of the Contract Work Hours and Safety Standards Act at 29 CFR 5.5(b) apply.

22.02 The project is funded by Washington Department of Ecology's State Revolving Fund Loan. See Sections 008501 for Federal Requirements.

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ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

Chelan Public Works, 50 State Route 150, Chelan, WA 98816.

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into a Contract Agreement (Document 005200) with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, and any data and reference items identified in the Bidding Documents, and hereby acknowledges receipt of the following Addenda:

Addendum No.	Addendum, Date

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all Federal, State and Local Laws and Regulations that may affect cost, progress, and performance of the Work including All **American Iron and Steel, and Prevailing Wage (Davis Bacon and WA Prevailing Wage) requirements**.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or adjacent to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site that have been identified in the Supplementary Conditions (Document 007314), especially with respect to Technical Data in such reports and drawings, and (2) reports and drawings relating to Hazardous Environmental Conditions, if any, at or adjacent to the Site that have been identified in the Supplementary Conditions (Document 007314), especially with respect to Technical Data in such reports and drawings.

E. Bidder has considered the information known to Bidder itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and any Site-related reports and drawings identified in the Bidding Documents, with respect to the

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effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder; and (3) Bidder's safety precautions and programs.

F. Bidder agrees, based on the information and observations referred to in the preceding paragraph 3.01.E, above, that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and confirms that the written resolution thereof by Engineer is acceptable to Bidder.

I. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance and furnishing of the Work.

J. The submission of this Bid constitutes an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article, and that without exception the Bid and all prices in the Bid are premised upon performing and furnishing the Work required by the Bidding Documents.

ARTICLE 4 – BIDDER'S CERTIFICATION

4.01 Bidder certifies that:

A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any collusive agreement or rules of any group, association, organization, or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for the Contract. For the purposes of this Paragraph 4.01.D:

1. "corrupt practice" means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process;

2. "fraudulent practice" means an intentional misrepresentation of facts made (a) to influence the bidding process to the detriment of Owner, (b) to establish bid prices at artificial non-competitive levels, or (c) to deprive Owner of the benefits of free and open competition;

3. "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which is to establish bid prices at artificial, non-competitive levels; and

4. "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the e execution of the Contract.

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ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

A. BIDS shall include sales tax (8.7%) and all other applicable taxes and fees.

B. Mobilization shall not exceed ten percent (10%) of the total Bid, nor shall mobilization for any given bid item exceed ten percent (10%) of the associated bid item. If mobilization does exceed 10% of the total contract price, retainage of the amount over 10% of the total contract will be withheld until Final Payment.

C. See section 012000 – Measurement and Payment for further description of bid items

D. Cash allowances have been computed in accordance with Paragraph 13.02 of the General Conditions (Document 007200).

Base Bid Lump Sum

Item No.	Description	Bid Amount
1	**Mobilization**	**$**
2	**Earthwork**	**$**
3	**Demolition**	**$**
4.1	**CC-1 Plaza and North Alley Surfacing & Site Improvements**	**$**
4.2	**Roadway Surface Restoration**	**$**
5	**Gravity Sanitary Sewer**	**$**
6	**Storm Drainage**	**$**
7	**Site Utilities**	**$**
8	**Lift Station**	**$**
9	**Landscaping**	**$**
10	**Electrical**	**$**
11	**Instrumentation and Control**	**$**
Base Bid Subtotal (Tax Not Included)		$
WA State Sales Tax (8.7%)		$
Total Base Bid		**$**

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E. Alternatives:

Alternatives	
Alternative 1 – Full Alley Concrete Replacement	$

1. Alternative 1 shall consist of the complete removal of all existing concrete within the North Alley, from face of building to face of building. All concrete within this area shall be replaced with traffic rated concrete. All traffic rated concrete shall Incorporate a 5' x 5' concrete joint pattern consistent with the CC-1 plaza. The limits of the surface repair work are identified on Sheet C100 and C101 of the Construction Plans.
2. Refer to Section 012300 – Alternates for further detail.

F. Unit Cost Allowances:

Unit Cost Allowances			
Description	Quantity	Unit Cost	Unit
Allowance A – Unsuitable/Contaminated Material Removal	100 CY	$	CY

1. Allowance Unit Costs shall include applicable taxes. Contractor to receive written authorization prior to proceeding with any work for which Allowance will be sought. Allowance costs will not be paid for work done prior to written authorization.
2. Unit Cost Allowance A: Provide unit cost of removing approximately 100 cubic yards of Unsuitable/ contaminated Material (per Section 312316), including excavating, hauling and disposal. Allowance includes taxes, miscellaneous fees, transportation and delivery/handling costs, Contractor's or Subcontractor's overhead and profit, and other incidental costs.
3. Refer to Section 012100 – Allowances for further detail.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment in accordance with Paragraph 15.06 of the General Conditions (Document 007200) on or before the dates or within the number of calendar days indicated in the Contract Agreement (Document 005200).

6.02 Bidder accepts the provisions of the Contract Agreement (Document 005200) as to liquidated damages.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are submitted with and made a condition of this Bid:

A. Bid Form;

B. Required Bid security in the form of a Bid Bond (Document 004300) or Certified Check (Circle type of security provided);

C. Evidence of authority to do business in the state of the Project; or a written covenant to obtain such license within the time for acceptance of Bids;

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D. Contractor's License No.: License or Evidence of Bidder's ability to obtain a State Contractor's License and a covenant by Bidder to obtain said license within the time for acceptance of Bids; and

E. Designation of Subcontractors (Article 10)

F. Nonsegregated Facilities Certification (Section 008501 CWSRF Insert – Attachment 3)

G. Non-Discrimination Notice (Section 008501 CWSRF Insert – Attachment 4)

H. Non-Collusion Affidavit (Section 008504)

I. Bidders List (40 CFR Part 33 part 33.501) as identified in Section 008501 CWSRF Insert

J. DBE Subcontractor Utilization Form (ECY Form 6100-4)

K. One copy of DBE Subcontractor Performance Form (ECY Form 6100-3) for each DBE subcontractor.

ARTICLE 8 – DEFINED TERMS

8.01 The terms used in this Bid with initial capital letters have the meanings stated in the Instructions to Bidders (Document 002113), the General Conditions (Document 007200), and the Supplementary Conditions (Document 007314).

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ARTICLE 9 – BID SUBMITTAL

BIDDER: *[Indicate correct name of bidding entity]*

_____

By:
[Signature] _____

[Printed name] _____
(If Bidder is a corporation, a limited liability company, a partnership, or a joint venture, attach evidence of authority to sign.)

Attest:
[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

_____

_____

_____

Telephone Number: _____

Fax Number: _____

Contact Name and e-mail address: _____

_____

Bidder's License No.: _____
(where applicable)

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ARTICLE 10 – CERTIFICATIONS & NAMING OF SUBCONTRACTORS

Naming of Subcontractors (RCW Section 39.30.060) – Due with of Bid Submittal

The sub-contractors to whom sub-contracts will be awarded if the bidder is awarded a contract are: (Insert "self" if properly licensed and so intended. Insert "Not required" if such specialty work is not required)

HVAC/ Mechanical Contractor

Name: _____

Address: _____

Contractor License

Number: _____

Electrical Contractor

Name: _____

Address: _____

Contractor License

Number: _____

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Rebar Install Contractor

Name: _____

Address: _____

Contractor License

Number: _____

Traffic Control Contractor

Name: _____

Address: _____

Contractor License

Number: _____

Other Contractor

Name: _____

Address: _____

Contractor License

Number: _____

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BID BOND

City of Chelan
Lift Station CC-1 Upgrade

Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

BIDDER *(Name and Address)*:

SURETY *(Name, and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:
City of Chelan
50 State Route 150
Chelan, WA 98816

BID
Bid Due Date:
Description *(Project Name— Include Location)*:
City of Chelan – Lift Station CC-1 Upgrade FY24

BOND
Bond Number:
Date:
Penal sum _____ $ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER	**SURETY**
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature	Signature (Attach Power of Attorney)
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	Attest: _____
Signature	Signature
Title	Title

Continues on next page.

Note: Addresses are to be used for giving any required notice.
Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2 All Bids are rejected by Owner, or

3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from the Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after the Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

NOTICE OF AWARD

Date of Issuance:			
Owner:	City of Chelan, Chelan, WA	Owner's Contract No.:	
Engineer:	Ardurra	Engineer's Project No.:	240217
Project:	Lift Station CC-1 Upgrade	Contract Name:	Lift Station CC-1 Upgrade
Bidder:			
Bidder's Address:			

TO BIDDER:

You are notified that Owner has accepted your Bid dated [_____] for the above Contract, and that you are the Successful Bidder and are awarded a Contract for:

_____ .

[describe Work, alternates, or sections of Work awarded]

The Contract Price of the awarded Contract is: $_____

[ ] unexecuted counterparts of the Agreement accompany this Notice of Award.

Sets of the Contract Documents and Construction Drawings have been transmitted or made available to Bidder electronically.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner [____]counterparts of the Agreement, fully executed by Bidder.
2. Deliver with the executed Agreement(s) the Contract security *[e.g., performance and payment bonds]* and insurance documentation as specified in the Instructions to Bidders and General Conditions, Articles 2 and 6.
3. Other conditions precedent (if any):

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as indicated in Paragraph 2.02 of the General Conditions.

Owner**:** City of Chelan

_____
Authorized Signature

By:

Title:

Copy: Engineer

CONTRACTOR AGREEMENT

THIS AGREEMENT (The "Agreement") is made and entered into this day by and between the CITY OF CHELAN, a Washington municipal corporation (the "City") and _____ ("Contractor"), sometimes collectively referred to as the "Parties".

City and Contractor, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE I
CONTRACT DOCUMENTS

The term "Contract Documents" may include but is not limited to the following:

- ☒ Information for Bidders
- ☒ Bid
- ☒ Bid Bond
- ☒ Contractor Agreement
- ☒ Performance Bond
- ☒ Payment Bond
- ☒ General Conditions
- ☒ Supplementary Conditions
- ☒ Notice of Award
- ☒ Notice to Proceed
- ☒ Work Change Directives
- ☒ Field Orders
- ☒ Change Orders
- ☒ Plans prepared by **Ardurra** dated June ,2026
- ☒ Specifications prepared or issued by **Ardurra**
- ☒ Washington State Department of Ecology Water Pollution Control Revolving Fund Program Specifications & Construction Contract Document Insert
- ☒ Any and all modifications and addendums issued thereto

If the item is marked with "X" it is included.

ARTICLE II
WORK

2.1 City desires to build the "Project" as described in the Project plans and specifications which is attached hereto and incorporated herein by this reference. Contractor agrees to work with City and other contractors who may be involved on the Project on such things as scheduling, work performance and the like, in implementing this Agreement, in order to coordinate a reasonable completion of the Project.

2.2 Except as otherwise provided in writing executed by City, the Contractor shall furnish all labor, materials, skill, and equipment necessary or incidentally required to perform and complete the Project, consistent with Plans and Specifications supplied by the City or as otherwise agreed to by City and Contractor (the "Work").

ARTICLE III
TIME OF COMMENCEMENT, CONSTRUCTION HOURS AND COMPLETION

3.1 Time is of the essence of this Agreement.

3.2 What Work to be performed by the terms of this Agreement shall be commenced on or before the 8th day of September, 2026, and shall be substantially completed on or before the 30th day of April, 2027, (the "Agreement Time"). The date for substantial completion may be extended if agreed to in writing, by the City.

3.3 If the Contractor is delayed at any time in the progress of the Work by strikes, fire, unavoidable casualty or any causes beyond the contractor's control, the time of completion shall be extended for such reasonable time as is agreed to in writing by the City.

ARTICLE IV
PAYMENT

4.1 The City shall pay the contractor for performance of the Work, the total sum of _____, ($_____), (the "Stipulated Sum"), subject to change orders made pursuant to Article VIII.

ARTICLE V
PROGRESS PAYMENTS

5.1 Payments shall be made as set forth below.

5.1.1 Payments to Contractor shall be made on the valuation of Work completed in compliance with the Contract Documents. The Contractor shall, before the first application, submit to the City a schedule of values of the various parts of the Work, made out in such detail as the Contractor and City may agree upon, and supported by such evidence as to its correctness as the City may direct. This schedule, when approved by the City shall be used as a basis for payment, unless it be found to be in error. In applying for payment, the contractor shall submit a statement based upon this schedule.

5.1.2 Applications for monthly progress payments and the Final Payment shall be in writing, shall state the estimated percentage of the Work that has been satisfactorily completed and shall be submitted to the City on or before the 10th day of each month for the Work performed in the preceding month.

5.1.3 From each progress payment, the City shall withhold retainage of five

percent (5%).

5.1.4 Unless otherwise provided in the Contract Documents, the City shall pay the Contractor each progress payment under this Agreement within thirty (30) working days after City receives and approves the application from Contractor for the preceding months' Work as set forth herein. The amount of each progress payment to the contractor shall be equal to the percentage of completion allowed to the City for the Work applied to the Contract Sum, less the aggregate of previous payments to the Contractor and less the percentage retained as provided in this Agreement.

5.2 To the extent Contractor is provided the materials and supplies by others or is subcontracting to others any portion of the Work, payment to Contractor of any monthly progress payment shall be conditioned on the receipt by City of a Lien Release executed by the materialman or subcontractor for any materials provided to the Project or for any subcontract work performed on behalf of the Contractor.

5.2.1 City may, at City's election, make checks payable to Contractor and a subcontractor or may make direct payment to any subcontractors or materialmen if a Lien Release is not presented with the application, or may elect to withhold payment as set forth above.

5.3 Contractor shall submit invoices on or before the tenth (10^{th}) day of each month for the cost of Work performed in the preceding month. Such invoices shall be in the form of application for monthly progress payments, and the form of application for Final Payment shall be in writing, shall state the Work performed, and shall include records of payroll, petty cash expenditure, receipted invoices or invoice with vouchers attached and any other evidence if required by the City to demonstrate payments made by Contractor on account of the cost of the Work for which payment has not previously been made by City to Contractor, and for which no previous application for payment has been made. Unless otherwise approved in writing by City, no application shall be made for materials which have not been delivered to the site or incorporated in off-site Work necessary for the completion of the on-site Work. City will not unreasonably withhold approval for off-site storage of materials.

5.4 Sales tax shall be paid on the full payment due.

ARTICLE VI
FINAL PAYMENT

6.1 Final payment (constituting the unpaid balance, less the retainage), under this Agreement, shall be made by the City to the Contractor when the Work described in this Agreement is fully completed and performed in accordance with the Contract Documents and is satisfactory to the City, and the Contractor has applied for final payment in the manner prescribed in Article V.

6.2 Before issuance of the final payment, the Contractor shall submit evidence satisfactory to the City that all payrolls, bills for materials and equipment, and all known

indebtedness connected with the Contractor's Work have been satisfied. In addition, the Contractor shall obtain from all subcontractors and materialmen t, and shall itself execute, a lien release for the Work performed and the materials supplied pursuant to this Agreement in exchange for the final payment.

6.3 The retained amount under this Agreement shall be paid to the Contractor within forty (40) days after completion of the Project; provided that the Contractor has executed and provided all necessary lien releases for the Work performed and the materials supplied; and provided that all certificates and releases from the Department of Revenue, Employment Security and Labor and Industries are received by the City.

6.4 Payments may be withheld on account of (1) defective Work not remedied, (2) claims filed by third parties, (3) reasonable evidence that the Work cannot be completed for the unpaid balance of the Stipulated Sum, if any, (4) damage to the City or another contractor related to Contractor or the Work, (5) reasonable evidence that the Work will not be completed within the Agreement Time and that the unpaid balance of the Stipulated Sum would not be adequate to cover actual or liquidated damages as provided in Article XIV for the anticipated delay, (6) persistent failure to carry out the Work in accordance with the Contract Documents, or (7) failure to adhere to the terms and conditions of this Agreement.

ARTICLE VII
PREVAILING WAGE

7.1 Contractor agrees to abide by the prevailing wage requirements of RCW 39.12, RCW 43.03 and RCW 49.28 as currently enacted or as hereafter amended.

ARTICLE VIII
CHANGES IN THE WORK

8.1 The City, without invalidating the Agreement, may order changes in the Work consisting of additions, deletions or modification. The Stipulated Sum and the Agreement Time shall be adjusted according to an agreement for change between the City and Contractor. Such changes in the Work shall be authorized by written Change Order signed by the City. Fair increases or decreases in the Contract Sum include a fifteen percent (15 %) adjustment for Contractor's overhead and profit.

8.2 Contractor shall make any and all changes in the Work without invalidating this Agreement when specifically ordered to do so in writing by the City.

ARTICLE IX
INSURANCE

9.1 Insurance Term

The Contractor shall procure and maintain insurance, as required in this Section, without interruption from commencement of the Contractor's work through the term of the contract and for thirty (30) days after the Physical Completion date, unless otherwise indicated herein.

9.2 No Limitation

Contractor's maintenance of insurance, its scope of coverage and limits as required herein shall not be construed to limit the liability of the Contractor to the coverage provided by such insurance, or otherwise limit the Public Entity's recourse to any remedy available at law or in equity.

9.3 Minimum Scope of Insurance

Contractors required insurance shall be of the types and coverage as stated below:

1. Automobile Liability insurance covering all owned, non-owned, hired and leased vehicles. Coverage shall be at least as broad as Insurance Services Office (ISO) form CA 00 01.

2. Commercial General Liability insurance shall be at least as broad as ISO occurrence form CG 00 01 and shall cover liability arising from premises, operations, stop gap liability, independent contractors, products-completed operations, personal injury and advertising injury, and liability assumed under an insured contract. The Commercial General Liability insurance shall be endorsed to provide a per project general aggregate limit, using ISO form CG 25 03 05 09 or an equivalent endorsement. There shall be no exclusion for liability arising from explosion, collapse or underground property damage. The Public Entity shall be named as an additional insured under the Contractor's Commercial General Liability insurance policy with respect to the work performed for the Public Entity using ISO Additional Insured endorsement CG 20 10 10 01 and Additional Insured-Completed Operations endorsement CG 20 37 10 01 or substitute endorsements providing at least as broad coverage.

3. Workers' Compensation coverage as required by the Industrial Insurance laws of the State of Washington.

9.4 Minimum Amounts of Insurance

Contractor shall maintain the following insurance limits:

1. Automobile Liability insurance with a minimum combined single limit for bodily injury and property damage of $1,000,000 per accident.

2. Commercial General Liability insurance shall be written with limits no less than $2,000,000 each occurrence, $2,000,000 general aggregate and a $2,000,000 products-completed operations aggregate limit.

9.5 Public Entity Full Availability of Contractor Limits

If the Contractor maintains higher insurance limits than the minimums shown above, the Public Entity shall be insured for the full available limits of Commercial General and Excess or Umbrella liability maintained by the Contractor, irrespective of whether such limits maintained by the Contractor are greater than those required by this contract or whether any certificate of insurance furnished to the Public Entity evidences limits of liability lower than those maintained by the Contractor.

9.6 Other Insurance Provision

The Contractor's Automobile Liability, Commercial General Liability and Builders Risk insurance policies are to contain, or be endorsed to contain that they shall be primary insurance as respect the Public Entity. Any Insurance, self-insurance, or self-insured pool coverage maintained by the Public Entity shall be excess of the Contractor's insurance and shall not contribute with it.

9.7 Contractor's Insurance for Other Losses

The Contractor shall assume full responsibility for all loss or damage from any cause whatsoever to any tools, Contractor's employee owned tools, machinery, equipment, or motor vehicles owned or rented by the Contractor, or the Contractor's agents, suppliers, contractors or subcontractors as well as to any temporary structures, scaffolding and protective fences.

9.8 Waiver of Subrogation

The Contractor and the Public Entity waive all rights against each other, any of their Subcontractors, Sub-subcontractors, agents and employees, each of the other, for damages caused by fire or other perils to the extent covered by Builders Risk insurance or other property insurance obtained pursuant to the Insurance Requirements Section of this Contract or other property insurance applicable to the work. The policies shall provide such waivers by endorsement or otherwise.

9.9 Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of not less than A: VII.

9.10 Verification of Coverage

Contractor shall furnish the Public Entity with original certificates and a copy of the amendatory endorsements, including but not necessarily limited to the additional insured endorsements, evidencing the insurance requirements of the Contractor before commencement of the work. Upon request by the Public Entity, the Contractor shall furnish certified copies of all required insurance policies, including endorsements, required in this contract and evidence of all subcontractors' coverage.

9.11 Subcontractors

The Contractor shall cause each and every Subcontractor to provide insurance coverage that complies with all applicable requirements of the Contractor-provided insurance as set forth herein, except the Contractor shall have sole responsibility for determining the limits of coverage required to be obtained by Subcontractors. The Contractor shall ensure that the Public Entity is an additional insured on each and every Subcontractor's Commercial General liability insurance policy using an endorsement at least as broad as ISO Additional Insured endorsement CG 20 38 04 13.

9.12 Notice of Cancellation

The Contractor shall provide the Public Entity and all Additional Insureds for this work with written notice of any policy cancellation within two business days of their receipt of such notice.

9.13 Failure to Maintain Insurance

Failure on the part of the Contractor to maintain the insurance as required shall constitute a material breach of contract, upon which the Public Entity may, after giving five business days notice to the Contractor to correct the breach, immediately terminate the contract or, at its discretion, procure or renew such insurance and pay any and all premiums in connection therewith, with any sums so expended to be repaid to the Public Entity on demand, or at the sole discretion of the Public Entity, offset against funds due the Contractor from the Public Entity.

ARTICLE X
INDEMNIFICATION (CONTRACTOR/CITY)

10.1 Contractor shall defend, indemnify and hold the City, its officers, officials, employees, contractors and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or resulting from the acts, errors or omissions of the Contractor in performance of this Agreement, except for injuries and damages caused by the sole negligence of the City.

10.2 However, should a court of competent jurisdiction determine that this Agreement is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of the Contractor and the City, its officers, officials, employees, and volunteers, the Contractor's liability hereunder shall be only to the extent of the Contractor's negligence. It is further specifically and expressly understood that the indemnification provided herein constitutes the Contractor's waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification. This waiver has been mutually negotiated by the parties. The provisions of this section shall survive the expiration or termination of this Agreement.

10.3 No liability shall attach to the City by reason of entering into this Agreement except as expressly provided herein.

ARTICLE XI
WARRANTIES, GUARANTEES/WORKING CONDITIONS

11.1 Contractor shall, and by this agreement hereby does, assign all manufacturer warranties and guarantees related to the Work to City. Unless otherwise provided in the Contract Documents or the manufacturer warranty, all labor and materials furnished by the Contractor are **guaranteed** against all defects in materials and workmanship for a period of two (2) years from the date of acceptance of the completion of the Work. All warranties and guarantees shall inure to the benefit of City.

11.2 Contractor shall take all necessary and proper safety precautions in connection with the Work performed pursuant to this Agreement so as to avoid all injury to persons and all damage to property. The Contractor shall maintain lights, barriers, supports and guards as shall be necessary and proper to effect this end. The Contractor shall comply with all federal, state and local laws, statutes, regulations and ordinances which govern labor, employment and occupational safety and health of the contractor's employees and other persons on or about the premises. Failure on the part of the Contractor and/or Contractor's employees to practice safe working procedures may result in the Contractor's immediate suspension and Work may not resume until safe working conditions are established. Repeated failures may result in termination of the Agreement for Breach.

11.3 Contractor shall supervise and direct the performance of work competently and efficiently, devoting such attention thereto and applying such skill and expertise as may be necessary to perform the work in accordance with this Agreement. Contractor shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. Contractor shall provide competent and suitably qualified personnel to perform the work as set out above and shall at all times maintain good discipline and order at the work site.

11.4 Contractor shall furnish and assume full responsibility for all materials, equipment, labor, transportation, equipment and machinery, tools, appliances, fuel, power, utilities, and any and all other facilities and incidentals necessarily covered by this Contract.

11.5 Contractor shall clean-up and remove all rubbish and debris from the Work area on a daily basis and upon the completion of the Work. In the event of a dispute over this responsibility for clean-up, the decision of the City allocating responsibility shall be final. The Contractor shall pay without reimbursement for the cost of all clean-up and removal of rubbish and debris left upon the premises contrary to this paragraph. Should and Contractor fail to clean-up and remove all its rubbish and debris as per this paragraph, then the City may have this done and charge all expenses thereof to the Contractor.

11.6 Contractor shall employ no person in connection with the performance of this Agreement who may be objectionable to the City and the Contractor shall remove any such person upon written notice from the City.

11.7 Contractor shall cooperate with the City and other Contractors and subcontractors whose work might interfere with the Contractor's Work, and shall participate in the preparation of

coordinated plans and drawings in areas of congestion, specifically noting and advising the City of any such interference.

11.8 Contractor shall cooperate with the City in scheduling and performing Contractor's Work to avoid conflict or interference with the work of others.

11.9 Contractor shall promptly submit shop drawings and samples as required by the Contract Documents in order to perform the Work efficiently, expeditiously and in a manner that will not cause delay in the progress of the Work of the City of other Contractors.

ARTICLE XII
CONTRACTOR'S RESPONSIBILITIES

12.1 Contractor shall make all claims promptly to the City for additional work, extensions of time, and damage for delays or otherwise, in accordance with the Contract Documents.

12.2 Contractor shall not assign this Agreement without the written consent of the City or subcontract the whole of this Agreement without the written consent of the City, or further subcontract portions of the Agreement without written consent of the City. The Contractor shall not assign any amounts due or to become due under this Agreement without written notice to the City.

12.3 Contractor warrants that all materials and equipment furnished and incorporated by it in the Project shall be new unless otherwise specified, and that all Work under this Agreement shall be of good quality, free from faults and defects and in conformance with the Contract Documents. All Work not conforming to these standards may be considered defective. The warranty provided in the Paragraph shall be in addition to and not in limitation of any other warranty or remedy required by law or by the Contact Documents.

12.4 Contractor agrees that the City's equipment will be available to the Contractor only at the City's discretion and on mutually satisfactory terms.

12.5 Contractor shall furnish periodic progress reports, including a work schedule, on the Work as mutually agreed, including information on the status of materials and equipment under this Agreement which may be in the course of preparation or manufacture.

12.6 Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the Work under this Agreement. The Contractor shall secure and pay for all permits, fees and licenses necessary for the execution of the Work.

12.7 Contractor agrees that all Work shall be done subject to the final approval of the City.

12.8 Contractor shall promptly correct Work rejected by the City for failing to conform

to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed, and shall correct any Work found to be not in accordance with the requirements of the Contract Documents within a period of one year from the date of Substantial Completion of the Agreement or by terms of an applicable special warranty required by the Contract Documents.

12.9 Nothing contained in this Agreement shall be construed to establish a period of limitation with respect to other obligations which the Contractor might have under the Contract Documents. Establishment of the time period of one year as described in the preceding paragraph relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

12.10 If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents or fails to perform a provision of the Agreement, the City, after three (3) days' written notice to the Contractor and without prejudice to any other remedy the City may have, may make good such deficiencies and may deduct the cost thereof, including compensation for consultant's services and expenses, including but not limited to, architects and engineers made necessary thereby, from the payment then or thereafter due the Contractor. Alternatively, at the City's option, the City may terminate the Agreement and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever method the City may deem expedient. If the unpaid balance of the Stipulated Sum, if any, exceeds costs of finishing the Work, including compensation for consultant's services and expenses made necessary thereby, such excess shall be paid to the Contractor, but if such costs exceed such unpaid balance, the Contractor shall pay the difference to the City, provided that in no event shall such payment cause the Stipulated Sum to be exceeded.

12.11 Contractor shall supply the names and addresses of all its employees, materialmen and subcontractors performing work or providing material to the Project pursuant to this Agreement.

12.12 Contractor shall not discriminate in any manner related to the performance of the Work on the basis of race, religion, sex, age, national origin or any other protected class or category.

ARTICLE XIII
DEFAULT/DELAY/LIQUIDATED DAMAGES

13.1 If the Contractor neglects to prosecute the Work diligently and properly or fails to perform any provisions of this Agreement, the City, after five (5) working days' written notice to the Contractor to cure the deficiencies stated therein, may, without prejudice to any other remedy the City may have:

13.1.1 Cure such deficiencies and deduct the costs thereof from the payments then or thereafter due the Contractor, or

13.1.2 Terminate this Agreement and seek liquidated damages.

13.2 In the event this Agreement is terminated, and in addition to any other remedy the City may have, the Contractor shall pay the City liquidated damages in the amount of one-thousand and five-hundred Dollars ($1,500) per working day until a replacement Contractor can resume the Work contemplated by this Agreement.

13.3 In the event the Contractor is unable to complete the Work within the Agreement time, in addition to any other remedy the City may have, the Contractor shall pay the City liquidated damages in the amount of one-thousand and five-hundred Dollars ($ 1,500) per working day from the completion date set forth in Article III until the Work is fully completed and performed and is satisfactory to the City.

13.4 The Contractor recognizes and acknowledges that time is of the essence of the completion of the Work, and that delays in completing the work prior to the date of Substantial Completion inconveniences the public and interferes with and delays commerce. The date of substantial completion is important as the Project must be completed prior to the Memorial Day weekend, where substantial use of the Project will occur. The Contractor further recognizes that delays in the completion of the Work also costs taxpayers undue sums of money, adding time needed for administration, engineering, inspection and supervision. Finally, the Contractor agrees that it is impractical to calculate the actual cost of delays, and the per diem amount in Sections 13.2 and 13.3 represents a reasonable estimate of the damages to the City if the Work is not completed on the date of Substantial completion, and that such amount does not constitute a penalty in order to secure performance.

ARTICLE XIV
ARBITRATION

14.1 In the event the Parties cannot agree on a matter arising from this Agreement, they shall consult together and attempt to resolve the dispute. In the event they cannot agree upon a resolution of the dispute, they shall submit the dispute to an Arbitrator pursuant to RCW 7.04. The Arbitrator shall be an attorney licensed to practice law in the State of Washington having at least 15 years' experience in contract dispute resolution and principally practicing in Chelan, Douglas or Okanogan Counties. If the parties cannot agree on an arbitrator, the Arbitrator shall be appointed by a judge of the Chelan County Superior Court. The Parties may agree to attempt to have the Arbitrator first attempt to mediate the dispute before proceeding to an arbitration. All decisions of the Arbitrator shall be final and binding on the Parties. The Parties shall equally bear the cost of the Mediator. All decisions of the Mediator as arbitrator shall be enforceable in a federal or state court in the eastern district of Washington.

ARTICLE XV
GENERAL PROVISIONS

15.1 **City's Representative**. Except as otherwise directed or designated by City, in writing, the City Administrator or his/her designee, shall be the City's representative for the Project. The administrator shall have authority to act on behalf of the City, except as otherwise provided in this Agreement, or as otherwise provided in writing, for all matters relative to the Project and this Agreement.

15.2 **Entire Agreement**. This Agreement constitutes the entire agreement between the City and Contractor. There are no understandings or agreements between the City and the Contractor other than those set forth in this Agreement and in the Contract Documents referred to herein. No other statement, representation or promise has been made to induce either party to enter into this Agreement, This Agreement may not be modified, except with written agreement executed by the parties.

15.3 **Independent Contractor**. The Contractor and the City agree that the Contractor is an independent Contractor with respect to the Work provided pursuant to this Agreement. Nothing in this Agreement shall be considered to create the relationship of employer and employee between the Parties hereto. Neither Contractor nor any employee of Contractor shall be entitled to any benefits afforded City employees by virtue of the Work provided under this Agreement. The City shall not be responsible for withholding or otherwise deducting federal income tax or Social Security or for contributing to the State Industrial Insurance program, or otherwise assuming the duties of an employer with respect to the Contractor, or any employees of Contractor.

15.4 **Site Visitation**. Execution of the Agreement by the Contractor is a representation that the Contractor has visited the site and become familiar with the local conditions under which the Work is to be performed.

15.5 **Governing Law and Venue**. This Agreement shall be governed exclusively by the laws of the State of Washington. Any court of competent jurisdiction in Chelan County, Washington, shall be the only proper venue for any and all suits brought to enforce the provisions of this Agreement.

15.6 **Attorney's Fees**. If any legal action or other proceeding is brought for the enforcement of this Agreement, or because of an alleged dispute, breach, default, or misrepresentation in connection with any of the provisions of the Agreement, the successful or substantially prevailing party shall be entitled to recover reasonable attorney's fees and other costs incurred in that action, arbitration or proceeding, in addition to any other relief to which it or he/she may be entitled.

15.7 **Waive of Breach**. The waiver by either party of the breach of any provision of this Agreement by the other party must be in writing and shall not operate or be construed as a waiver of any subsequent breach by such other party.

15.8 **Notice**. Any notices shall be effective if personally served upon the other party or if mailed by registered or certified mail, return receipt request, to the following addresses:

City:
City of Chelan
PO Box 1669
Chelan, WA 98816

Contractor:

15.9 **Registration and Bond**. The Contractor represents that the Contractor is bonded in compliance with Washington State law and is licensed with the State of Washington, as evidenced by the following:

License Number:_____

THE CONTRACTOR HEREBY ACKNOWLEDGES, GUARANTEES, AND REPRESENTS THAT AFTER AN OPPORTUNITY TO CONSULT WITH HIS/HER ATTORNEY HE/SHE HAS CAREFULLY READ THIS AGREEMENT, FULLY UNDERSTANDS THE TERMS THEREOF, AND FINDS IT TO BE A COMPLETE, WRITTEN STATEMENT OF THE TERMS AND CONDITIONS OF THE AGREEMENT.

CITY

By: _____

Dated: _____

CONTRACTOR

By: _____

Dated: _____

PERFORMANCE BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: City of Chelan, 50 State Route 150, Chelan, WA 98816

CONSTRUCTION CONTRACT
Effective Date of the Contract Agreement:
Amount:
Description *(name and location)*:

BOND
Bond Number:
Date *(not earlier than the Effective Date of the Contract Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Paragraph 3.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after:

3.1 The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor, and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Paragraph 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor, and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 The Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

4. Failure on the part of the Owner to comply with the notice requirement in Paragraph 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

5. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owners concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:

5.4.1 After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

5.4.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

6. If the Surety does not proceed as provided in Paragraph 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Paragraph 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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7. If the Surety elects to act under Paragraph 5.1, 5.2, or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication for:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 additional legal, design professional, and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 5; and

7.3 liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

8. If the Surety elects to act under Paragraph 5.1, 5.3, or 5.4, the Surety's liability is limited to the amount of this Bond.

9. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors, and assigns.

10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

11. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum periods of limitations available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Definitions

14.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made including allowance for the Contractor for any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

14.2 Construction Contract: The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

14.3 Contractor Default: Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

14.4 Owner Default: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

14.5 Contract Documents: All the documents that comprise the agreement between the Owner and Contractor.

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15. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

16. Modifications to this Bond are as follows:

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PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*: City of Chelan, 50 State Route 150, Chelan, WA 98816

CONSTRUCTION CONTRACT

Effective Date of the Contract Agreement:
Amount:
Description *(name and location)*:

BOND

Bond Number:
Date *(not earlier than the Effective Date of the Contract Agreement of the Construction Contract)*:
Amount:
Modifications to this Bond Form: ☐ None ☐ See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL	**SURETY**
_____ *(seal)*	_____ *(seal)*
Contractor's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	**By:** _____
Signature	Signature *(attach power of attorney)*
_____	_____
Print Name	Print Name
_____	_____
Title	Title
Attest: _____	**Attest:** _____
Signature	Signature
_____	_____
Title	Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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1. The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials, and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

2. If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies, and holds harmless the Owner from claims, demands, liens, or suits by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

3. If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 13) of claims, demands, liens, or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, and tendered defense of such claims, demands, liens, or suits to the Contractor and the Surety.

4. When the Owner has satisfied the conditions in Paragraph 3, the Surety shall promptly and at the Surety's expense defend, indemnify, and hold harmless the Owner against a duly tendered claim, demand, lien, or suit.

5. The Surety's obligations to a Claimant under this Bond shall arise after the following:

   5.1 Claimants who do not have a direct contract with the Contractor,

      5.1.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

      5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 13).

   5.2 Claimants who are employed by or have a direct contract with the Contractor have sent a Claim to the Surety (at the address described in Paragraph 13).

6. If a notice of non-payment required by Paragraph 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Paragraph 5.1.1.

7. When a Claimant has satisfied the conditions of Paragraph 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

   7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

   7.2 Pay or arrange for payment of any undisputed amounts.

   7.3 The Surety's failure to discharge its obligations under Paragraph 7.1 or 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Paragraph 7.1 or 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

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8. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Paragraph 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

9. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

10. The Surety shall not be liable to the Owner, Claimants, or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to or give notice on behalf of Claimants, or otherwise have any obligations to Claimants under this Bond.

11. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders, and other obligations.

12. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Paragraph 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

13. Notice and Claims to the Surety, the Owner, or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

14. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

15. Upon requests by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

16. **Definitions**

    16.1 **Claim:** A written statement by the Claimant including at a minimum:

    1. The name of the Claimant;
    2. The name of the person for whom the labor was done, or materials or equipment furnished;
    3. A copy of the agreement or purchase order pursuant to which labor, materials, or equipment was furnished for use in the performance of the Construction Contract;
    4. A brief description of the labor, materials, or equipment furnished;
    5. The date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
    6. The total amount earned by the Claimant for labor, materials, or equipment furnished as of the date of the Claim;

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7. The total amount of previous payments received by the Claimant; and
8. The total amount due and unpaid to the Claimant for labor, materials, or equipment furnished as of the date of the Claim.

16.2 **Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials, or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms of "labor, materials, or equipment" that part of the water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.

16.3 **Construction Contract:** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

16.4 **Owner Default**: Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

16.5 **Contract Documents:** All the documents that comprise the agreement between the Owner and Contractor.

17. If this Bond is issued for an agreement between a contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

18. Modifications to this Bond are as follows:

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STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents, a term printed with initial capital letters, including the term's singular and plural forms, will have the meaning indicated in the definitions below. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

3. *Bid*—The offer of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

4. *Bidder*—An individual or entity that submits a Bid to Owner.

5. *Bidding Documents*—The Bidding Requirements, the proposed Contract Documents, and all Addenda.

6. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid Bond or other Bid security, if any, the Bid Form, and the Bid with any attachments.

7. *Change Order*—A document which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, or other revision to the Contract, issued on or after the Effective Date of the Contract.

8. *Change Proposal*—A written request by Contractor, duly submitted in compliance with the procedural requirements set forth herein, seeking an adjustment in Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; challenging a set-off against payments due; or seeking other relief with respect to the terms of the Contract.

9. *Claim*—(a) A demand or assertion by Owner directly to Contractor, duly submitted in compliance with the procedural requirements set forth herein: seeking an adjustment of Contract Price or Contract Times, or both; contesting an initial decision by Engineer concerning the requirements of the Contract Documents or the acceptability of Work under the Contract Documents; contesting Engineer's decision regarding a Change Proposal; seeking resolution of a contractual issue that Engineer has declined to address; or seeking other relief with respect to the terms of the Contract; or (b) a demand or assertion by Contractor directly to Owner, duly submitted in compliance with the procedural requirements set forth herein, contesting Engineer's decision regarding a Change Proposal; or seeking resolution of a contractual issue that Engineer has declined to address. A demand for money or services by a third party is not a Claim.

10. *Constituent of Concern*—Asbestos, petroleum, radioactive materials, polychlorinated biphenyls (PCBs), hazardous waste, and any substance, product, waste, or other

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material of any nature whatsoever that is or becomes listed, regulated, or addressed pursuant to (a) the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §§9601 et seq. ("CERCLA"); (b) the Hazardous Materials Transportation Act, 49 U.S.C. §§5501 et seq.; (c) the Resource Conservation and Recovery Act, 42 U.S.C. §§6901 et seq. ("RCRA"); (d) the Toxic Substances Control Act, 15 U.S.C. §§2601 et seq.; (e) the Clean Water Act, 33 U.S.C. §§1251 et seq.; (f) the Clean Air Act, 42 U.S.C. §§7401 et seq.; or (g) any other federal, state, or local statute, law, rule, regulation, ordinance, resolution, code, order, or decree regulating, relating to, or imposing liability or standards of conduct concerning, any hazardous, toxic, or dangerous waste, substance, or material.

11. *Contract*—The entire and integrated written contract between the Owner and Contractor concerning the Work.

12. *Agreement—The written instrument, executed by Owner and Contractor, that sets forth the Contract Price and Contract Times, identifies the parties and the Engineer, and designates the specific items that are Contract Documents.*

13. *Contract Documents*—Those items so designated in the Agreement, and which together comprise the Contract.

14. *Contract Price*—The money that Owner has agreed to pay Contractor for completion of the Work in accordance with the Contract Documents. .

15. *Contract Times*—The number of days or the dates by which Contractor shall: (a) achieve Milestones, if any; (b) achieve Substantial Completion; and (c) complete the Work.

16. *Contractor*—The individual or entity with which Owner has contracted for performance of the Work.

17. *Cost of the Work*—See Paragraph 13.01 for definition.

18. *Drawings*—The part of the Contract that graphically shows the scope, extent, and character of the Work to be performed by Contractor.

19. *Effective Date of the Contract*—The date, indicated in the Agreement, on which the Contract becomes effective.

20. *Engineer*—The individual or entity named as such in the Agreement.

21. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but does not change the Contract Price or the Contract Times.

22. *Hazardous Environmental Condition*—The presence at the Site of Constituents of Concern in such quantities or circumstances that may present a danger to persons or property exposed thereto. The presence at the Site of materials that are necessary for the execution of the Work, or that are to be incorporated in the Work, and that are controlled and contained pursuant to industry practices, Laws and Regulations, and the requirements of the Contract, does not establish a Hazardous Environmental Condition.

23. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, statutes, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

24. *Liens*—Charges, security interests, or encumbrances upon Contract-related funds, real property, or personal property.

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25. *Milestone*—A principal event in the performance of the Work that the Contract requires Contractor to achieve by an intermediate completion date or by a time prior to Substantial Completion of all the Work.

26. *Notice of Award*—The written notice by Owner to a Bidder of Owner's acceptance of the Bid.

27. *Notice to Proceed*—A written notice by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work.

28. *Owner*—The individual or entity with which Contractor has contracted regarding the Work, and which has agreed to pay Contractor for the performance of the Work, pursuant to the terms of the Contract.

29. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

30. *Project*—The total undertaking to be accomplished for Owner by engineers, contractors, and others, including planning, study, design, construction, testing, commissioning, and start-up, and of which the Work to be performed under the Contract Documents is a part.

31. *Project Manual*—The written documents prepared for, or made available for, procuring and constructing the Work, including but not limited to the Bidding Documents or other construction procurement documents, geotechnical and existing conditions information, the Agreement, bond forms, General Conditions, Supplementary Conditions, and Specifications. The contents of the Project Manual may be bound in one or more volumes.

32. *Resident Project Representative*—The authorized representative of Engineer assigned to assist Engineer at the Site. As used herein, the term Resident Project Representative or "RPR" includes any assistants or field staff of Resident Project Representative.

33. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and that establish the standards by which such portion of the Work will be judged.

34. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements for Engineer's review of the submittals and the performance of related construction activities.

35. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

36. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information that are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work. Shop Drawings, whether approved or not, are not Drawings and are not Contract Documents.

37. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements, and such other lands furnished by Owner which are designated for the use of Contractor.

38. *Specifications*—The part of the Contract that consists of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable to the Work.

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39. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work.

40. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

41. *Successful Bidder*—The Bidder whose Bid the Owner accepts, and to which the Owner makes an award of contract, subject to stated conditions.

42. *Supplementary Conditions*—The part of the Contract that amends or supplements these General Conditions.

43. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or a Subcontractor.

44. *Technical Data*—Those items expressly identified as Technical Data in the Supplementary Conditions, with respect to either (a) subsurface conditions at the Site, or physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) or (b) Hazardous Environmental Conditions at the Site. If no such express identifications of Technical Data have been made with respect to conditions at the Site, then the data contained in boring logs, recorded measurements of subsurface water levels, laboratory test results, and other factual, objective information regarding conditions at the Site that are set forth in any geotechnical or environmental report prepared for the Project and made available to Contractor are hereby defined as Technical Data with respect to conditions at the Site under Paragraphs 5.03, 5.04, and 5.06.

45. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including but not limited to those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, fiber optic transmissions, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

46. *Unit Price Work*—Work to be paid for on the basis of unit prices.

47. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction; furnishing, installing, and incorporating all materials and equipment into such construction; and may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

48. *Work Change Directive*—A written directive to Contractor issued on or after the Effective Date of the Contract, signed by Owner and recommended by Engineer, ordering an addition, deletion, or revision in the Work.

1.02 *Terminology*

A. The words and terms discussed in the following paragraphs are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

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B. *Intent of Certain Terms or Adjectives*:

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered," "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Article 10 or any other provision of the Contract Documents.

C. *Day*:

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*:

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents; or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or

c. has been damaged prior to Engineer's recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 15.03 or 15.04).

E. *Furnish, Install, Perform, Provide*:

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. If the Contract Documents establish an obligation of Contractor with respect to specific services, materials, or equipment, but do not expressly use any of the four words "furnish," "install," "perform," or "provide," then Contractor shall furnish and install said services, materials, or equipment complete and ready for intended use.

F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

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ARTICLE 2 – PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. *Bonds*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Contractor's Insurance*: When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract), the certificates and other evidence of insurance required to be provided by Contractor in accordance with Article 6.

C. *Evidence of Owner's Insurance*: After receipt of the executed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver to Contractor, with copies to each named insured and additional insured (as identified in the Supplementary Conditions or otherwise), the certificates and other evidence of insurance required to be provided by Owner under Article 6.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor four printed copies of the Contract (including one fully executed counterpart of the Agreement), and one copy in electronic portable document format (PDF). Additional printed copies will be furnished upon request at the cost of reproduction.

B. Owner shall maintain and safeguard at least one original printed record version of the Contract, including Drawings and Specifications signed and sealed by Engineer and other design professionals. Owner shall make such original printed record version of the Contract available to Contractor for review. Owner may delegate the responsibilities under this provision to Engineer.

2.03 *Before Starting Construction*

A. *Preliminary Schedules*: Within 10 days after the Effective Date of the Contract (or as otherwise specifically required by the Contract Documents), Contractor shall submit to Engineer for timely review:

1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.04 *Preconstruction Conference; Designation of Authorized Representatives*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.03.A, procedures for handling Shop Drawings, Samples, and other submittals, processing Applications for Payment, electronic or digital transmittals, and maintaining required records.

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B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit and receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.05 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference, attended by Contractor, Engineer, and others as appropriate, will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.03.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to the component parts of the Work.

2.06 *Electronic Transmittals*

A. Except as otherwise stated elsewhere in the Contract, the Owner, Engineer, and Contractor may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

B. If the Contract does not establish protocols for electronic or digital transmittals, then Owner, Engineer, and Contractor shall jointly develop such protocols.

C. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

ARTICLE 3 – DOCUMENTS: INTENT, REQUIREMENTS, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents.

C. Unless otherwise stated in the Contract Documents, if there is a discrepancy between the electronic or digital versions of the Contract Documents (including any printed copies derived from such electronic or digital versions) and the printed record version, the printed record version shall govern.

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D. The Contract supersedes prior negotiations, representations, and agreements, whether written or oral.

E. Engineer will issue clarifications and interpretations of the Contract Documents as provided herein.

3.02 *Reference Standards*

A. Standards Specifications, Codes, Laws and Regulations

1. Reference in the Contract Documents to standard specifications, manuals, reference standards, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard specification, manual, reference standard, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Contract if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard specification, manual, reference standard, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the part of the Contract Documents prepared by or for Engineer. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the part of the Contract Documents prepared by or for Engineer.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies*:

1. *Contractor's Verification of Figures and Field Measurements*: Before undertaking each part of the Work, Contractor shall carefully study the Contract Documents, and check and verify pertinent figures and dimensions therein, particularly with respect to applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy that Contractor discovers, or has actual knowledge of, and shall not proceed with any Work affected thereby until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

2. *Contractor's Review of Contract Documents*: If, before or during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) actual field conditions, (c) any standard specification, manual, reference standard, or code, or (d) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 7.15) until the conflict, error, ambiguity, or discrepancy is resolved, by a clarification or interpretation by Engineer, or by an amendment or supplement to the Contract Documents issued pursuant to Paragraph 11.01.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

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B. *Resolving Discrepancies*:

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the part of the Contract Documents prepared by or for Engineer shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between such provisions of the Contract Documents and:

a. the provisions of any standard specification, manual, reference standard, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference as a Contract Document); or

b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Requirements of the Contract Documents*

A. During the performance of the Work and until final payment, Contractor and Owner shall submit to the Engineer all matters in question concerning the requirements of the Contract Documents (sometimes referred to as requests for information or interpretation—RFIs), or relating to the acceptability of the Work under the Contract Documents, as soon as possible after such matters arise. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

B. Engineer will, with reasonable promptness, render a written clarification, interpretation, or decision on the issue submitted, or initiate an amendment or supplement to the Contract Documents. Engineer's written clarification, interpretation, or decision will be final and binding on Contractor, unless it appeals by submitting a Change Proposal, and on Owner, unless it appeals by filing a Claim.

C. If a submitted matter in question concerns terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work under the Contract Documents, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, then Engineer will promptly give written notice to Owner and Contractor that Engineer is unable to provide a decision or interpretation. If Owner and Contractor are unable to agree on resolution of such a matter in question, either party may pursue resolution as provided in Article 12.

3.05 *Reuse of Documents*

A. Contractor and its Subcontractors and Suppliers shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions, or reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer; or

2. have or acquire any title or ownership rights in any other Contract Documents, reuse any such Contract Documents for any purpose without Owner's express written consent, or violate any copyrights pertaining to such Contract Documents.

B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

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ARTICLE 4 – COMMENCEMENT AND PROGRESS OF THE WORK

4.01 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Contract or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Contract. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

4.02 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to such date.

4.03 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.05 as it may be adjusted from time to time as provided below.

1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.05) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 11.

B. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, or during any appeal process, except as permitted by Paragraph 16.04, or as Owner and Contractor may otherwise agree in writing.

4.05 *Delays in Contractor's Progress*

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor. Delay, disruption, and interference attributable to and within the control of a Subcontractor or Supplier shall be deemed to be within the control of Contractor.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those

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for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays, disruption, and interference described in this paragraph. Causes of delay, disruption, or interference that may give rise to an adjustment in Contract Times under this paragraph include but are not limited to the following:

1. severe and unavoidable natural catastrophes such as fires, floods, epidemics, and earthquakes;
2. abnormal weather conditions;
3. acts or failures to act of utility owners (other than those performing other work at or adjacent to the Site by arrangement with the Owner, as contemplated in Article 8); and
4. acts of war or terrorism.

D. Delays, disruption, and interference to the performance or progress of the Work resulting from the existence of a differing subsurface or physical condition, an Underground Facility that was not shown or indicated by the Contract Documents, or not shown or indicated with reasonable accuracy, and those resulting from Hazardous Environmental Conditions, are governed by Article 5.

E. Paragraph 8.03 governs delays, disruption, and interference to the performance or progress of the Work resulting from the performance of certain other work at or adjacent to the Site.

F. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor.

G. Contractor must submit any Change Proposal seeking an adjustment in Contract Price or Contract Times under this paragraph within 30 days of the commencement of the delaying, disrupting, or interfering event.

ARTICLE 5 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS

5.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which permanent improvements are to be made and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

5.02 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas*:

1. Contractor shall confine construction equipment, temporary construction facilities, the storage of materials and equipment, and the operations of workers to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise,

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and other adjacent areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and such other adjacent areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for (a) damage to the Site; (b) damage to any such other adjacent areas used for Contractor's operations; (c) damage to any other adjacent land or areas; and (d) for injuries and losses sustained by the owners or occupants of any such land or areas; provided that such damage or injuries result from the performance of the Work or from other actions or conduct of the Contractor or those for which Contractor is responsible.

2. If a damage or injury claim is made by the owner or occupant of any such land or area because of the performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible, Contractor shall (a) take immediate corrective or remedial action as required by Paragraph 7.12, or otherwise; (b) promptly attempt to settle the claim as to all parties through negotiations with such owner or occupant, or otherwise resolve the claim by arbitration or other dispute resolution proceeding, or at law; and (c) to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against any such claim, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused directly or indirectly, in whole or in part by, or based upon, Contractor's performance of the Work, or because of other actions or conduct of the Contractor or those for which Contractor is responsible.

B. *Removal of Debris During Performance of the Work*: During the progress of the Work the Contractor shall keep the Site and other adjacent areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning*: Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site and adjacent areas all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading of Structures*: Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent structures or land to stresses or pressures that will endanger them.

5.03 *Subsurface and Physical Conditions*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports known to Owner of explorations and tests of subsurface conditions at or adjacent to the Site;

2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities); and

3. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely upon

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the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions, or information.

5.04 *Differing Subsurface or Physical Conditions*

A. *Notice by Contractor*: If Contractor believes that any subsurface or physical condition that is uncovered or revealed at the Site either:

1. is of such a nature as to establish that any Technical Data on which Contractor is entitled to rely as provided in Paragraph 5.03 is materially inaccurate; or
2. is of such a nature as to require a change in the Drawings or Specifications; or
3. differs materially from that shown or indicated in the Contract Documents; or
4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. *Engineer's Review*: After receipt of written notice as required by the preceding paragraph, Engineer will promptly review the subsurface or physical condition in question; determine the necessity of Owner's obtaining additional exploration or tests with respect to the condition; conclude whether the condition falls within any one or more of the differing site condition categories in Paragraph 5.04.A above; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. *Owner's Statement to Contractor Regarding Site Condition*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

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D. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in Contract Price or Contract Times, or both, to the extent that the existence of a differing subsurface or physical condition, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

   a. such condition must fall within any one or more of the categories described in Paragraph 5.04.A;

   b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03; and,

   c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times with respect to a subsurface or physical condition if:

   a. Contractor knew of the existence of such condition at the time Contractor made a commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract, or otherwise; or

   b. the existence of such condition reasonably could have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas expressly required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such commitment; or

   c. Contractor failed to give the written notice as required by Paragraph 5.04.A.

3. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

4. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the subsurface or physical condition in question.

5.05 *Underground Facilities*

A. *Contractor's Responsibilities*: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or adjacent to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer do not warrant or guarantee the accuracy or completeness of any such information or data provided by others; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

   a. reviewing and checking all information and data regarding existing Underground Facilities at the Site;

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b. locating all Underground Facilities shown or indicated in the Contract Documents as being at the Site;

c. coordination of the Work with the owners (including Owner) of such Underground Facilities, during construction; and

d. the safety and protection of all existing Underground Facilities at the Site, and repairing any damage thereto resulting from the Work.

B. *Notice by Contractor*: If Contractor believes that an Underground Facility that is uncovered or revealed at the Site was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, then Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 7.15), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer.

C. *Engineer's Review*: Engineer will promptly review the Underground Facility and conclude whether such Underground Facility was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy; obtain any pertinent cost or schedule information from Contractor; prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the Underground Facility in question; determine the extent, if any, to which a change is required in the Drawings or Specifications to reflect and document the consequences of the existence or location of the Underground Facility; and advise Owner in writing of Engineer's findings, conclusions, and recommendations. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

D. *Owner's Statement to Contractor Regarding Underground Facility*: After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor (with a copy to Engineer) regarding the Underground Facility in question, addressing the resumption of Work in connection with such Underground Facility, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations in whole or in part.

E. *Possible Price and Times Adjustments*:

1. Contractor shall be entitled to an equitable adjustment in the Contract Price or Contract Times, or both, to the extent that any existing Underground Facility at the Site that was not shown or indicated in the Contract Documents, or was not shown or indicated with reasonable accuracy, or any related delay, disruption, or interference, causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated the existence or actual location of the Underground Facility in question;

b. With respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraph 13.03;

c. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times; and

d. Contractor gave the notice required in Paragraph 5.05.B.

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2. If Owner and Contractor agree regarding Contractor's entitlement to and the amount or extent of any adjustment in the Contract Price or Contract Times, or both, then any such adjustment shall be set forth in a Change Order.

3. Contractor may submit a Change Proposal regarding its entitlement to or the amount or extent of any adjustment in the Contract Price or Contract Times, or both, no later than 30 days after Owner's issuance of the Owner's written statement to Contractor regarding the Underground Facility in question.

5.06 *Hazardous Environmental Conditions at Site*

A. *Reports and Drawings*: The Supplementary Conditions identify:

1. those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at or adjacent to the Site; and

2. Technical Data contained in such reports and drawings.

B. *Reliance by Contractor on Technical Data Authorized*: Contractor may rely upon the accuracy of the Technical Data expressly identified in the Supplementary Conditions with respect to such reports and drawings, but such reports and drawings are not Contract Documents. If no such express identification has been made, then Contractor may rely on the accuracy of the Technical Data (as defined in Article 1) contained in any geotechnical or environmental report prepared for the Project and made available to Contractor. Except for such reliance on Technical Data, Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any Technical Data or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for removing or remediating any Hazardous Environmental Condition encountered, uncovered, or revealed at the Site unless such removal or remediation is expressly identified in the Contract Documents to be within the scope of the Work.

D. Contractor shall be responsible for controlling, containing, and duly removing all Constituents of Concern brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible, and for any associated costs; and for the costs of removing and remediating any Hazardous Environmental Condition created by the presence of any such Constituents of Concern.

E. If Contractor encounters, uncovers, or reveals a Hazardous Environmental Condition whose removal or remediation is not expressly identified in the Contract Documents as being within the scope of the Work, or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, then Contractor shall immediately: (1) secure or otherwise isolate such condition; (2) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 7.15); and (3) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after

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consulting with Engineer, Owner shall take such actions as are necessary to permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 5.06.F. If Contractor or anyone for whom Contractor is responsible created the Hazardous Environmental Condition in question, then Owner may remove and remediate the Hazardous Environmental Condition, and impose a set-off against payments to account for the associated costs.

F. Contractor shall not resume Work in connection with such Hazardous Environmental Condition or in any affected area until after Owner has obtained any required permits related thereto, and delivered written notice to Contractor either (1) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work, or (2) specifying any special conditions under which such Work may be resumed safely.

G. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, then within 30 days of Owner's written notice regarding the resumption of Work, Contractor may submit a Change Proposal, or Owner may impose a set-off.

H. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work, following the contractual change procedures in Article 11. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 8.

I. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition (1) was not shown or indicated in the Drawings, Specifications, or other Contract Documents, identified as Technical Data entitled to limited reliance pursuant to Paragraph 5.06.B, or identified in the Contract Documents to be included within the scope of the Work, and (2) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.H shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

J. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the failure to control, contain, or remove a Constituent of Concern brought to the Site by Contractor or by anyone for whom Contractor is responsible, or to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 5.06.J shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

K. The provisions of Paragraphs 5.03, 5.04, and 5.05 do not apply to the presence of Constituents of Concern or to a Hazardous Environmental Condition uncovered or revealed at the Site.

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ARTICLE 6 – BONDS AND INSURANCE

6.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish a performance bond and a payment bond, each in an amount at least equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 15.08, whichever is later, except as provided otherwise by Laws or Regulations, the Supplementary Conditions, or other specific provisions of the Contract. Contractor shall also furnish such other bonds as are required by the Supplementary Conditions or other specific provisions of the Contract.

B. All bonds shall be in the form prescribed by the Contract except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (as amended and supplemented) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. A bond signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed the accompanying bond.

C. Contractor shall obtain the required bonds from surety companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds in the required amounts.

D. If the surety on a bond furnished by Contractor is declared bankrupt or becomes insolvent, or its right to do business is terminated in any state or jurisdiction where any part of the Project is located, or the surety ceases to meet the requirements above, then Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the bond and surety requirements above.

E. If Contractor has failed to obtain a required bond, Owner may exclude the Contractor from the Site and exercise Owner's termination rights under Article 16.

F. Upon request, Owner shall provide a copy of the payment bond to any Subcontractor, Supplier, or other person or entity claiming to have furnished labor or materials used in the performance of the Work.

6.02 *Insurance—General Provisions*

A. Owner and Contractor shall obtain and maintain insurance as required in this Article and in the Supplementary Conditions.

B. All insurance required by the Contract to be purchased and maintained by Owner or Contractor shall be obtained from insurance companies that are duly licensed or authorized, in the state or jurisdiction in which the Project is located, to issue insurance policies for the required limits and coverages. Unless a different standard is indicated in the Supplementary Conditions, all companies that provide insurance policies required under this Contract shall have an A.M. Best rating of A-VII or better.

C. Contractor shall deliver to Owner, with copies to each named insured and additional insured (as identified in this Article, in the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Contractor has obtained and is maintaining the policies, coverages, and endorsements required by the Contract. Upon request by Owner or any other insured, Contractor shall also furnish other evidence of such required insurance,

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including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

D. Owner shall deliver to Contractor, with copies to each named insured and additional insured (as identified in this Article, the Supplementary Conditions, or elsewhere in the Contract), certificates of insurance establishing that Owner has obtained and is maintaining the policies, coverages, and endorsements required of Owner by the Contract (if any). Upon request by Contractor or any other insured, Owner shall also provide other evidence of such required insurance (if any), including but not limited to copies of policies and endorsements, and documentation of applicable self-insured retentions and deductibles. Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

E. Failure of Owner or Contractor to demand such certificates or other evidence of the other party's full compliance with these insurance requirements, or failure of Owner or Contractor to identify a deficiency in compliance from the evidence provided, shall not be construed as a waiver of the other party's obligation to obtain and maintain such insurance.

F. If either party does not purchase or maintain all of the insurance required of such party by the Contract, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage.

G. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 16.

H. Without prejudice to any other right or remedy, if a party has failed to obtain required insurance, the other party may elect to obtain equivalent insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and the Contract Price shall be adjusted accordingly.

I. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor or Contractor's interests.

J. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner and other individuals and entities in the Contract.

6.03 *Contractor's Insurance*

A. *Workers' Compensation*: Contractor shall purchase and maintain workers' compensation and employer's liability insurance for:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts.

2. United States Longshoreman and Harbor Workers' Compensation Act and Jones Act coverage (if applicable).

3. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees (by stop-gap endorsement in monopolist worker's compensation states).

4. Foreign voluntary worker compensation (if applicable).

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B. *Commercial General Liability—Claims Covered*: Contractor shall purchase and maintain commercial general liability insurance, covering all operations by or on behalf of Contractor, on an occurrence basis, against:

1. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees.
2. claims for damages insured by reasonably available personal injury liability coverage.
3. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom.

C. *Commercial General Liability—Form and Content*: Contractor's commercial liability policy shall be written on a 1996 (or later) ISO commercial general liability form (occurrence form) and include the following coverages and endorsements:

1. Products and completed operations coverage:
   a. Such insurance shall be maintained for three years after final payment.
   b. Contractor shall furnish Owner and each other additional insured (as identified in the Supplementary Conditions or elsewhere in the Contract) evidence of continuation of such insurance at final payment and three years thereafter.
2. Blanket contractual liability coverage, to the extent permitted by law, including but not limited to coverage of Contractor's contractual indemnity obligations in Paragraph 7.18.
3. Broad form property damage coverage.
4. Severability of interest.
5. Underground, explosion, and collapse coverage.
6. Personal injury coverage.
7. Additional insured endorsements that include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together); or CG 20 10 07 04 and CG 20 37 07 04 (together); or their equivalent.
8. For design professional additional insureds, ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent.

D. *Automobile liability*: Contractor shall purchase and maintain automobile liability insurance against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

E. *Umbrella or excess liability*: Contractor shall purchase and maintain umbrella or excess liability insurance written over the underlying employer's liability, commercial general liability, and automobile liability insurance described in the paragraphs above. Subject to industry-standard exclusions, the coverage afforded shall follow form as to each and every one of the underlying policies.

F. *Contractor's pollution liability insurance*: Contractor shall purchase and maintain a policy covering third-party injury and property damage claims, including clean-up costs, as a result of pollution conditions arising from Contractor's operations and completed operations. This insurance shall be maintained for no less than three years after final completion.

G. *Additional insureds*: The Contractor's commercial general liability, automobile liability, umbrella or excess, and pollution liability policies shall include and list as additional

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insureds Owner and Engineer, and any individuals or entities identified in the Supplementary Conditions; include coverage for the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of all such additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis. Contractor shall obtain all necessary endorsements to support these requirements.

H. *Contractor's professional liability insurance*: If Contractor will provide or furnish professional services under this Contract, through a delegation of professional design services or otherwise, then Contractor shall be responsible for purchasing and maintaining applicable professional liability insurance. This insurance shall provide protection against claims arising out of performance of professional design or related services, and caused by a negligent error, omission, or act for which the insured party is legally liable. It shall be maintained throughout the duration of the Contract and for a minimum of two years after Substantial Completion. If such professional design services are performed by a Subcontractor, and not by Contractor itself, then the requirements of this paragraph may be satisfied through the purchasing and maintenance of such insurance by such Subcontractor.

I. *General provisions*: The policies of insurance required by this Paragraph 6.03 shall:

1. include at least the specific coverages provided in this Article.

2. be written for not less than the limits of liability provided in this Article and in the Supplementary Conditions, or required by Laws or Regulations, whichever is greater.

3. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed, or renewal refused until at least 10 days prior written notice has been given to Contractor. Within three days of receipt of any such written notice, Contractor shall provide a copy of the notice to Owner, Engineer, and each other insured under the policy.

4. remain in effect at least until final payment (and longer if expressly required in this Article) and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work as a warranty or correction obligation, or otherwise, or returning to the Site to conduct other tasks arising from the Contract Documents.

5. be appropriate for the Work being performed and provide protection from claims that may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable.

J. The coverage requirements for specific policies of insurance must be met by such policies, and not by reference to excess or umbrella insurance provided in other policies.

6.04 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 6.03, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

B. Owner's liability policies, if any, operate separately and independently from policies required to be provided by Contractor, and Contractor cannot rely upon Owner's liability policies for any of Contractor's obligations to the Owner, Engineer, or third parties.

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6.05 *Property Insurance*

A. *Builder's Risk*: Unless otherwise provided in the Supplementary Conditions, Contractor shall purchase and maintain builder's risk insurance upon the Work on a completed value basis, in the amount of the full insurable replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the Owner and Contractor as named insureds, and all Subcontractors, and any individuals or entities required by the Supplementary Conditions to be insured under such builder's risk policy, as insureds or named insureds. For purposes of the remainder of this Paragraph 6.05, Paragraphs 6.06 and 6.07, and any corresponding Supplementary Conditions, the parties required to be insured shall collectively be referred to as "insureds."

2. be written on a builder's risk "all risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire; lightning; windstorm; riot; civil commotion; terrorism; vehicle impact; aircraft; smoke; theft; vandalism and malicious mischief; mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; flood; collapse; explosion; debris removal; demolition occasioned by enforcement of Laws and Regulations; water damage (other than that caused by flood); and such other perils or causes of loss as may be specifically required by the Supplementary Conditions. If insurance against mechanical breakdown, boiler explosion, and artificially generated electric current; earthquake; volcanic activity, and other earth movement; or flood, are not commercially available under builder's risk policies, by endorsement or otherwise, such insurance may be provided through other insurance policies acceptable to Owner and Contractor.

3. cover, as insured property, at least the following: (a) the Work and all materials, supplies, machinery, apparatus, equipment, fixtures, and other property of a similar nature that are to be incorporated into or used in the preparation, fabrication, construction, erection, or completion of the Work, including Owner-furnished or assigned property; (b) spare parts inventory required within the scope of the Contract; and (c) temporary works which are not intended to form part of the permanent constructed Work but which are intended to provide working access to the Site, or to the Work under construction, or which are intended to provide temporary support for the Work under construction, including scaffolding, form work, fences, shoring, falsework, and temporary structures.

4. cover expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects).

5. extend to cover damage or loss to insured property while in temporary storage at the Site or in a storage location outside the Site (but not including property stored at the premises of a manufacturer or Supplier).

6. extend to cover damage or loss to insured property while in transit.

7. allow for partial occupation or use of the Work by Owner, such that those portions of the Work that are not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

8. allow for the waiver of the insurer's subrogation rights, as set forth below.

9. provide primary coverage for all losses and damages caused by the perils or causes of loss covered.

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10. not include a co-insurance clause.

11. include an exception for ensuing losses from physical damage or loss with respect to any defective workmanship, design, or materials exclusions.

12. include performance/hot testing and start-up.

13. be maintained in effect, subject to the provisions herein regarding Substantial Completion and partial occupancy or use of the Work by Owner, until the Work is complete.

B. *Notice of Cancellation or Change*: All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 6.05 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the purchasing policyholder. Within three days of receipt of any such written notice, the purchasing policyholder shall provide a copy of the notice to each other insured.

C. *Deductibles*: The purchaser of any required builder's risk or property insurance shall pay for costs not covered because of the application of a policy deductible.

D. *Partial Occupancy or Use by Owner*: If Owner will occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 15.04, then Owner (directly, if it is the purchaser of the builder's risk policy, or through Contractor) will provide notice of such occupancy or use to the builder's risk insurer. The builder's risk insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy; rather, those portions of the Work that are occupied or used by Owner may come off the builder's risk policy, while those portions of the Work not yet occupied or used by Owner shall remain covered by the builder's risk insurance.

E. *Additional Insurance*: If Contractor elects to obtain other special insurance to be included in or supplement the builder's risk or property insurance policies provided under this Paragraph 6.05, it may do so at Contractor's expense.

F. *Insurance of Other Property*: If the express insurance provisions of the Contract do not require or address the insurance of a property item or interest, such as tools, construction equipment, or other personal property owned by Contractor, a Subcontractor, or an employee of Contractor or a Subcontractor, then the entity or individual owning such property item will be responsible for deciding whether to insure it, and if so in what amount.

6.06 *Waiver of Rights*

A. All policies purchased in accordance with Paragraph 6.05, expressly including the builder's risk policy, shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any insureds thereunder, or against Engineer or its consultants, or their officers, directors, members, partners, employees, agents, consultants, or subcontractors. Owner and Contractor waive all rights against each other and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Engineer, its consultants, all Subcontractors, all individuals or entities identified in the Supplementary Conditions as insureds, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner or Contractor as trustee or fiduciary, or otherwise payable under any policy so issued.

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B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial occupancy or use pursuant to Paragraph 15.04, after Substantial Completion pursuant to Paragraph 15.03, or after final payment pursuant to Paragraph 15.06.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 6.06.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, or the officers, directors, members, partners, employees, agents, consultants, or subcontractors of each and any of them.

D. Contractor shall be responsible for assuring that the agreement under which a Subcontractor performs a portion of the Work contains provisions whereby the Subcontractor waives all rights against Owner, Contractor, all individuals or entities identified in the Supplementary Conditions as insureds, the Engineer and its consultants, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them, for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by builder's risk insurance and any other property insurance applicable to the Work.

6.07 *Receipt and Application of Property Insurance Proceeds*

A. Any insured loss under the builder's risk and other policies of insurance required by Paragraph 6.05 will be adjusted and settled with the named insured that purchased the policy. Such named insured shall act as fiduciary for the other insureds, and give notice to such other insureds that adjustment and settlement of a claim is in progress. Any other insured may state its position regarding a claim for insured loss in writing within 15 days after notice of such claim.

B. Proceeds for such insured losses may be made payable by the insurer either jointly to multiple insureds, or to the named insured that purchased the policy in its own right and as fiduciary for other insureds, subject to the requirements of any applicable mortgage clause. A named insured receiving insurance proceeds under the builder's risk and other policies of insurance required by Paragraph 6.05 shall distribute such proceeds in accordance with such agreement as the parties in interest may reach, or as otherwise required under the dispute resolution provisions of this Contract or applicable Laws and Regulations.

C. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the money so received applied on account thereof, and the Work and the cost thereof covered by Change Order, if needed.

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ARTICLE 7 – CONTRACTOR'S RESPONSIBILITIES

7.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

7.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours, Monday through Friday. Contractor will not perform Work on a Saturday, Sunday, or any legal holiday. Contractor may perform Work outside regular working hours or on Saturdays, Sundays, or legal holidays only with Owner's written consent, which will not be unreasonably withheld.

7.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

7.04 *"Or Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the Contract Price has been based upon Contractor furnishing such item as specified. The specification or description of such an item is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or equal" item is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment, or items from other proposed suppliers under the circumstances described below.

1. If Engineer in its sole discretion determines that an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, Engineer shall deem it an "or equal"

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item. For the purposes of this paragraph, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole;

3) it has a proven record of performance and availability of responsive service; and

4) it is not objectionable to Owner.

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times; and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

B. *Contractor's Expense*: Contractor shall provide all data in support of any proposed "or equal" item at Contractor's expense.

C. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each "or-equal" request. Engineer may require Contractor to furnish additional data about the proposed "or-equal" item. Engineer will be the sole judge of acceptability. No "or-equal" item will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an "or-equal", which will be evidenced by an approved Shop Drawing or other written communication. Engineer will advise Contractor in writing of any negative determination.

D. *Effect of Engineer's Determination*: Neither approval nor denial of an "or-equal" request shall result in any change in Contract Price. The Engineer's denial of an "or-equal" request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents.

E. *Treatment as a Substitution Request*: If Engineer determines that an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item, Contractor may request that Engineer considered the proposed item as a substitute pursuant to Paragraph 7.05.

7.05 *Substitutes*

A. Unless the specification or description of an item of material or equipment required to be furnished under the Contract Documents contains or is followed by words reading that no substitution is permitted, Contractor may request that Engineer authorize the use of other items of material or equipment under the circumstances described below. To the extent possible such requests shall be made before commencement of related construction at the Site.

1. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is functionally equivalent to that named and an acceptable substitute therefor. Engineer will not accept requests for review of proposed substitute items of material or equipment from anyone other than Contractor.

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2. The requirements for review by Engineer will be as set forth in Paragraph 7.05.B, as supplemented by the Specifications, and as Engineer may decide is appropriate under the circumstances.

3. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

   a. shall certify that the proposed substitute item will:

      1) perform adequately the functions and achieve the results called for by the general design,

      2) be similar in substance to that specified, and

      3) be suited to the same use as that specified.

   b. will state:

      1) the extent, if any, to which the use of the proposed substitute item will necessitate a change in Contract Times,

      2) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and

      3) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty.

   c. will identify:

      1) all variations of the proposed substitute item from that specified, and

      2) available engineering, sales, maintenance, repair, and replacement services.

   d. shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including but not limited to changes in Contract Price, shared savings, costs of redesign, and claims of other contractors affected by any resulting change.

B. *Engineer's Evaluation and Determination*: Engineer will be allowed a reasonable time to evaluate each substitute request, and to obtain comments and direction from Owner. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No substitute will be ordered, furnished, installed, or utilized until Engineer's review is complete and Engineer determines that the proposed item is an acceptable substitute. Engineer's determination will be evidenced by a Field Order or a proposed Change Order accounting for the substitution itself and all related impacts, including changes in Contract Price or Contract Times. Engineer will advise Contractor in writing of any negative determination.

C. *Special Guarantee*: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

D. *Reimbursement of Engineer's Cost*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

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E. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute at Contractor's expense.

F. *Effect of Engineer's Determination*: If Engineer approves the substitution request, Contractor shall execute the proposed Change Order and proceed with the substitution. The Engineer's denial of a substitution request shall be final and binding, and may not be reversed through an appeal under any provision of the Contract Documents. Contractor may challenge the scope of reimbursement costs imposed under Paragraph 7.05.D, by timely submittal of a Change Proposal.

7.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor may retain Subcontractors and Suppliers for the performance of parts of the Work. Such Subcontractors and Suppliers must be acceptable to Owner.

B. Contractor shall retain specific Subcontractors, Suppliers, or other individuals or entities for the performance of designated parts of the Work if required by the Contract to do so.

C. Subsequent to the submittal of Contractor's Bid or final negotiation of the terms of the Contract, Owner may not require Contractor to retain any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against which Contractor has reasonable objection.

D. Prior to entry into any binding subcontract or purchase order, Contractor shall submit to Owner the identity of the proposed Subcontractor or Supplier (unless Owner has already deemed such proposed Subcontractor or Supplier acceptable, during the bidding process or otherwise). Such proposed Subcontractor or Supplier shall be deemed acceptable to Owner unless Owner raises a substantive, reasonable objection within five days.

E. Owner may require the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work. Owner also may require Contractor to retain specific replacements; provided, however, that Owner may not require a replacement to which Contractor has a reasonable objection. If Contractor has submitted the identity of certain Subcontractors, Suppliers, or other individuals or entities for acceptance by Owner, and Owner has accepted it (either in writing or by failing to make written objection thereto), then Owner may subsequently revoke the acceptance of any such Subcontractor, Supplier, or other individual or entity so identified solely on the basis of substantive, reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity.

F. If Owner requires the replacement of any Subcontractor, Supplier, or other individual or entity retained by Contractor to perform any part of the Work, then Contractor shall be entitled to an adjustment in Contract Price or Contract Times, or both, with respect to the replacement; and Contractor shall initiate a Change Proposal for such adjustment within 30 days of Owner's requirement of replacement.

G. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of the right of Owner to the completion of the Work in accordance with the Contract Documents.

H. On a monthly basis Contractor shall submit to Engineer a complete list of all Subcontractors and Suppliers having a direct contract with Contractor, and of all other Subcontractors and Suppliers known to Contractor at the time of submittal.

I. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions.

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J. Contractor shall be solely responsible for scheduling and coordinating the work of Subcontractors, Suppliers, and all other individuals or entities performing or furnishing any of the Work.

K. Contractor shall restrict all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work from communicating with Engineer or Owner, except through Contractor or in case of an emergency, or as otherwise expressly allowed herein.

L. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

M. All Work performed for Contractor by a Subcontractor or Supplier shall be pursuant to an appropriate contractual agreement that specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer.

N. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by the particular Subcontractor or Supplier.

O. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier, or other individual or entity; nor

2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any money due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.

7.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.

C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of

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engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

7.08 *Permits*

A. Unless otherwise provided in the Contract Documents, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of the submission of Contractor's Bid (or when Contractor became bound under a negotiated contract). Owner shall pay all charges of utility owners for connections for providing permanent service to the Work

7.09 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

7.10 *Laws and Regulations*

A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. If Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work or other action. It shall not be Contractor's responsibility to make certain that the Work described in the Contract Documents is in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Owner or Contractor may give notice to the other party of any changes after the submission of Contractor's Bid (or after the date when Contractor became bound under a negotiated contract) in Laws or Regulations having an effect on the cost or time of performance of the Work, including but not limited to changes in Laws or Regulations having an effect on procuring permits and on sales, use, value-added, consumption, and other similar taxes. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times resulting from such changes, then within 30 days of such notice Contractor may submit a Change Proposal, or Owner may initiate a Claim.

7.11 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved Shop Drawings. Contractor shall keep such record documents in good order and annotate them to show changes made during construction. These record documents, together with all approved Samples, will be available

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to Engineer for reference. Upon completion of the Work, Contractor shall deliver these record documents to Engineer.

7.12 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. all persons on the Site or who may be affected by the Work;

2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, other work in progress, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify Owner; the owners of adjacent property, Underground Facilities, and other utilities; and other contractors and utility owners performing work at or adjacent to the Site, when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property or work in progress.

C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.

D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.

E. All damage, injury, or loss to any property referred to in Paragraph 7.12.A.2 or 7.12.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

F. Contractor's duties and responsibilities for safety and protection shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 15.06.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

G. Contractor's duties and responsibilities for safety and protection shall resume whenever Contractor or any Subcontractor or Supplier returns to the Site to fulfill warranty or correction obligations, or to conduct other tasks arising from the Contract Documents.

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7.13 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

7.14 *Hazard Communication Programs*

A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

7.15 *Emergencies*

A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.16 *Shop Drawings, Samples, and Other Submittals*

A. *Shop Drawing and Sample Submittal Requirements*:

1. Before submitting a Shop Drawing or Sample, Contractor shall have:

a. reviewed and coordinated the Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;

b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

c. determined and verified the suitability of all materials and equipment offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and

d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be set forth in a written communication separate from the Shop Drawings or Sample submittal; and, in addition, in the case of Shop Drawings by a specific notation made on each Shop Drawing submitted to Engineer for review and approval of each such variation.

B. *Submittal Procedures for Shop Drawings and Samples*: Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals. Each submittal will be identified as Engineer may require.

1. *Shop Drawings*:

a. Contractor shall submit the number of copies required in the Specifications.

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b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 7.16.D.

2. *Samples*:

a. Contractor shall submit the number of Samples required in the Specifications.

b. Contractor shall clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 7.16.D.

3. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Other Submittals*: Contractor shall submit other submittals to Engineer in accordance with the accepted Schedule of Submittals, and pursuant to the applicable terms of the Specifications.

D. *Engineer's Review*:

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs incident thereto.

3. Engineer's review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

4. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 7.16.A.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer will document any such approved variation from the requirements of the Contract Documents in a Field Order.

5. Engineer's review and approval of a Shop Drawing or Sample shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 7.16.A and B.

6. Engineer's review and approval of a Shop Drawing or Sample, or of a variation from the requirements of the Contract Documents, shall not, under any circumstances, change the Contract Times or Contract Price, unless such changes are included in a Change Order.

7. Neither Engineer's receipt, review, acceptance or approval of a Shop Drawing, Sample, or other submittal shall result in such item becoming a Contract Document.

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8. Contractor shall perform the Work in compliance with the requirements and commitments set forth in approved Shop Drawings and Samples, subject to the provisions of Paragraph 7.16.D.4.

E. *Resubmittal Procedures*:

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

2. Contractor shall furnish required submittals with sufficient information and accuracy to obtain required approval of an item with no more than three submittals. Engineer will record Engineer's time for reviewing a fourth or subsequent submittal of a Shop Drawings, sample, or other item requiring approval, and Contractor shall be responsible for Engineer's charges to Owner for such time. Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges.

3. If Contractor requests a change of a previously approved submittal item, Contractor shall be responsible for Engineer's charges to Owner for its review time, and Owner may impose a set-off against payments due to Contractor to secure reimbursement for such charges, unless the need for such change is beyond the control of Contractor.

7.17 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal;

6. the issuance of a notice of acceptability by Engineer;

7. any inspection, test, or approval by others; or

8. any correction of defective Work by Owner.

D. If the Contract requires the Contractor to accept the assignment of a contract entered into by Owner, then the specific warranties, guarantees, and correction obligations contained in the

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assigned contract shall govern with respect to Contractor's performance obligations to Owner for the Work described in the assigned contract.

7.18 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable.

B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 7.18.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 7.18.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

7.19 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable Laws and Regulations.

B. If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

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C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy, and completeness of the services, certifications, or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this paragraph, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 7.16.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria specified by Owner or Engineer.

ARTICLE 8 – OTHER WORK AT THE SITE

8.01 *Other Work*

A. In addition to and apart from the Work under the Contract Documents, the Owner may perform other work at or adjacent to the Site. Such other work may be performed by Owner's employees, or through contracts between the Owner and third parties. Owner may also arrange to have third-party utility owners perform work on their utilities and facilities at or adjacent to the Site.

B. If Owner performs other work at or adjacent to the Site with Owner's employees, or through contracts for such other work, then Owner shall give Contractor written notice thereof prior to starting any such other work. If Owner has advance information regarding the start of any utility work at or adjacent to the Site, Owner shall provide such information to Contractor.

C. Contractor shall afford each other contractor that performs such other work, each utility owner performing other work, and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, and provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected.

D. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 8, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

8.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, to perform other work at or adjacent to the Site with Owner's employees, or to arrange to have utility owners perform work at or adjacent to the Site, the following will be set forth in the Supplementary Conditions or provided to Contractor prior to the start of any such other work:

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1. the identity of the individual or entity that will have authority and responsibility for coordination of the activities among the various contractors;
2. an itemization of the specific matters to be covered by such authority and responsibility; and
3. the extent of such authority and responsibilities.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

8.03 *Legal Relationships*

A. If, in the course of performing other work at or adjacent to the Site for Owner, the Owner's employees, any other contractor working for Owner, or any utility owner causes damage to the Work or to the property of Contractor or its Subcontractors, or delays, disrupts, interferes with, or increases the scope or cost of the performance of the Work, through actions or inaction, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor must submit any Change Proposal seeking an equitable adjustment in the Contract Price or the Contract Times under this paragraph within 30 days of the damaging, delaying, disrupting, or interfering event. The entitlement to, and extent of, any such equitable adjustment shall take into account information (if any) regarding such other work that was provided to Contractor in the Contract Documents prior to the submittal of the Bid or the final negotiation of the terms of the Contract. When applicable, any such equitable adjustment in Contract Price shall be conditioned on Contractor assigning to Owner all Contractor's rights against such other contractor or utility owner with respect to the damage, delay, disruption, or interference that is the subject of the adjustment. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site. If Contractor fails to take such measures and as a result damages, delays, disrupts, or interferes with the work of any such other contractor or utility owner, then Owner may impose a set-off against payments due to Contractor, and assign to such other contractor or utility owner the Owner's contractual rights against Contractor with respect to the breach of the obligations set forth in this paragraph.

C. When Owner is performing other work at or adjacent to the Site with Owner's employees, Contractor shall be liable to Owner for damage to such other work, and for the reasonable direct delay, disruption, and interference costs incurred by Owner as a result of Contractor's failure to take reasonable and customary measures with respect to Owner's other work. In response to such damage, delay, disruption, or interference, Owner may impose a set-off against payments due to Contractor.

D. If Contractor damages, delays, disrupts, or interferes with the work of any other contractor, or any utility owner performing other work at or adjacent to the Site, through Contractor's failure to take reasonable and customary measures to avoid such impacts, or if any claim arising out of Contractor's actions, inactions, or negligence in performance of the Work at or adjacent to the Site is made by any such other contractor or utility owner against Contractor, Owner, or Engineer, then Contractor shall (1) promptly attempt to settle the claim as to all parties through negotiations with such other contractor or utility owner, or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law, and (2) indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against

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any such claims, and against all costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such damage, delay, disruption, or interference.

ARTICLE 9 – OWNER'S RESPONSIBILITIES

9.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

9.02 *Replacement of Engineer*

A. Owner may at its discretion appoint an engineer to replace Engineer, provided Contractor makes no reasonable objection to the replacement engineer. The replacement engineer's status under the Contract Documents shall be that of the former Engineer.

9.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

9.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in the Agreement.

9.05 *Lands and Easements; Reports, Tests, and Drawings*

A. Owner's duties with respect to providing lands and easements are set forth in Paragraph 5.01.

B. Owner's duties with respect to providing engineering surveys to establish reference points are set forth in Paragraph 4.03.

C. Article 5 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of conditions at the Site, and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

9.06 *Insurance*

A. Owner's responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 6.

9.07 *Change Orders*

A. Owner's responsibilities with respect to Change Orders are set forth in Article 11.

9.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 14.02.B.

9.09 *Limitations on Owner's Responsibilities*

A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

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9.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 5.06.

9.11 *Evidence of Financial Arrangements*

A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents (including obligations under proposed changes in the Work).

9.12 *Safety Programs*

A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

B. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 10 – ENGINEER'S STATUS DURING CONSTRUCTION

10.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract.

10.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 10.08. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

10.03 *Project Representative*

A. If Owner and Engineer have agreed that Engineer will furnish a Resident Project Representative to represent Engineer at the Site and assist Engineer in observing the progress and quality of the Work, then the authority and responsibilities of any such Resident Project Representative will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 10.08. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent, or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

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10.04 *Rejecting Defective Work*

A. Engineer has the authority to reject Work in accordance with Article 14.

10.05 *Shop Drawings, Change Orders and Payments*

A. Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, are set forth in Paragraph 7.16.

B. Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, are set forth in Paragraph 7.19.

C. Engineer's authority as to Change Orders is set forth in Article 11.

D. Engineer's authority as to Applications for Payment is set forth in Article 15.

10.06 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor as set forth in Paragraph 13.03.

10.07 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work, pursuant to the specific procedures set forth herein for initial interpretations, Change Proposals, and acceptance of the Work. In rendering such decisions and judgments, Engineer will not show partiality to Owner or Contractor, and will not be liable to Owner, Contractor, or others in connection with any proceedings, interpretations, decisions, or judgments conducted or rendered in good faith.

10.08 *Limitations on Engineer's Authority and Responsibilities*

A. Neither Engineer's authority or responsibility under this Article 10 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 15.06.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals, that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 10.08 shall also apply to the Resident Project Representative, if any.

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10.09 *Compliance with Safety Program*

A. While at the Site, Engineer's employees and representatives will comply with the specific applicable requirements of Owner's and Contractor's safety programs (if any) of which Engineer has been informed.

ARTICLE 11 – AMENDING THE CONTRACT DOCUMENTS; CHANGES IN THE WORK

11.01 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended or supplemented by a Change Order, a Work Change Directive, or a Field Order.

1. *Change Orders*:

a. If an amendment or supplement to the Contract Documents includes a change in the Contract Price or the Contract Times, such amendment or supplement must be set forth in a Change Order. A Change Order also may be used to establish amendments and supplements of the Contract Documents that do not affect the Contract Price or Contract Times.

b. Owner and Contractor may amend those terms and conditions of the Contract Documents that do not involve (1) the performance or acceptability of the Work, (2) the design (as set forth in the Drawings, Specifications, or otherwise), or (3) other engineering or technical matters, without the recommendation of the Engineer. Such an amendment shall be set forth in a Change Order.

2. *Work Change Directives*: A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the modification ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order, following negotiations by the parties as to the Work Change Directive's effect, if any, on the Contract Price and Contract Times; or, if negotiations are unsuccessful, by a determination under the terms of the Contract Documents governing adjustments, expressly including Paragraph 11.04 regarding change of Contract Price. Contractor must submit any Change Proposal seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 30 days after the completion of the Work set out in the Work Change Directive. Owner must submit any Claim seeking an adjustment of the Contract Price or the Contract Times, or both, no later than 60 days after issuance of the Work Change Directive.

3. *Field Orders*: Engineer may authorize minor changes in the Work if the changes do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Such changes will be accomplished by a Field Order and will be binding on Owner and also on Contractor, which shall perform the Work involved promptly. If Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, then before proceeding with the Work at issue, Contractor shall submit a Change Proposal as provided herein.

11.02 *Owner-Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work. Such changes shall be supported by Engineer's recommendation, to the extent the change involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters. Such changes may be accomplished by a Change Order, if Owner and Contractor have agreed as to the effect, if any, of the changes on Contract Times or Contract Price; or

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by a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved; or, in the case of a deletion in the Work, promptly cease construction activities with respect to such deleted Work. Added or revised Work shall be performed under the applicable conditions of the Contract Documents. Nothing in this paragraph shall obligate Contractor to undertake work that Contractor reasonably concludes cannot be performed in a manner consistent with Contractor's safety obligations under the Contract Documents or Laws and Regulations.

11.03 *Unauthorized Changes in the Work*

A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents, as amended, modified, or supplemented, except in the case of an emergency as provided in Paragraph 7.15 or in the case of uncovering Work as provided in Paragraph 14.05.

11.04 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Price shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment of Contract Price shall comply with the provisions of Article 12.

B. An adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, then by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 13.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, then by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 11.04.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and the parties do not reach mutual agreement to a lump sum, then on the basis of the Cost of the Work (determined as provided in Paragraph 13.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 11.04.C).

C. *Contractor's Fee*: When applicable, the Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 13.01.B.1 and 13.01.B.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 13.01.B.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 11.01.C.2.a and 11.01.C.2.b is that the Contractor's fee shall be based on: (1) a fee of 15 percent of the costs incurred under Paragraphs 13.01.A.1 and 13.01.A.2 by the Subcontractor that actually performs the Work, at whatever tier, and (2) with respect to Contractor itself and to any Subcontractors of a tier higher than that of the Subcontractor that actually performs the Work, a fee of five percent of the amount (fee plus underlying costs incurred) attributable to the next lower tier Subcontractor; provided, however, that for any such subcontracted work the

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maximum total fee to be paid by Owner shall be no greater than 27 percent of the costs incurred by the Subcontractor that actually performs the work;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 13.01.B.4, 13.01.B.5, and 13.01.C;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 11.04.C.2.a through 11.04.C.2.e, inclusive.

11.05 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Change Proposal for an adjustment in the Contract Times shall comply with the provisions of Paragraph 11.06. Any Claim for an adjustment in the Contract Times shall comply with the provisions of Article 12.

B. An adjustment of the Contract Times shall be subject to the limitations set forth in Paragraph 4.05, concerning delays in Contractor's progress.

11.06 *Change Proposals*

A. Contractor shall submit a Change Proposal to Engineer to request an adjustment in the Contract Times or Contract Price; appeal an initial decision by Engineer concerning the requirements of the Contract Documents or relating to the acceptability of the Work under the Contract Documents; contest a set-off against payment due; or seek other relief under the Contract. The Change Proposal shall specify any proposed change in Contract Times or Contract Price, or both, or other proposed relief, and explain the reason for the proposed change, with citations to any governing or applicable provisions of the Contract Documents.

1. *Procedures*: Contractor shall submit each Change Proposal to Engineer promptly (but in no event later than 30 days) after the start of the event giving rise thereto, or after such initial decision. The Contractor shall submit supporting data, including the proposed change in Contract Price or Contract Time (if any), to the Engineer and Owner within 15 days after the submittal of the Change Proposal. The supporting data shall be accompanied by a written statement that the supporting data are accurate and complete, and that any requested time or price adjustment is the entire adjustment to which Contractor believes it is entitled as a result of said event. Engineer will advise Owner regarding the Change Proposal, and consider any comments or response from Owner regarding the Change Proposal.

2. *Engineer's Action*: Engineer will review each Change Proposal and, within 30 days after receipt of the Contractor's supporting data, either deny the Change Proposal in whole, approve it in whole, or deny it in part and approve it in part. Such actions shall be in writing, with a copy provided to Owner and Contractor. If Engineer does not take action on the Change Proposal within 30 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of Engineer's inaction the Change Proposal is deemed denied, thereby commencing the time for appeal of the denial under Article 12.

3. *Binding Decision*: Engineer's decision will be final and binding upon Owner and Contractor, unless Owner or Contractor appeals the decision by filing a Claim under Article 12.

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B. *Resolution of Certain Change Proposals*: If the Change Proposal does not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters, then Engineer will notify the parties that the Engineer is unable to resolve the Change Proposal. For purposes of further resolution of such a Change Proposal, such notice shall be deemed a denial, and Contractor may choose to seek resolution under the terms of Article 12.

11.07 *Execution of Change Orders*

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. changes in Contract Price resulting from an Owner set-off, unless Contractor has duly contested such set-off;

3. changes in the Work which are: (a) ordered by Owner pursuant to Paragraph 11.02, (b) required because of Owner's acceptance of defective Work under Paragraph 14.04 or Owner's correction of defective Work under Paragraph 14.07, or (c) agreed to by the parties, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

4. changes in the Contract Price or Contract Times, or other changes, which embody the substance of any final and binding results under Paragraph 11.06, or Article 12.

B. If Owner or Contractor refuses to execute a Change Order that is required to be executed under the terms of this Paragraph 11.07, it shall be deemed to be of full force and effect, as if fully executed.

11.08 *Notification to Surety*

A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 12 – CLAIMS

12.01 *Claims*

A. *Claims Process*: The following disputes between Owner and Contractor shall be submitted to the Claims process set forth in this Article:

1. Appeals by Owner or Contractor of Engineer's decisions regarding Change Proposals;

2. Owner demands for adjustments in the Contract Price or Contract Times, or other relief under the Contract Documents; and

3. Disputes that Engineer has been unable to address because they do not involve the design (as set forth in the Drawings, Specifications, or otherwise), the acceptability of the Work, or other engineering or technical matters.

B. *Submittal of Claim*: The party submitting a Claim shall deliver it directly to the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto; in the case of appeals regarding Change Proposals within 30 days of the decision under appeal. The party submitting the Claim shall also furnish a copy to the

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Engineer, for its information only. The responsibility to substantiate a Claim shall rest with the party making the Claim. In the case of a Claim by Contractor seeking an increase in the Contract Times or Contract Price, or both, Contractor shall certify that the Claim is made in good faith, that the supporting data are accurate and complete, and that to the best of Contractor's knowledge and belief the amount of time or money requested accurately reflects the full amount to which Contractor is entitled.

C. *Review and Resolution*: The party receiving a Claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the Claim through the exchange of information and direct negotiations. The parties may extend the time for resolving the Claim by mutual agreement. All actions taken on a Claim shall be stated in writing and submitted to the other party, with a copy to Engineer.

D. *Mediation*:

1. At any time after initiation of a Claim, Owner and Contractor may mutually agree to mediation of the underlying dispute. The agreement to mediate shall stay the Claim submittal and response process.

2. If Owner and Contractor agree to mediation, then after 60 days from such agreement, either Owner or Contractor may unilaterally terminate the mediation process, and the Claim submittal and decision process shall resume as of the date of the termination. If the mediation proceeds but is unsuccessful in resolving the dispute, the Claim submittal and decision process shall resume as of the date of the conclusion of the mediation, as determined by the mediator.

3. Owner and Contractor shall each pay one-half of the mediator's fees and costs.

E. *Partial Approval*: If the party receiving a Claim approves the Claim in part and denies it in part, such action shall be final and binding unless within 30 days of such action the other party invokes the procedure set forth in Article 17 for final resolution of disputes.

F. *Denial of Claim*: If efforts to resolve a Claim are not successful, the party receiving the Claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the Claim within 90 days, then either Owner or Contractor may at any time thereafter submit a letter to the other party indicating that as a result of the inaction, the Claim is deemed denied, thereby commencing the time for appeal of the denial. A denial of the Claim shall be final and binding unless within 30 days of the denial the other party invokes the procedure set forth in Article 17 for the final resolution of disputes.

G. *Final and Binding Results*: If the parties reach a mutual agreement regarding a Claim, whether through approval of the Claim, direct negotiations, mediation, or otherwise; or if a Claim is approved in part and denied in part, or denied in full, and such actions become final and binding; then the results of the agreement or action on the Claim shall be incorporated in a Change Order to the extent they affect the Contract, including the Work, the Contract Times, or the Contract Price.

ARTICLE 13 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

13.01 *Cost of the Work*

A. *Purposes for Determination of Cost of the Work*: The term Cost of the Work means the sum of all costs necessary for the proper performance of the Work at issue, as further defined below. The provisions of this Paragraph 13.01 are used for two distinct purposes:

1. To determine Cost of the Work when Cost of the Work is a component of the Contract Price, under cost-plus-fee, time-and-materials, or other cost-based terms; or

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2. To determine the value of a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price. When the value of any such adjustment is determined on the basis of Cost of the Work, Contractor is entitled only to those additional or incremental costs required because of the change in the Work or because of the event giving rise to the adjustment.

B. *Costs Included*: Except as otherwise may be agreed to in writing by Owner, costs included in the Cost of the Work shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 13.01.C, and shall include only the following items:

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, and vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates, and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 13.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof, whether rented from Contractor or others in accordance with rental agreements

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approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 6.05), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as communication service at the Site, express and courier services, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance that Contractor is required by the Contract Documents to purchase and maintain.

C. *Costs Excluded*: The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 13.01.B.1 or specifically covered by Paragraph 13.01.B.4. The payroll costs and other compensation excluded here are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraph 13.01.B.

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D. *Contractor's Fee*: When the Work as a whole is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order, Change Proposal, Claim, set-off, or other adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 11.04.C.

E. *Documentation*: Whenever the Cost of the Work for any purpose is to be determined pursuant to this Article 13, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

13.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*: Contractor agrees that:

1. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

2. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance*: Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

13.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Payments to Contractor for Unit Price Work will be based on actual quantities.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of the following paragraph.

E. Within 30 days of Engineer's written decision under the preceding paragraph, Contractor may submit a Change Proposal, or Owner may file a Claim, seeking an adjustment in the Contract Price if:

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1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement;

2. there is no corresponding adjustment with respect to any other item of Work; and

3. Contractor believes that it is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price, and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 14 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

14.01 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and authorities having jurisdiction will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

14.02 *Tests, Inspections, and Approvals*

A. Contractor shall give Engineer timely notice of readiness of the Work (or specific parts thereof) for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

B. Owner shall retain and pay for the services of an independent inspector, testing laboratory, or other qualified individual or entity to perform all inspections and tests expressly required by the Contract Documents to be furnished and paid for by Owner, except that costs incurred in connection with tests or inspections of covered Work shall be governed by the provisions of Paragraph 14.05.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging, obtaining, and paying for all inspections and tests required:

1. by the Contract Documents, unless the Contract Documents expressly allocate responsibility for a specific inspection or test to Owner;

2. to attain Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work;

3. by manufacturers of equipment furnished under the Contract Documents;

4. for testing, adjusting, and balancing of mechanical, electrical, and other equipment to be incorporated into the Work; and

5. for acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work.

Such inspections and tests shall be performed by independent inspectors, testing laboratories, or other qualified individuals or entities acceptable to Owner and Engineer.

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E. If the Contract Documents require the Work (or part thereof) to be approved by Owner, Engineer, or another designated individual or entity, then Contractor shall assume full responsibility for arranging and obtaining such approvals.

F. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense unless Contractor had given Engineer timely notice of Contractor's intention to cover the same and Engineer had not acted with reasonable promptness in response to such notice.

14.03 *Defective Work*

A. *Contractor's Obligation*: It is Contractor's obligation to assure that the Work is not defective.

B. *Engineer's Authority*: Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. *Notice of Defects*: Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. *Correction, or Removal and Replacement*: Promptly after receipt of written notice of defective Work, Contractor shall correct all such defective Work, whether or not fabricated, installed, or completed, or, if Engineer has rejected the defective Work, remove it from the Project and replace it with Work that is not defective.

E. *Preservation of Warranties*: When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. *Costs and Damages*: In addition to its correction, removal, and replacement obligations with respect to defective Work, Contractor shall pay all claims, costs, losses, and damages arising out of or relating to defective Work, including but not limited to the cost of the inspection, testing, correction, removal, replacement, or reconstruction of such defective Work, fines levied against Owner by governmental authorities because the Work is defective, and the costs of repair or replacement of work of others resulting from defective Work. Prior to final payment, if Owner and Contractor are unable to agree as to the measure of such claims, costs, losses, and damages resulting from defective Work, then Owner may impose a reasonable set-off against payments due under Article 15.

14.04 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner prefers to accept it, Owner may do so (subject, if such acceptance occurs prior to final payment, to Engineer's confirmation that such acceptance is in general accord with the design intent and applicable engineering principles, and will not endanger public safety). Contractor shall pay all claims, costs, losses, and damages attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness), and for the diminished value of the Work to the extent not otherwise paid by Contractor. If any such acceptance occurs prior to final payment, the necessary revisions in the Contract Documents with respect to the Work shall be incorporated in a Change Order. If the parties are unable to agree as to the decrease in the Contract Price, reflecting the diminished value of Work so accepted, then Owner may impose a reasonable set-off against payments due under Article 15. If the acceptance of defective Work occurs after final payment, Contractor shall pay an appropriate amount to Owner.

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14.05 *Uncovering Work*

A. Engineer has the authority to require special inspection or testing of the Work, whether or not the Work is fabricated, installed, or completed.

B. If any Work is covered contrary to the written request of Engineer, then Contractor shall, if requested by Engineer, uncover such Work for Engineer's observation, and then replace the covering, all at Contractor's expense.

C. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, then Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, and provide all necessary labor, material, and equipment.

1. If it is found that the uncovered Work is defective, Contractor shall be responsible for all claims, costs, losses, and damages arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and pending Contractor's full discharge of this responsibility the Owner shall be entitled to impose a reasonable set-off against payments due under Article 15.

2. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, then Contractor may submit a Change Proposal within 30 days of the determination that the Work is not defective.

14.06 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

14.07 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, then Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 14.07, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this paragraph.

C. All claims, costs, losses, and damages incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 14.07 will be charged against Contractor as set-offs

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against payments due under Article 15. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 14.07.

ARTICLE 15 – PAYMENTS TO CONTRACTOR; SET-OFFS; COMPLETION; CORRECTION PERIOD

15.01 *Progress Payments*

A. *Basis for Progress Payments*: The Schedule of Values established as provided in Article 2 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed during the pay period, as determined under the provisions of Paragraph 13.03. Progress payments for cost-based Work will be based on Cost of the Work completed by Contractor during the pay period.

B. *Applications for Payments*:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

C. *Review of Applications*:

1. Engineer will, within 10 days after receipt of each Application for Payment, including each resubmittal, either indicate in writing a recommendation of payment and present the Application to Owner, or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

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b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 13.03, and any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

   a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract; or

   b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

   a. to supervise, direct, or control the Work, or

   b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

   c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

   d. to make any examination to ascertain how or for what purposes Contractor has used the money paid on account of the Contract Price, or

   e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 15.01.C.2.

6. Engineer will recommend reductions in payment (set-offs) necessary in Engineer's opinion to protect Owner from loss because:

   a. the Work is defective, requiring correction or replacement;

   b. the Contract Price has been reduced by Change Orders;

   c. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

   d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible; or

   e. Engineer has actual knowledge of the occurrence of any of the events that would constitute a default by Contractor and therefore justify termination for cause under the Contract Documents.

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D. *Payment Becomes Due*:

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

E. *Reductions in Payment by Owner*:

1. In addition to any reductions in payment (set-offs) recommended by Engineer, Owner is entitled to impose a set-off against payment based on any of the following:

   a. claims have been made against Owner on account of Contractor's conduct in the performance or furnishing of the Work, or Owner has incurred costs, losses, or damages on account of Contractor's conduct in the performance or furnishing of the Work, including but not limited to claims, costs, losses, or damages from workplace injuries, adjacent property damage, non-compliance with Laws and Regulations, and patent infringement;

   b. Contractor has failed to take reasonable and customary measures to avoid damage, delay, disruption, and interference with other work at or adjacent to the Site;

   c. Contractor has failed to provide and maintain required bonds or insurance;

   d. Owner has been required to remove or remediate a Hazardous Environmental Condition for which Contractor is responsible;

   e. Owner has incurred extra charges or engineering costs related to submittal reviews, evaluations of proposed substitutes, tests and inspections, or return visits to manufacturing or assembly facilities;

   f. the Work is defective, requiring correction or replacement;

   g. Owner has been required to correct defective Work in accordance with Paragraph 14.07, or has accepted defective Work pursuant to Paragraph 14.04;

   h. the Contract Price has been reduced by Change Orders;

   i. an event that would constitute a default by Contractor and therefore justify a termination for cause has occurred;

   j. liquidated damages have accrued as a result of Contractor's failure to achieve Milestones, Substantial Completion, or final completion of the Work;

   k. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

   l. there are other items entitling Owner to a set off against the amount recommended.

2. If Owner imposes any set-off against payment, whether based on its own knowledge or on the written recommendations of Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and the specific amount of the reduction, and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, if Contractor remedies the reasons for such action. The reduction imposed shall be binding on Contractor unless it duly submits a Change Proposal contesting the reduction.

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3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 15.01.C.1 and subject to interest as provided in the Agreement.

15.02 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all Liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

15.03 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete and request that Engineer issue a certificate of Substantial Completion. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a preliminary certificate of Substantial Completion which shall fix the date of Substantial Completion. Engineer shall attach to the certificate a punch list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the preliminary certificate during which to make written objection to Engineer as to any provisions of the certificate or attached punch list. If, after considering the objections to the provisions of the preliminary certificate, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the preliminary certificate to Owner, notify Contractor in writing that the Work is not substantially complete, stating the reasons therefor. If Owner does not object to the provisions of the certificate, or if despite consideration of Owner's objections Engineer concludes that the Work is substantially complete, then Engineer will, within said 14 days, execute and deliver to Owner and Contractor a final certificate of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the preliminary certificate as Engineer believes justified after consideration of any objections from Owner.

D. At the time of receipt of the preliminary certificate of Substantial Completion, Owner and Contractor will confer regarding Owner's use or occupancy of the Work following Substantial Completion, review the builder's risk insurance policy with respect to the end of the builder's risk coverage, and confirm the transition to coverage of the Work under a permanent property insurance policy held by Owner. Unless Owner and Contractor agree otherwise in writing, Owner shall bear responsibility for security, operation, protection of the Work, property insurance, maintenance, heat, and utilities upon Owner's use or occupancy of the Work.

E. After Substantial Completion the Contractor shall promptly begin work on the punch list of items to be completed or corrected prior to final payment. In appropriate cases Contractor may submit monthly Applications for Payment for completed punch list items, following the progress payment procedures set forth above.

F. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the punch list.

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15.04 *Partial Use or Occupancy*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. At any time Owner may request in writing that Contractor permit Owner to use or occupy any such part of the Work that Owner believes to be substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 15.03.A through E for that part of the Work.

2. At any time Contractor may notify Owner and Engineer in writing that Contractor considers any such part of the Work substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 15.03 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 6.05 regarding builder's risk or other property insurance.

15.05 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

15.06 *Final Payment*

A. *Application for Payment*:

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents (as provided in Paragraph 7.11), and other documents, Contractor may make application for final payment.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents;

b. consent of the surety, if any, to final payment;

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c. satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any Liens or other title defects, or will so pass upon final payment.

d. a list of all disputes that Contractor believes are unsettled; and

e. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of the Work, and of Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 15.06.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (a) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (b) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien, or Owner at its option may issue joint checks payable to Contractor and specified Subcontractors and Suppliers.

B. *Engineer's Review of Application and Acceptance*:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of final payment and present the Application for Payment to Owner for payment. Such recommendation shall account for any set-offs against payment that are necessary in Engineer's opinion to protect Owner from loss for the reasons stated above with respect to progress payments. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable, subject to the provisions of Paragraph 15.07. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. *Completion of Work*: The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. *Payment Becomes Due*: Thirty days after the presentation to Owner of the final Application for Payment and accompanying documentation, the amount recommended by Engineer (less any further sum Owner is entitled to set off against Engineer's recommendation, including but not limited to set-offs for liquidated damages and set-offs allowed under the provisions above with respect to progress payments) will become due and shall be paid by Owner to Contractor.

15.07 *Waiver of Claims*

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor. Owner expressly reserves claims and rights arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 15.05, from Contractor's failure to comply with the Contract Documents or the terms of any special

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guarantees specified therein, from outstanding Claims by Owner, or from Contractor's continuing obligations under the Contract Documents.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted or appealed under the provisions of Article 17.

15.08 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents, or by any specific provision of the Contract Documents), any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. correct the defective repairs to the Site or such other adjacent areas;
2. correct such defective Work;
3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others, or to other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others).

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this paragraph, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this paragraph are in addition to all other obligations and warranties. The provisions of this paragraph shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

ARTICLE 16 – SUSPENSION OF WORK AND TERMINATION

16.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price

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or an extension of the Contract Times, or both, directly attributable to any such suspension. Any Change Proposal seeking such adjustments shall be submitted no later than 30 days after the date fixed for resumption of Work.

16.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will constitute a default by Contractor and justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule);

2. Failure of Contractor to perform or otherwise to comply with a material term of the Contract Documents;

3. Contractor's disregard of Laws or Regulations of any public body having jurisdiction; or

4. Contractor's repeated disregard of the authority of Owner or Engineer.

B. If one or more of the events identified in Paragraph 16.02.A occurs, then after giving Contractor (and any surety) ten days written notice that Owner is considering a declaration that Contractor is in default and termination of the contract, Owner may proceed to:

1. declare Contractor to be in default, and give Contractor (and any surety) notice that the Contract is terminated; and

2. enforce the rights available to Owner under any applicable performance bond.

C. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

D. Owner may not proceed with termination of the Contract under Paragraph 16.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

E. If Owner proceeds as provided in Paragraph 16.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds the cost to complete the Work, including all related claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals) sustained by Owner, such excess will be paid to Contractor. If the cost to complete the Work including such related claims, costs, losses, and damages exceeds such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this paragraph, Owner shall not be required to obtain the lowest price for the Work performed.

F. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue, or any rights or remedies of Owner against Contractor or any surety under any payment bond or performance bond. Any retention or payment of money due Contractor by Owner will not release Contractor from liability.

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G. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 6.01.A, the provisions of that bond shall govern over any inconsistent provisions of Paragraphs 16.02.B and 16.02.D.

16.03 *Owner May Terminate For Convenience*

A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):

1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

16.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (3) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the contract and recover from Owner payment on the same terms as provided in Paragraph 16.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this paragraph are not intended to preclude Contractor from submitting a Change Proposal for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this paragraph.

ARTICLE 17 – FINAL RESOLUTION OF DISPUTES

17.01 *Methods and Procedures*

A. *Disputes Subject to Final Resolution*: The following disputed matters are subject to final resolution under the provisions of this Article:

1. A timely appeal of an approval in part and denial in part of a Claim, or of a denial in full; and

2. Disputes between Owner and Contractor concerning the Work or obligations under the Contract Documents, and arising after final payment has been made.

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B. *Final Resolution of Disputes*: For any dispute subject to resolution under this Article, Owner or Contractor may:

1. elect in writing to invoke the dispute resolution process provided for in the Supplementary Conditions; or
2. agree with the other party to submit the dispute to another dispute resolution process; or
3. if no dispute resolution process is provided for in the Supplementary Conditions or mutually agreed to, give written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction.

ARTICLE 18 – MISCELLANEOUS

18.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person, by a commercial courier service or otherwise, to the individual or to a member of the firm or to an officer of the corporation for which it is intended; or
2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the sender of the notice.

18.02 *Computation of Times*

A. When any period of time is referred to in the Contract by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

18.03 *Cumulative Remedies*

A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

18.04 *Limitation of Damages*

A. With respect to any and all Change Proposals, Claims, disputes subject to final resolution, and other matters at issue, neither Owner nor Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or anticipated project.

18.05 *No Waiver*

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

18.06 *Survival of Obligations*

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

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18.07 *Controlling Law*

A. This Contract is to be governed by the law of the state in which the Project is located.

18.08 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 007314 - SUPPLEMENTARY CONDITIONS - EJCDC

1.1 SUPPLEMENTARY CONDITIONS

A. Amendments:

1. These Supplementary Conditions amend or supplement EJCDC C-700 - Standard General Conditions of the Construction Contract and other provisions of the Contract Documents as indicated below.
2. EJCDC C-700 is regularly referenced as Section 007200 in the contract documents.
3. Supplementary conditions from funding agencies are incorporated into this project and can be seen in sections 008501 – CWSRF Specifications Insert.
4. All provisions not amended or supplemented remain in full force.

B. The terms used in these Supplementary Conditions, which are defined in EJCDC C-700, have the meanings assigned to them in the General Conditions.

(SC-1.01.A): Add following to Paragraph 1.01.A.28:

A. (SC-1.01.A.29) Products: New material, machinery, components, equipment, fixtures, and systems forming the Work, not including machinery and equipment used for preparation, fabrication, conveying, and erection of the Work. Products may also include existing materials or components required for reuse.

(SC-1.01.A): Add to Paragraph 1.01.A.40:

B. (SC-1.01.A.40) Substantial Completion is further defined as
1. that degree of completion of the Project's operating facilities or systems sufficient to provide the Owner the full time, uninterrupted, and continuous beneficial operation of the Work; and
2. all required functional, performance and acceptance, or startup testing and commissioning has been successfully demonstrated for all components, devices, equipment, and instrumentation and control to the satisfaction of the continuous days operation without significant interruption has been completed, as specified; and
3. all inspections required have been completed and identified defective Work replaced or corrected, and
4. all paving is complete.

(SC-2.01.B): Delete Paragraph 2.01.B and 2.01.C in their entirety and replace with the following:

B. Evidence of Contractor's Insurance: When Contractor delivers the signed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner copies of the policies (including all endorsements, and identification of applicable self-insured retentions and deductibles) of insurance required to be provided by Contractor in this Contract. Contractor may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

C. Evidence of Owner's Insurance: After receipt from Contractor of the signed counterparts of the Agreement and all required bonds and insurance documentation, Owner shall promptly deliver

to Contractor copies of the policies of insurance to be provided by Owner in this Contract (if any). Owner may block out (redact) any confidential premium or pricing information contained in any policy or endorsement furnished under this provision.

(SC-2.01.D): Add following Paragraph immediately after Paragraph 2.01.C:

D. (Paragraph 2.01.D): Third-Party Beneficiary: All parties agree that the State of Washington shall be, and is hereby, named as an express third-party beneficiary of this contract, with full rights as such.

(SC-2.02.A): Delete Paragraph 2.02.A in its entirety and replace with the following:

A. Owner shall furnish to the Contractor one copy of the Contract Documents (including one fully signed counterpart of the Agreement) in electronic portable document format (PDF).

(SC-2.06): Delete Paragraphs 2.06.B and 2.06.C in their entirety and insert the following in their place:

B. Electronic Documents Protocol: The parties shall conform to the following provisions in Paragraphs 2.06.B and 2.06.C, together referred to as the Electronic Documents Protocol ("EDP" or "Protocol") for exchange of electronic transmittals.
   1. 1. Basic Requirements
      a. To the fullest extent practical, the parties agree to and will transmit and accept Electronic Documents in an electronic or digital format using the procedures described in this Protocol. Use of the Electronic Documents and any information contained therein is subject to the requirements of this Protocol and other provisions of the Contract.
      b. The contents of the information in any Electronic Document will be the responsibility of the transmitting party.
      c. Electronic Documents as exchanged by this Protocol may be used in the same manner as the printed versions of the same documents that are exchanged using non-electronic format and methods, subject to the same governing requirements, limitations, and restrictions, set forth in the Contract Documents.
      d. Except as otherwise explicitly stated herein, the terms of this Protocol will be incorporated into any other agreement or subcontract between a party and any third party for any portion of the Work on the Project, or any Project-related services, where that third party is, either directly or indirectly, required to exchange Electronic Documents with a party or with Engineer. Nothing herein will modify the requirements of the Contract regarding communications between and among the parties and their subcontractors and consultants.
      e. When transmitting Electronic Documents, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the receiving party's use of software application packages, operating systems, or computer hardware differing from those established in this Protocol.
      f. Nothing herein negates any obligation 1) in the Contract to create, provide, or maintain an original printed record version of Drawings and Specifications, signed and sealed according to applicable Laws and Regulations; 2) to comply with any applicable Law or Regulation governing the signing and sealing of design documents or the signing and electronic transmission of any other documents; or 3)

to comply with the notice requirements of Paragraph 18.01 of the General Conditions.

2. System Infrastructure for Electronic Document Exchange
   a. Each party will provide hardware, operating system(s) software, internet, e-mail, and large file transfer functions ("System Infrastructure") at its own cost and sufficient for complying with the EDP requirements. With the exception of minimum standards set forth in this EDP, and any explicit system requirements specified by attachment to this EDP, it is the obligation of each party to determine, for itself, its own System Infrastructure.
      1) The maximum size of an email attachment for exchange of Electronic Documents under this EDP is 20 MB. Attachments larger than that may be exchanged using large file transfer functions or physical media.
      2) Each Party assumes full and complete responsibility for any and all of its own costs, delays, deficiencies, and errors associated with converting, translating, updating, verifying, licensing, or otherwise enabling its System Infrastructure, including operating systems and software, for use with respect to this EDP.
   b. Each party is responsible for its own system operations, security, back-up, archiving, audits, printing resources, and other Information Technology ("IT") for maintaining operations of its System Infrastructure during the Project, including coordination with the party's individual(s) or entity responsible for managing its System Infrastructure and capable of addressing routine communications and other IT issues affecting the exchange of Electronic Documents.
   c. Each party will operate and maintain industry-standard, industry-accepted, ISO standard, commercial-grade security software and systems that are intended to protect the other party from: software viruses and other malicious software like worms, trojans, adware; data breaches; loss of confidentiality; and other threats in the transmission to or storage of information from the other parties, including transmission of Electronic Documents by physical media such as CD/DVD/flash drive/hard drive. To the extent that a party maintains and operates such security software and systems, it shall not be liable to the other party for any breach of system security.
   d. In the case of disputes, conflicts, or modifications to the EDP required to address issues affecting System Infrastructure, the parties shall cooperatively resolve the issues; but, failing resolution, the Owner is authorized to make and require reasonable and necessary changes to the EDP to effectuate its original intent. If the changes cause additional cost or time to Contractor, not reasonably anticipated under the original EDP, Contractor may seek an adjustment in price or time under the appropriate process in the Contract.
   e. Each party is responsible for its own back-up and archive of documents sent and received during the term of the contract under this EDP, unless this EDP establishes a Project document archive, either as part of a mandatory Project website or other communications protocol, upon which the parties may rely for document archiving during the specified term of operation of such Project document archive. Further, each party remains solely responsible for its own post-Project back-up and archive of Project documents after the term of the Contract, or after termination of the Project document archive, if one is established, for as long as required by the Contract and as each party deems necessary for its own purposes.

f. If a receiving party receives an obviously corrupted, damaged, or unreadable Electronic Document, the receiving party will advise the sending party of the incomplete transmission.

g. The parties will bring any non-conforming Electronic Documents into compliance with the EDP. The parties will attempt to complete a successful transmission of the Electronic Document or use an alternative delivery method to complete the communication.

C. Software Requirements for Electronic Document Exchange; Limitations

1. Each party will acquire the software and software licenses necessary to create and transmit Electronic Documents and to read and to use any Electronic Documents received from the other party (and if relevant from third parties), using the software formats required in this section of the EDP.
   a. Prior to using any updated version of the software required in this section for sending Electronic Documents to the other party, the originating party will first notify and receive concurrence from the other party for use of the updated version or adjust its transmission to comply with this EDP.
2. The parties agree not to intentionally edit, reverse engineer, decrypt, remove security or encryption features, or convert to another format for modification purposes any Electronic Document or information contained therein that was transmitted in a software data format, including Portable Document Format (PDF), intended by sender not to be modified, unless the receiving party obtains the permission of the sending party or is citing or quoting excerpts of the Electronic Document for Project purposes.
3. Software and data formats for exchange of Electronic Documents will conform to the requirements set forth in Exhibit A to this EDP, including software versions, if listed.

D. Requests by Contractor for Electronic Documents in Other Formats

1. Release of any Electronic Document versions of the Project documents in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be at the sole discretion of the Owner.
2. To extent determined by Owner, in its sole discretion, to be prudent and necessary, release of Electronic Documents versions of Project documents and other Project information requested by Contractor ("Request") in formats other than those identified in the Electronic Documents Protocol (if any) or elsewhere in the Contract will be subject to the provisions of the Owner's response to the Request, and to the following conditions to which Contractor agrees:
   a. The content included in the Electronic Documents created by Engineer and covered by the Request was prepared by Engineer as an internal working document for Engineer's purposes solely, and is being provided to Contractor on an "AS IS" basis without any warranties of any kind, including, but not limited to any implied warranties of fitness for any purpose. As such, Contractor is advised and acknowledges that the content may not be suitable for Contractor's application, or may require substantial modification and independent verification by Contractor. The content may include limited resolution of models, not-to-scale schematic representations and symbols, use of notes to convey design concepts in lieu of accurate graphics, approximations, graphical simplifications, undocumented intermediate revisions, and other devices that may affect subsequent reuse.
   b. Electronic Documents containing text, graphics, metadata, or other types of data that are provided by Engineer to Contractor under the request are only for convenience of Contractor. Any conclusion or information obtained or derived from such data will be at the Contractor's sole risk and the Contractor waives any

claims against Engineer or Owner arising from use of data in Electronic Documents covered by the Request.

c. Contractor shall indemnify and hold harmless Owner and Engineer and their subconsultants from all claims, damages, losses, and expenses, including attorneys' fees and defense costs arising out of or resulting from Contractor's use, adaptation, or distribution of any Electronic Documents provided under the Request.

d. Contractor agrees not to sell, copy, transfer, forward, give away or otherwise distribute this information (in source or modified file format) to any third party without the direct written authorization of Engineer, unless such distribution is specifically identified in the Request and is limited to Contractor's subcontractors. Contractor warrants that subsequent use by Contractor's subcontractors complies with all terms of the Contract Documents and Owner's response to Request.

3. In the event that Owner elects to provide or directs the Engineer to provide to Contractor any Contractor-requested Electronic Document versions of Project information that is not explicitly identified in the Contract Documents as being available to Contractor, the Owner shall be reimbursed by Contractor on an hourly basis at rates established in the Agreement or as mutually agreed in writing for any engineering costs necessary to create or otherwise prepare the data in a manner deemed appropriate by Engineer.

(SC-3.01.C): Delete Paragraph 3.01.C in its entirety and replace with the following Paragraph:

C. (Paragraph 3.01.C): Sections of Division 01 govern the execution of the Work of all Sections of the Specifications.

(SC-4.01.A): Amend the last sentence of Paragraph 4.01.A by STRIKING OUT the following words:

A. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Contract, whichever date is earlier.

(SC-4.05.C): Amend Paragraph 4.05.C by adding the following subparagraphs:

5. *Weather-Related Delays*

a. If "abnormal weather conditions" as set forth in Paragraph 4.05.C.2 of the General Conditions are the basis for a request for an equitable adjustment in the Contract Times, such request must be documented by data substantiating each of the following: 1) that weather conditions were abnormal for the period of time in which the delay occurred, 2) that such weather conditions could not have been reasonably anticipated, and 3) that such weather conditions had an adverse effect on the Work as scheduled. Extreme or unusual weather that is typical for a given region, elevation, or season should not be considered abnormal weather conditions. Requests for time extensions due to abnormal weather conditions will be submitted to the Engineer within five days of the end of the abnormal weather condition event. It is the responsibility of the Contractor to provide the information listed in SC 4.05.C.5.b.

b. The existence of abnormal weather conditions will be determined on a month-by-month basis in accordance with the following:

1) Every workday on which one or more of the following conditions exist will be considered a "bad weather day":

i) Total precipitation (as rain equivalent) occurring between 7:00 p.m. on the preceding day (regardless of whether such preceding day is a work-day) through 7:00 p.m. on the workday in question equals or exceeds **1.0"** of precipitation.

ii) Ambient outdoor air temperature at 11:00 a.m. is equal to or less than the following low temperature threshold: **32** degrees Fahrenheit; or, at 3:00 p.m. the ambient outdoor temperature is equal to or greater than the following high temperature threshold: **110** degrees Fahrenheit.

2) Determination of actual bad weather days during performance of the Work will be based on the weather records measured and recorded by **National Weather Service (National Oceanic and Atmospheric Administration)** weather monitoring station **Manson (MASW)**.

(SC-5.03): Add following Paragraphs immediately after Paragraph 5.03.A:

B. (Paragraph 5.03.B): The following reports of exploration and tests of subsurface conditions at or contiguous to the Site are known to Owner:
1. (Paragraph 5.03.B.1): Report dated December 31, 2025, prepared by GeoEngineers and titled Geotechnical Engineering Evaluation is included within the Contract as Section 023200. The technical data contained in such report upon which Contractor may rely is report, figures, boring log, and laboratory test results.

C. (Paragraph 5.03.C): The reports identified above are not part of the Contract Documents, but the technical data contained therein upon which Contractor may rely, as expressly identified and established above, are incorporated into the Contract Documents by reference. Contractor is not entitled to rely upon any other information and data known to or identified by Owner or Engineer.

(SC-5.06): Add following Subparagraphs immediately after Paragraph 5.06.A.2:

3. (Subparagraph 5.06.A.3): The following drawings regarding Hazardous Environmental Conditions at the Site are known to Owner. The Contractor shall take all necessary precautions applicable to the handling of hazardous materials:
   a. If materials suspected of containing other hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.
   b. Asbestos cement pipe shall be handled in accordance with Specification Section 028213.33.
   c. Soil and Groundwater shall be handled in accordance with the project soil and groundwater management plan.

(SC-5.06): Add following Paragraphs immediately after Paragraph 5.06.A.3:

D. (Paragraph 5.06.B): The following reports of Hazardous Environmental conditions at or contiguous to the Site are known to Owner:
1. (Paragraph 5.06.B.1): Report dated October 23, 2025, prepared by McCrink Consulting LLC and titled Asbestos Survey is included within the Contract as Section 022623. The technical data contained in such report upon which Contractor may rely is report, figures, boring log, and laboratory test results.

2. (Paragraph 5.06.B.2): Report dated October 27, 2025, prepared by McCrink Consulting LLC and titled Dry Pit Interior Total Lead Paint Sampling is included within the Contract as Section 022626.01. The technical data contained in such report upon which Contractor may rely is report, figures, laboratory test results, and lead paint finding.
3. (Paragraph 5.06.B.3): Report dated October 23, 2025, prepared by McCrink Consulting LLC and titled Building Demolition TCLP Lead Sampling is included within the Contract as Section 022626.02. The technical data contained in such report upon which Contractor may rely is report, figures, laboratory test results, and TCLP-lead finding.
4. (Paragraph 5.06.B.4): Report dated March 12, 2026, prepared by GeoEngineers and titled Soil and Groundwater Management Plan is included within the Contract as Section 026100. The technical data contained in such report upon which Contractor may rely is report, figures, boring log, and laboratory test results.

(SC-5.06.D): Add following at end of Paragraph 5.06.D:

E. (Paragraph 5.06.D): No construction related activity shall contribute to the degradation of the environment, allow material to enter surface or ground waters, or allow particulate emissions to the atmosphere, which exceed state or federal standards. Any actions that potentially allow a discharge to state waters must have prior approval of the Washington Department of Ecology.

(SC 6.01) Add the following paragraphs immediately after Paragraph 6.01.A:

B. Required Performance Bond Form (Document 006113.13): The performance bond that Contractor furnishes will be in the form of EJCDC® C 610, Performance Bond.

C. Required Payment Bond Form Document 006113.16): The payment bond that Contractor furnishes will be in the form of EJCDC® C 615, Payment Bond.

(SC-6.02.B.): Add the following paragraph immediately after Paragraph 6.02.B:

1. Contractor may obtain worker's compensation insurance from an insurance company that has not been rated by A.M. Best, provided that such company (a) is domiciled in the state in which the Project is located, (b) is certified or authorized as a worker's compensation insurance provider by the appropriate state agency, and (c) has been accepted to provide worker's compensation insurance for similar projects by the state within the last 12 months.

(SC-6.03): ADD the following new paragraph immediately after Paragraph 6.03.J.

K. The limits of liability for insurance required by Paragraph 6.03 of the General Conditions (Document 007200) shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
1. Workers' Compensation, and related coverages under Paragraphs 6.03.A.1 and A.2 of the General Conditions (Document 007200):

State:	Statutory
Applicable Federal, if applicable, (Longshoremen's)	Statutory
Employer's Liability	{$500,000}

2. Contractor's Commercial General Liability under Paragraphs 6.03.B and 6.03.C of the General Conditions (Document 007200) which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of the Contractor:

General Aggregate (Per Project Limit)	{$2,000,000}

Products - Completed Operations Aggregate {$2,000,000}
Personal and Advertising Injury {$2,000,000}
Each Occurrence (Bodily Injury and Property Damage) {$2,000,000}

3. Automobile Liability under Paragraph 6.03.D of the General Conditions (Document 007200):

Bodily Injury:
1) Each person {$1,000,000}
2) Each Accident {$1,000,000}
Property Damage
3) Each Accident {$1,000,000}
Excess or Umbrella Liability:
4) Per Occurrence {$5,000,000}
5) General Aggregate {$5,000,000}

(SC-7.02.C): Add the following new subparagraphs immediately after Paragraph 7.02.B:

C. Regular working hours will be 7:00 am to 5:30 pm.

D. Nighttime working hours will be 8:00 pm to 7:00 am.

E. Owner's legal holidays are all federally recognized holidays.

(SC-7.03): ADD the following new Paragraphs after Paragraph 7.03.C:

D. All iron and steel products must meet American Iron and Steel requirements.

E. Miscellaneous small structures such as signs, irrigation and drainage facilities, utility poles, lines, and appurtenances, when necessary to remove or disturb, shall be replaced or reconstructed to equal to or better their condition prior to disturbance. Work shall be considered incidental to construction and included as part of the bid.

(SC-7.04.A): Amend the third sentence of Paragraph 7.04.A by STRIKING OUT the following words:

A. Unless the specification or description contains or is followed by words reading that no like, equivalent, or ‘or-equal’ item is permitted.

(SC-7.04.A.1):

3) Amend the last sentence of Paragraph a.3 by STRIKING OUT “and;” and ADDING a period at the end of Paragraph a.3.
4) DELETE paragraph 7.04.A.1.a.4 in its entirety and insert the following in its place:
a) [Deleted]

(SC-7.04.B.1) ADD the following new Subparagraph after Paragraph 7.04.B:

C. Contractor shall include a Manufacturer’s Certification letter for compliance with American Iron and Steel requirements in support data, if applicable. Refer to Manufacturer’s Certification Letter provided in these Contract Documents. In addition, for the de minimis Waiver, Contractor shall maintain an itemized list of incidental components and ensure that non-domestically sourced materials do not exceed 5% of the total material cost or 1% for any single item, and de minimis items must be “incidental to the project purpose.”

(SC-7.05.A.3.a.4): ADD the following new Paragraph after Paragraph 7.05.A.3.a.3:

4) comply with American Iron and Steel by providing Manufacturer's Certification letter of American Iron and Steel compliance, if applicable. Refer to Manufacturer's Certification Letter provided in these Contract Documents."

(SC-7.06.A): Amend Paragraph 7.06.A by ADDING the following text to the end of the Paragraph:

A. The Contractor shall not award work valued at more than fifty percent of the Contract Price to Subcontractor(s), without prior written approval of the Owner.

(SC-7.06.B): DELETE paragraph 7.06.B in its entirety and insert the following in its place:

B. Contractor shall be fully responsible for the acts and omissions of all Subcontractors, Suppliers, and other persons performing any portion of the Work under a contract with Contractor.

(SC-7.06.E): Amend the second sentence of Paragraph 7.06.E by STRIKING OUT the following:

E. "Owner may also require Contractor to retain specific replacements; provided, however, that".

(SC-7.11.A): Amend Paragraph 7.11.A by INSERTING the following after "written interpretations and clarifications,":

A. Manufacturers' Certification provided by the manufacturer, supplier, distributor, vendor, fabricator, etc. stating that the iron and steel products to be used in the project are produced in the United States in accordance with American Iron and Steel Requirements.

(SC-7.16.A.1.e): ADD the following new Paragraph after Paragraph 7.16.A.1.d:

e. obtained Manufacturer's Certification letter for any item in the submittal subject to American Iron and Steel requirements and include the Certificate in the submittal. Refer to Manufacturer's Certification Letter provided in these Contract Documents.

(SC-7.16.D.9): ADD the following new Paragraph after Paragraph 7.16.D.8:

9. Engineer's review and approval of Shop Drawing or Sample shall include review of compliance with American Iron and Steel requirements, as applicable.

(SC-7.17.C.1.) Add "or Owner" after "Engineer."

(SC-7.17.E): ADD the following new Paragraph after Paragraph 7.17.D:

E. Contractor shall certify upon Substantial Completion that all Work and Materials has complied with American Iron and Steel requirements. Contractor shall provide said Certification to Owner.

(SC-7.17.F): ADD the following new Paragraph after Paragraph 7.17.E:

F. The Contractor's standard warranty and guarantee period shall be one year and shall commence on the date of final project acceptance as indicated on the Notice of Acceptability; or for such longer period of time as may be prescribed by the terms of any specific provisions of the Contract Documents or Specifications.

(SC-9.01.A): DELETE paragraph 9.01.A and ADD the following new Paragraph 9.01.A:

A. Except as otherwise provided in these General Conditions, Owner may issue all communications to Contractor through Engineer or directly to Contractor. Owner shall copy Engineer on any communications delivered directly to Contractor.

(SC-10.03): ADD the following new paragraphs immediately after Paragraph 10.03.A:

A. The Resident Project Representative (RPR) will be Engineer's representative at the Site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's actions.
   1. General: RPR's dealings in matters pertaining to the Work in general shall be with Engineer and Contractor. RPR's dealings with Subcontractors shall only be through or with the full knowledge and approval of Contractor. RPR shall generally communicate with Owner only with the knowledge of and under the direction of Engineer.
   2. Schedules: Review the progress schedule, schedule of Shop Drawing and Sample submittals, and Schedule of Values prepared by Contractor and consult with Engineer concerning acceptability.
   3. Conferences and Meetings: Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences, and other Project-related meetings, and prepare and circulate copies of minutes thereof.
   4. Liaison:
      Serve as Engineer’s liaison with Contractor. Working principally through Contractor’s authorized representative or designee, assist in providing information regarding the provisions and intent of the Contract Documents.
      Assist Engineer in serving as Owner’s liaison with Contractor when Contractor’s operations affect Owner’s on-Site operations.
      Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
   5. Interpretation of Contract Documents: Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
   6. Shop Drawings and Samples:
      Record date of receipt of Samples and Contractor-approved Shop Drawings.
      Receive Samples which are furnished at the Site by Contractor, and notify Engineer of availability of Samples for examination.
      Advise Engineer and Contractor of the commencement of any portion of the Work requiring a Shop Drawing or Sample submittal for which RPR believes that the submittal has not been approved by Engineer.
   7. Modifications: Consider and evaluate Contractor’s suggestions for modifications in Drawings or Specifications and report such suggestions, together with RPR’s recommendations, if any, to Engineer. Transmit to Contractor in writing decisions as issued by Engineer.
   8. Review of Work and Rejection of Defective Work:
      Conduct on-Site observations of Contractor’s work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
      Report to Engineer whenever RPR believes that any part of Contractor’s work in progress is defective, will not produce a completed Project that conforms generally to the Contract Documents, or will imperil the integrity of the design concept of the completed Project as a functioning whole as indicated in the Contract Documents, or has been damaged, or

does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of that part of work in progress that RPR believes should be corrected or rejected or should be uncovered for observation, or requires special testing, inspection or approval.

9. Inspections, Tests, and System Start-ups:
   Verify that tests, equipment, and systems start-ups and operating and maintenance training are conducted in the presence of appropriate Owner's personnel, and that Contractor maintains adequate records thereof.
   Observe, record, and report to Engineer appropriate details relative to the test procedures and systems start-ups.
10. Records:
    Prepare a daily report or keep a diary or log book, recording Contractor's hours on the Site, Subcontractors present at the Site, weather conditions, data relative to questions of Change Orders, Field Orders, Work Change Directives, or changed conditions, Site visitors, deliveries of equipment or materials, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send copies to Engineer.
    Record names, addresses, fax numbers, e-mail addresses, web site locations, and telephone numbers of all Contractors, Subcontractors, and major Suppliers of materials and equipment.
    Maintain records for use in preparing Project documentation.
11. Reports:
    Furnish to Engineer periodic reports as required of progress of the Work and of Contractor's compliance with the Progress Schedule and schedule of Shop Drawing and Sample submittals.
    Draft and recommend to Engineer proposed Change Orders, Work Change Directives, and Field Orders. Obtain backup material from Contractor.
    Immediately notify Engineer of the occurrence of any Site accidents, emergencies, acts of God endangering the Work, force majeure or delay events, damage to property by fire or other causes, or the discovery of any Constituent of Concern or Hazardous Environmental Condition.
12. Payment Requests: Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the Schedule of Values, Work completed, and materials and equipment delivered at the Site but not incorporated in the Work.
13. Certificates, Operation and Maintenance Manuals: During the course of the Work, verify that materials and equipment certificates, operation and maintenance manuals and other data required by the Contract Documents to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have these documents delivered to Engineer for review and forwarding to Owner prior to payment for that part of the Work.
14. Completion:
    Participate in Engineer's visits to the Site to determine Substantial Completion, assist in the determination of Substantial Completion and the preparation of a punch list of items to be completed or corrected.
    Participate in Engineer's final visit to the Site to determine completion of the Work, in the company of Owner and Contractor, and prepare a final punch list of items to be completed and deficiencies to be remedied.

Observe whether all items on the final list have been completed or corrected and make recommendations to Engineer concerning acceptance and issuance of the notice of acceptability of the work.

15. The RPR shall not:
Authorize any deviation from the Contract Documents or substitution of materials or equipment (including "or-equal" items).
Exceed limitations of Engineer's authority as set forth in the Contract Documents.
Undertake any of the responsibilities of Contractor, Subcontractors, or Suppliers.
Advise on, issue directions relative to, or assume control over any aspect of the means, methods, techniques, sequences or procedures of Contractor's work.
Advise on, issue directions regarding, or assume control over security or safety practices, precautions, and programs in connection with the activities or operations of Owner or Contractor.
Participate in specialized field or laboratory tests or inspections conducted off-site by others except as specifically authorized by Engineer.
Accept Shop Drawing or Sample submittals from anyone other than Contractor.
Authorize Owner to occupy the Project in whole or in part.

(SC-10.10.A) ADD the following new Paragraph after Paragraph 10.09:

A. American Iron & Steel: A. "Services required to determine and certify that to the best of the Engineer's knowledge and belief all iron and steel products referenced in engineering analysis, the Plans, Specifications, Bidding Documents, and associated Bid Addenda requiring design revisions are either produced in the United States or are the subject of an approved waiver and services required to determine to the best of the engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates are either produced in the United States or are the subject of a de minimis waiver.

(SC-11.06.A.1): Amend Paragraph 11.06.A.1 by INSERTING the following after "within 15 days after the submittal of the Change Proposal.":

1. Include supporting data (name of manufacturer, city and state where the product was manufactured, description of product, signature of authorized manufacturer's representative) in the Manufacturer's Certification Letter, as applicable.

(SC-11.07.C): ADD the following new Paragraph after Paragraph 11.07.B:

C. All Contract Change Orders must be concurred in by Agency before they are effective.

(SC-12.01.D): DELETE Paragraph 12.01.D and its Sub-Paragraphs in its entirety and insert the following in its place:

D. Mediation

1. All appealed or unsettled claims, disputes, or other matters between Owner and Contractor arising out of or relating to the Contract Documents or the breach thereof, (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 15.07) shall first be submitted to mediation under the Construction Industry Mediation Rules of the American Arbitration Association then obtaining prior to either of them exercising any rights or remedies as either may otherwise have under the Contract Documents or by Laws or Regulations in respect of any dispute.

2. Should the mediation be unsuccessful (except for claims which have been waived by the making or acceptance of final payment as provided by paragraph 15.07) and is terminated by written notice to all involved by Mediator or Owner or Contractor, the dispute resolution process shall revert to Article 12 of the General Conditions, as if the mediation had been a second phase of the unsuccessful executive negotiation.
3. Notice of demand for mediation shall be filed in writing with the other party to the Agreement and with the American Arbitration Association with a copy to the Engineer for information. Any demand for mediation of any appealed or unsettled claim, dispute, or other matter that is required to be referred to Engineer initially for decision in accordance with paragraph 10.0 shall be filed by the appealing party within 10 days after the executive negotiation has been declared unsuccessful by the Owner or Contractor, and in all other cases within a reasonable time after the unsettled claim, dispute or other matter has arisen, and in no event shall any such demand be made after the date when institution of legal or equitable proceedings based on such unsettled claim, dispute or other matter would be barred by the applicable statute of limitations. Failure to demand mediation within said 10 day period will result in Engineer's decision being final

(SC-13.01.B.1): Add the following to the end of the subparagraph:

1. (Subparagraph 13.01.B.1): The Successful bidder will be required to conform to the wage requirements prescribed by the federal Davis-Bacon and Relate Acts which requires that all laborers and mechanics employed by contractors and subcontractors performing on contracts funded in whole or in part by SRF appropriations in excess of $2000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits, and determined by the Secretary of Labor, for corresponding classes of laborers and mechanics employed on similar projects in the area.

(SC-13.01.B.2): Add the following subparagraph:

3. 2. Federally funded projects within the state of Washington require the Contractor to comply with both federal and state prevailing wage laws. Contractor will be required to meet the more demanding of state and federal prevailing wage requirements and complete required paperwork for each law. Please refer to the requirements listed at the Washington State Department of Labor and Industries website and SAM.gov. Wage determinations can be found at:
   Washington State - https://seure.lni.wa.gov/wagelookup/
   Federal - https://sam.gov/content/wage-determinations
   The effective date for wage determinations shall be the date of bid opening.
4. The project will be in Chelan County, Washington. Printed copies of the wage determinations are available for viewing at any Ardurra office or by mail.
5. No payments will be made until the Contractor has submitted an approved Statement of Intent to pay prevailing wages to Washington State Department of Labor and Industries per RCW 39.12.040.

(SC-13.02.C): DELETE Paragraph 13.02.C in its entirety and insert the following in its place:

E. [Deleted]

(SC-13.03.E): ADD Paragraph 13.04 following paragraph 13.03.E:

E. It is anticipated that this project will be funded in part by the Washington State Department of Ecology. Neither the State of Washington nor any of its departments or employees are, or shall

be, a party to this contract or any subcontract. Notwithstanding the foregoing, the State may exercise such rights as are expressly granted to it as a third-party beneficiary.

F. Requirements imposed by the funding agencies impose some costs to the work. Refer to Section 008501 detailing requirements.

(SC-14.02.G): ADD the following new Paragraph after Paragraph 14.02.F:

G. The Engineer shall decide any and all questions which may arise as to the quality and acceptability of materials furnished, work performed, and as to the manner of which performance and rate of progress of the Work. He shall decide all questions which may arise as to the interpretations of the specifications or plans relating to the Work. The Engineer shall determine the amount and quality of the several kinds of Work performed and materials furnished which are to be paid for under contract.

H. The Engineer does not have the authority to accept furnished materials that do not conform to the Contract Document requirements.

I. All work and all materials furnished shall be in reasonably close conformity with the lines, grading sections, cross sections, dimensions, material requirements, and testing requirements that are specified (including specified tolerances) in the contract, plans or specifications.

J. If the Engineer finds the materials furnished, work performed, or the finished product not within reasonably close conformity with the plans and specifications but that the portion of the work affected will, in his or her opinion, result in a finished product having a level of safety, economy, durability, and workmanship acceptable to the Owner, he will advise the Owner of his or her determination that the affected work be accepted and remain in place. In this event, the Engineer will document his or her determination and recommended to the Owner a basis of acceptance which provide for an adjustment in the contract price for the affected portion of the Work. The Engineer's determination and recommended contract price adjustments will be his or her opinion needed. Changes in the contract price shall be covered by contract modifications (change order or supplemental agreement) as applicable.

K. If the Engineer finds the materials furnished, work performed, or the finished product are not in reasonably close conformity with the plans and specifications and have resulted in an unacceptable finished product, the affected work or materials shall be removed and replace or otherwise corrected by and at the expense of the Contractor in accordance with the Engineer's written orders.

L. For the purpose of this subsection, the term "reasonably close conformity" shall not be construed as waiving the Contractor's responsibility to complete the Work in accordance with the contract, plans, or specifications. The term shall not be construed as waiving the Engineer's right to insist on strict compliance with the requirements of the contract, plans, and specifications during the Contractor's execution of the Work, when, in the Engineer's opinion, such compliance is essential to provide an acceptable finish portion of the Work.

M. For the purpose of this subsection, the term "reasonably close conformity" is also intended to provide the Engineer with the authority, after consultation with the Owner, to use sound Engineering judgment in his or her determinations as to acceptance of Work that is not in strict conformity, but will provide a finished product equal to or better than intended by the requirements of the contract, plans and specifications.

N. The Engineer will not be responsible for the Contractor's means, methods, techniques, sequences, or procedures of construction or the safety precautions incident thereto.

O. Inspectors shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the Work and to the preparations, fabrications, or manufacture of the materials to be used. Inspectors are not authorized to revoke, alter, or waive any provision of the contract. Inspectors are not authorized to issue instructions contrary to the plans and specifications or to act as foreman for the Contractor.

P. Inspectors are authorized to notify the Contractor or his or her representatives of any failure of the Work or materials to conform to the requirements of the contract, plans, or specifications and to reject such nonconforming materials in question until such issues can be referred to the Engineer for a decision.

Q. All materials and each part or detail of the Work shall be subject to inspection. The Engineer shall be allowed access to all parts of the Work and shall be furnished with such information and assistance by the Contractor as is require to make a complete and detailed inspection.

R. If the Engineer requests it, the Contractor, at any time before acceptance of the Work shall remove or uncover such portions of the finished work as may be directed. After examination, the Contractor shall restore said portions of the Work to the standard required by the specifications. Should the work thus exposed or examined prove acceptable, the uncovering, or removing, and replacing of the covering or making good of the parts removed will be paid for as extra work; but should the work so exposed or examined prove unacceptable, the uncovering, or removing, and the replacing of the covering or making good of the parts removed will be at the Contractor's expense.

S. Any Work done, or materials used without supervision or inspection by an authorized representative of the Owner may be ordered, removed, and replaced at the Contractor's expense unless the Owner's representative failed to inspect after having been given reasonable notice in writing that the work was to be performed.

T. Should the contract work include relocation, adjustment, or any other modification to existing facilities, not the property of the (contract) Owner, authorized representatives of the Owners of such facilities shall have the right to inspect such work. Such inspection shall in no sense make any facility Owner a party to the contract, and shall in no way interfere with the rights of the parties to this contract.

U. No removal work made under provision of this subsection shall be done without lines and grades having been given by the Engineer. Work done contrary to the instructions of the Engineer, work done beyond the lines shown on the plans or as given, except as herein specified, or any extra work done without authority, will be considered as unauthorized and will not be paid for under the provisions of the contract. Work so done may be ordered removed or replaced at the Contractor's expense.

V. Upon failure on the part of the Contractor to comply with any order of the Engineer made under the provisions of this subsection, the Engineer will have authority to cause unacceptable work to be remedied or removed and replaced and unauthorized work to be removed and to deduct the costs incurred by the Owner from any monies due or to become due the Contractor.

SC 14.03.G - ADD the following new Paragraph after Paragraph 14.03.F:

G. Installation of Materials that are non-compliant with American Iron and Steel requirements shall be considered defective work.

SC 15.01.B.3 - ADD the following language at the end of paragraph 15.01.B.3:

1. No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC 15.01.B.4 - ADD the following new Paragraph after Paragraph 15.01.B.3:

2. The Application for Payment form to be used on this Project is Section 006276 (EJCDC C-620). The Agency must approve all Applications for Payment before payment is made.

SC 15.01.B.5 - ADD the following new Paragraph after Paragraph 15.01.B.4:

3. By submitting Materials for payment, Contractor is certifying that the submitted Materials are compliant with American Iron and Steel requirements. Manufacturer's Certification letter for Materials satisfy this certification.

SC-15.01.C.2.d - ADD the following new Paragraph after Paragraph 15.01.C.2.c:

d. the Materials presented for payment comply with American Iron and Steel.

SC 15.01.D.1 - DELETE Paragraph 15.01.D.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 15.01.E will become due thirty (30) days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC 15.01.F - Add the following new Paragraph 15.01.F:

F. For contracts in which the Contract Price is based on the Cost of Work, if Owner determines that progress payments made to date substantially exceed the actual progress of the Work (as measured by reference to the Schedule of Values), or present a potential conflict with the Guaranteed Maximum Price, then Owner may require that Contractor prepare and submit a plan for the remaining anticipated Applications for Payment that will bring payments and progress into closer alignment and take into account the Guaranteed Maximum Price (if any), through reductions in billings, increases in retainage, or other equitable measures. Owner will review the plan, discuss any necessary modifications, and implement the plan as modified for all remaining Applications for Payment.

SC 15.02.A - Amend Paragraph 15.02.A by STRIKING OUT the following text:

A. "no later than seven days after the time of payment by Owner" and insert "no later than the time of payment by Owner."

SC 15.03.A - Amend Paragraph 15.03.A by ADDING the following text to the end of the Paragraph:

A. Services required to determine and certify that to the best of the Engineer's knowledge and belief all iron and steel products referenced in engineering analysis, the Plans, Specifications, Bidding Documents, and associated Bid Addenda requiring design revisions are either produced in the United States or are the subject of an approved waiver and services required to determine to the best of the engineer's knowledge and belief that approved substitutes, equals, and all iron and steel products proposed in the shop drawings, Change Orders and Partial Payment Estimates are either produced in the United States or are the subject of a de minimis waiver.

SC 17.02 - Add the following new paragraph immediately after Paragraph 17.01.:

17.02 *Arbitration*

A. All matters subject to final resolution under this Article will be settled by arbitration administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules (subject to the conditions and limitations of this Paragraph SC-17.02). Any controversy or claim in the amount of $100,000 or less will be settled in accordance with the American Arbitration Association's supplemental rules for Fixed Time and Cost Construc-

tion Arbitration. This agreement to arbitrate will be specifically enforceable under the prevailing law of any court having jurisdiction.

B. The demand for arbitration will be filed in writing with the other party to the Contract and with the selected arbitration administrator, and a copy will be sent to Engineer for information. The demand for arbitration will be made within the specific time required in Article 17, or if no specified time is applicable within a reasonable time after the matter in question has arisen, and in no event will any such demand be made after the date when institution of legal or equitable proceedings based on such matter in question would be barred by the applicable statute of limitations.

C. The arbitrator(s) must be licensed engineers, contractors, attorneys, or construction managers. Hearings will take place pursuant to the standard procedures of the Construction Arbitration Rules that contemplate in-person hearings. The arbitrators will have no authority to award punitive or other damages not measured by the prevailing party's actual damages, except as may be required by statute or the Contract. Any award in an arbitration initiated under this clause will be limited to monetary damages and include no injunction or direction to any party other than the direction to pay a monetary amount.

D. The Arbitrators will have the authority to allocate the costs of the arbitration process among the parties, but will only have the authority to allocate attorneys' fees if a specific Law or Regulation or this Contract permits them to do so.

E. The award of the arbitrators must be accompanied by a reasoned written opinion and a concise breakdown of the award. The written opinion will cite the Contract provisions deemed applicable and relied on in making the award.

F. The parties agree that failure or refusal of a party to pay its required share of the deposits for arbitrator compensation or administrative charges will constitute a waiver by that party to present evidence or cross-examine witness. In such event, the other party shall be required to present evidence and legal argument as the arbitrator(s) may require for the making of an award. Such waiver will not allow for a default judgment against the non-paying party in the absence of evidence presented as provided for above.

G. No arbitration arising out of or relating to the Contract will include by consolidation, joinder, or in any other manner any other individual or entity (including Engineer, and Engineer's consultants and the officers, directors, partners, agents, employees or consultants of any of them) who is not a party to this Contract unless:

1. the inclusion of such other individual or entity will allow complete relief to be afforded among those who are already parties to the arbitration;

2. such other individual or entity is substantially involved in a question of law or fact which is common to those who are already parties to the arbitration, and which will arise in such proceedings;

3. such other individual or entity is subject to arbitration under a contract with either Owner or Contractor, or consents to being joined in the arbitration; and

4. the consolidation or joinder is in compliance with the arbitration administrator's procedural rules.

H. The award will be final. Judgment may be entered upon it in any court having jurisdiction thereof, and it will not be subject to modification or appeal, subject to provisions of the Laws and Regulations relating to vacating or modifying an arbitral award.

I. Except as may be required by Laws or Regulations, neither party nor an arbitrator may disclose the existence, content, or results of any arbitration hereunder without the prior written consent of both parties, with the exception of any disclosure required by Laws and Regulations or the Contract. To the extent any disclosure is allowed pursuant to the exception, the disclosure must be strictly and narrowly limited to maintain confidentiality to the extent possible.

SC-17.03 Add the following new paragraph immediately after Paragraph 17.02.

17.03 *Attorneys' Fees*

A. For any matter subject to final resolution under this Article, the prevailing party shall be entitled to an award of its attorneys' fees incurred in the final resolution proceedings, in an equitable amount to be determined in the discretion of the court, arbitrator, arbitration panel, or other arbiter of the matter subject to final resolution, taking into account the parties' initial demand or defense positions in comparison with the final result.

SC 18.01 - Delete paragraph 18.01 in its entirety and insert the following in its place:

18.01 Giving Notice

A. Whenever any provision of the Contract requires the giving of written notice to Owner, Engineer, or Contractor, it will be deemed to have been validly given only if delivered:
   1. In person, by a commercial courier service or otherwise, to the recipient's place of business; or
   2. by registered or certified mail, postage prepaid, to the recipient's place of business; or
   3. in writing to the to the recipient by electronic transmission if a method for electronic transmission is set forth in the agreement, or through common practice by the parties, with the words "Formal Notice" or similar in the electronic transmission's subject line.

SC-18.10 - ADD the following after Article 18.09 with the title "Additional Construction Requirements"
   4. The following additional construction requirements will be adhered to by the contractor:
   5. The Contractor shall comply with EPA's regulations regarding the Construction General Permit under the National Pollutant Discharge Elimination System.
   6. All construction activities shall be in accordance with the Stormwater Management Manual for Eastern Washington.
   7. Refueling of equipment and storage of petroleum products is forbidden within 300 feet of any waterway or wetland.
   8. The Contractor will employ measures to control and minimize dust resulting from construction activities.

SC-18.11 - ADD the following after Article 18.10 with the title "Counterparts and Originals":
   11. The owner-contractor agreement may be simultaneously executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument. Exact reproductions of the executed instrument shall be considered as valid and admissible for all purposes as if the reproduction was a counterpart original.

END OF DOCUMENT 007314

WASHINGTON STATE DEPARTMENT OF ECOLOGY

WATER POLLUTION CONTROL REVOLVING FUND

SPECIFICATIONS INSERT

Revised 1/22/21

The following clauses will be incorporated into construction contracts receiving financial assistance from the Washington State Department of Ecology Water Pollution Control Revolving Fund. In the event of conflict within the contract these clauses shall take precedence

Required Bid Submittals

The following submittals are required to be submitted with the bid proposal:

- Certification Of Nonsegregated Facilities (attachment 3)
- DBE Subcontractor Utilization Form (EPA Form 6100-4)
- One copy of DBE Subcontractor Performance Form (EPA Form 6100-3) for each DBE subcontractor.
- Complete Bidders List.

Compliance with State and Local Laws

The Contractor shall assure compliance with all applicable federal, state, and local laws, requirements, and ordinances as they pertain to the design, implementation, and administration of the approved project.

State Interest Exclusion

It is anticipated that this project will be funded in part by the Washington State Department of Ecology . Neither the State Of Washington nor any of its departments or employees are, or shall be, a party to this contract or any subcontract.

Third Party Beneficiary

Partial funding of this project is being provided through the Washington State Department of Ecology Water Pollution Control Revolving Fund. All parties agree that the State of Washington shall be, and is hereby, named as an express third-party beneficiary of this contract, with full rights as such.

Access to the construction site and to records

The contractor shall provide for the safe access to the construction site and to the contractor's records by Washington State Department of Ecology and Environmental Protection Agency (EPA) personnel.

The Contractor shall maintain accurate records and accounts to facilitate the Owner’s audit requirements and shall ensure that all subcontractors maintain auditable records.

These Project records shall be separate and distinct from the Contractor's other records and accounts.

All such records shall be available to the Owner and to Washington State Department of Ecology and EPA personnel for examination. All records pertinent to this project shall be retained by the Contractor for a period of three (3) years after the final audit.

Protection of the Environment

No construction related activity shall contribute to the degradation of the environment, allow material to enter surface or ground waters, or allow particulate emissions to the atmosphere, which exceed state or federal standards. Any actions that potentially allow a discharge to state waters must have prior approval of the Washington State Department of Ecology.

Funding Recognition

All site-specific projects must have a sign of sufficient size to be seen from nearby roadways acknowledging department financial assistance and left in place throughout the life of the project. Department logos must be on all signs and documents. Logos will be provided as needed.

Inadvertent Discovery Of Archeological Resources

The contractor shall obtain a copy of the Inadvertent Discovery Plan from the Project Owner. The contractor shall keep a copy of the inadvertent discovery plan for the project on the work site at all times. The contractor shall immediately stop all work if human remains, cultural, or archeological resources are discovered in the course of construction. The contractor shall follow the inadvertent discovery plan in dealing with the human remains, cultural, or archeological resources.

Use Of American Iron And Steel

This provision applies to projects for the construction, alteration, maintenance, or repair of a "treatment works" as defined in the Federal Water Pollution Control Act (33 USC 1381 et seq.). This provision does not apply if the engineering plans and specifications for the project were approved by the Ecology prior to January 17, 2014.

The Contractor acknowledges to and for the benefit of the Project Owner and the State of Washington that it understands the goods and services under this Agreement are being funded with monies made available by the Water Pollution Control Revolving Fund which contains provisions commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project be produced in the United States ("American Iron and Steel Requirements") including iron and steel products provided by the Contactor pursuant to this Agreement. "Iron and Steel products" means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

The Contractor hereby represents and warrants to and for the benefit of the Project Owner and the State that:

(a) the Contractor has reviewed and understands the American Iron and Steel Requirements,
(b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirements, unless a waiver of the requirements is approved, and
(c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirements, as may be requested by the Project Owner or the State.

Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Project Owner or State to recover as damages against the Contractor any loss, expense or cost (including without limitation attorney's fees) incurred by the Project Owner or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Project Owner). While the Contractor has no direct contractual privity with the State, as a lender to the Project Owner for the funding of its project, the Project Owner and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of the Agreement necessary to give this paragraph force or effect shall be amended or waived without the prior written consent of the State.

Prevailing Wage

The work performed under this contract is subject to the wage requirements of the Davis-Bacon Act. The Contractor shall conform to the wage requirements prescribed by the federal Davis-Bacon and Relate Acts which requires that all laborers and mechanics employed by contractors and subcontractors performing on contracts funded in whole or in part by SRF appropriations in excess of $2000 pay their laborers and mechanics not less than the prevailing wage rates and fringe benefits, and determined by the Secretary of Labor, for corresponding classes of laborers and mechanics employed on similar projects in the area. Attachment 1 to this specification insert and an up to date wage determination shall be included in full into this contract and in any subcontract in excess of $2,000. Wage determinations can be found at http://www.wdol.gov.

The Contractor agrees that the Contractor is legally and financially responsible for compliance with the Davis-Bacon Act wage rules. All laborers and mechanics employed by contractors and subcontractors employed as part of this contract shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code.

Certification Regarding Suspension, Debarment, Ineligibility Or Voluntary Exclusion

1. The CONTRACTOR, by signing this agreement, certifies that it is not suspended, debarred, proposed for debarment, declared ineligible or otherwise excluded from contracting with the federal government, or from receiving contracts paid for with federal funds. If the CONTRACTOR is unable to certify to the statements contained in the certification, they must provide an explanation as to why they cannot.

2. The CONTRACTOR shall provide immediate written notice to the Department if at any time the CONTRACTOR learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.

3. The terms covered transaction, debarred, suspended, ineligible, lower tier covered transaction, participant, person, primary covered transaction, principal, proposal, and voluntarily excluded, as used in this clause, have the meaning set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department for assistance in obtaining a copy of those regulations..

4. The CONTRACTOR agrees it shall not knowingly enter into any lower tier covered transaction with a person who is proposed for debarment under the applicable Code of Federal Regulations, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction.

5. The CONTRACTOR further agrees by signing this agreement, that it will include this clause titled "Certification Regarding Suspension, Debarment, Ineligibility Or Voluntary Exclusion" without modification in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

6. Pursuant to 2CFR180.330, the CONTRACTOR is responsible for ensuring that any lower tier covered transaction complies with certification of suspension and debarment requirements.

7. CONTRACTOR acknowledges that failing to disclose the information required in the Code of Federal Regulations may result in the delay or negation of this funding agreement, or pursuance of legal remedies, including suspension and debarment.

8. CONTRACTOR agrees to keep proof in its agreement file, that it, and all lower tier recipients or contractors, are not suspended or debarred, and will make this proof available to the Department upon request. RECIPIENT/CONTRACTOR must run a search in http://www.sam.gov/ and print a copy of completed searches to document proof of compliance.

This term and condition supersedes EPA Form 5700-49, "Certification Regarding Debarment, Suspension, and Other Responsibility Matters."

Disadvantaged Business Enterprises

General Compliance (40 CFR Part 33).
The contractor shall comply with the requirements of the Environmental Protection Agency's Program for Participation By Disadvantaged Business Enterprises (DBE) 40 CFR Part 33.

Non-discrimination Provision (40CFR Appendix A to Part 33).
The contractor shall not discriminate on the basis of race, color, national origin or sex in the performance of this contract. The contractor shall carry out applicable requirements of 40 CFR

part 33 in the award and administration of contracts awarded under EPA financial assistance agreements. Failure by the contractor to carry out these requirements is a material breach of this contract which may result in the termination of this contract or other legally available remedies.

The contractor shall comply with all federal and state nondiscrimination laws, including, but not limited to Title VI and VII of the Civil Rights Act of 1964, Section 504 of the Rehabilitation Act of 1973, Title IX of the Education Amendments of 1972, the Age Discrimination Act of 1975, and Chapter 49.60 RCW, Washington's Law Against Discrimination, and 42 U.S.C. 12101 et seq, the Americans with Disabilities Act (ADA).

Six Good Faith Efforts (40 CFR Part 33 Subpart C).
The contractor agrees to make the following good faith efforts whenever procuring subcontracts, equipment, services and supplies. The contractor shall retain records documenting compliance with the following six good faith efforts.

1. Ensuring Disadvantaged Business Enterprises are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing Disadvantaged Business Enterprises on solicitation lists and soliciting them whenever they are potential sources. Qualified Women and Minority business enterprises may be found on the Internet at www.omwbe.wa.gov or by contacting the Washington State Office of Minority and Women's Enterprises at (866) 208-1064.
2. Making information on forthcoming opportunities available to Disadvantaged Business Enterprises and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by Disadvantaged Business Enterprises in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of thirty (30) calendar days before the bid or proposal closing date.
3. Considering in the contracting process whether firms competing for large contracts could subcontract with Disadvantaged Business Enterprises. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by Disadvantaged Business Enterprises in the competitive process.
4. Encourage contracting with a consortium of Disadvantaged Business Enterprises when a contract is too large for one of these firms to handle individually.
5. Using services and assistance of the Small Business Administration and the Minority Business Development Agency of the Department of Commerce.
6. If the prime contractor awards subcontracts, requiring the subcontractors to take the six good faith efforts in paragraphs 1 through 5 above.

MBE/WBE Reporting (40 CFR Part 33 Parts 33.302, 33.502 and 33.503).

1. The contractor shall complete the DBE Subcontractor Utilization Form (EPA Form 6100–4).
2. The contractor shall require all DBE subcontractors to complete the DBE Subcontractor Performance Form (EPA Form 6100-3). The DBE Subcontractor Performance Form is only required to be completed by certified DBE subcontractors.

3. The contractor shall submit DBE Subcontractor Utilization Form (EPA Form 6100-4) and all completed DBE Subcontractor Performance Form(s) (EPA Form 6100-3) as part of the bid, or within one hour after the published bid submittal time (consistent with RCW 39.30.060)
4. The contractor shall provide DBE Subcontractor Participation Form (EPA Form 6100-2) to all DBE subcontractors. These subcontractors may submit Subcontractor Participation Form (EPA Form 6100-2) to the EPA Region 10 DBE coordinator in order to document issues or concerns with their usage or payment for a subcontract.

The 6100 forms can be found at:
https://ecology.wa.gov/About-us/How-we-operate/Grants-loans/Find-a-grant-or-loan/Water-Quality-grants-and-loans/Facility-project-resources

Bidders List (40 CFR Part 33 part 33.501)
All bidders shall submit the following information for all firms that bid or quote on subcontracts (including both DBE and non-DBE firms) as part of the bid, or within one hour after the published bid submittal time (consistent with RCW 39.30.060).

1. Firm's name with point of contact;
2. Firm's mailing address, telephone number, and e-mail address;
3. The work on which the firm bid or quoted, and when the firm bid or quoted; and
4. Firm's status as an MBE/WBE or non-MBE/WBE.

Contract Administration Provisions (40 CFR part 33.302).
The contractor shall comply with the contract administration provisions of 40 CFR, Part33.302.

1. The contractor shall pay its subcontractor for satisfactory performance no more than 30 days from the contractor's receipt of payment.
2. The contractor shall notify the owner in writing prior to any termination of a DBE subcontractor.
3. If a DBE subcontractor fails to complete work under the subcontract for any reason, the contractor shall employ the six good faith efforts when soliciting a replacement subcontractor.
4. The contractor shall employ the six good faith efforts even if the contractor has achieved its fair share objectives.

Equal Opportunity (EEO)

If this Contract exceeds $10,000, the Contractor shall comply with Executive Order 11246, "Equal Employment Opportunity," as amended by Executive Order 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," and as supplemented by regulations at 41 CFR part 60.

Contractor's compliance with Executive Order 11246 shall be based on implementation of the Equal Opportunity Clause, and specific affirmative active obligations required by the Standard Federal Equal Employment Opportunity Construction Contract Specifications, as set forth in 41 CFR Part 60-4.

Equal Opportunity Clause (41 CFR part 60-1.4(b))
During the performance of this contract, the contractor agrees as follows:

1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
2. The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
3. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
5. The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
6. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
7. The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, That in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the contractor may request the United States to

enter into such litigation to protect the interests of the United States.

Federal Equal Employment Opportunity Construction Contract Specifications
(Executive Order 11246 and 41 CFR part 60-4.3)

1. As used in these specifications:
   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;
   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;
   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.
   d. "Minority" includes:
      i. Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);
      ii. Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);
      iii. Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and
      iv. American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).
2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.
3. If the Contractor is participating (pursuant to 41 CFR 60–4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.
4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered Construction contractors performing construction work in geographical areas where they do not have a Federal or federally assisted constuction

contract shall apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in theFederal Registerin notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.
7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:
    a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
    b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations' responses.
    c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefor, along with whatever additional actions the Contractor may have taken.
    d. Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
    e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading

programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newpaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents, General Foremen, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR part 60–3.

l. Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are nonsegregated except that

separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.
9. A single goal for minorities and a separate single goal for women have been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).
10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.
11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations, by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246, as amended.
13. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60–4.8.
14. The Contractor shall designate a responsible official to monitor all employment related

activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

Reporting Requirements (EEO-1)

On or before September 30 of each year, a contractor that is subject to Title VII of the Civil Rights Act of 1964, as amended, and that has 100 or more employees, shall file with the EEOC or its delegate an "Employer Information Report EEO-1". Instructions on how to file are available on the EEOC's website at http://www.eeoc.gov/employers/eeo1survey/howtofile.cfm. The contractor shall retain a copy of the most recent report filed.

Segregated Facilities (41 CFR part 60-1.8)

The contractor shall ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensuring that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. This obligation extends to all contracts containing the equal opportunity clause regardless of the amount of the contract. The term "facilities," as used in this section, means waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, wash rooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees; Provided, That separate or single-user restrooms and necessary dressing or sleeping areas shall be provided to assure privacy between the sexes.

Attachments:

1. Wage Rate Requirements For Subrecipients
2. Current Wage Rate Determination (to be provided by project owner)
3. Certification Of Nonsegregated Facilities
4. Notice To Labor Unions Or Other Organization Of Workers: Non-Discrimination In Employment

EPA Form 6100-4, EPA Form 6100.3, EPA Form 6100-2

ATTACHMENT 1 - WAGE RATE REQUIREMENTS FOR SUBRECIPIENTS. (To be included in full in any contract in excess of $2,000)

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the FY 2013 Continuing Resolution with respect to State recipients and subrecipients that are governmental entities. If a subrecipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient may contact Lorraine Fleury at fleury.lorraine@epa.gov or at 215-814-2341 of EPA, Region III Grants and Audit Management Branch for guidance. for guidance. The recipient or subrecipient may also obtain additional guidance from DOL's web site at http://www.dol.gov/whd/

1. **Applicability of the Davis- Bacon (DB) prevailing wage requirements**.

Under the FY 2013 Appropriations Act, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a subrecipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the subrecipient must discuss the situation with the recipient State before authorizing work on that site.

2. **Obtaining Wage Determinations**.

(a) Subrecipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.

(i) While the solicitation remains open, the subrecipient shall monitor www.wdol.gov weekly to ensure that the wage determination contained in the solicitation remains current. The subrecipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the subrecipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the subrecipient.

(ii) If the subrecipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the subrecipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The subrecipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.

(b) If the subrecipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the subrecipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.

(c) Subrecipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.

(d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a subrecipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the subrecipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the subrecipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The subrecipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the subrecipient(s) shall insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY 2012 Appropriations Act , the following clauses:

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Subrecipients may obtain wage determinations from the U.S. Department of Labor's web site, www.wdol.gov.

(ii)(A) The subrecipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the subrecipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the subrecipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the subrecipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably

anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The subrecipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the subrecipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the subrecipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional

Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/programs/dbra/wh347.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the subrecipient(s) for transmission to the State or EPA if requested by EPA , the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the subrecipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees--

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and

Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Subrecipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

4. **Contract Provision for Contracts in Excess of $100,000.**

(a) Contract Work Hours and Safety Standards Act. The subrecipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act.

These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The subrecipient**,** upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.

(b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Subrecipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Subrecipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

5. **Compliance Verification**

(a) The subrecipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The subrecipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.

(b) The subrecipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Subrecipients must conduct more frequent interviews if the initial interviews or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB . Subrecipients shall immediately conduct necessary interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence.

(c) The subrecipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The subrecipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the subrecipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract . Subrecipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the subrecipient shall verify evidence of fringe benefit plans and payments thereunder by contractors and subcontractors who claim credit for fringe benefit contributions.

(d) The subrecipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Subrecipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at http://www.dol.gov/whd/america2.htm.

ATTACHMENT 2

DAVIS-BACON WAGE RATE DETERMINATION

[SRF Assistance Recipient to insert applicable wage determinations here]

How to obtain a Wage Determination:

1. www.wdol.gov
2. Click "Selecting DBA WDs"
3. Select the State and county where the work will be performed
4. Select the "Construction Type": Heavy, Building, Highway, or Residential
5. Click on one of the wage determinations. Verify that the wage determination displayed is the correct wage determination, and not for "Heavy Dredging".
6. Select the text box displaying the Wage Determination and copy the text of the Wage Determination.
7. Click "Sign Up for Alert Service" to receive notification if the Wage Determination is updated.

When to update the wage determination:

1. If DOL updates the Wage Determination, you must update the Wage Determination through an addendum to the bid specifications.
2. If the update occurs less than 10 days prior to the date of bid opening, you are not required to update the Wage Determination.

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ATTACHMENT 3

CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to federally assisted construction contracts and related subcontracts exceeding $10,000 which are not exempt from the Equal Opportunity clause.)

The federally assisted construction contractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor certified, further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work area, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or area, in fact, segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed contractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the Equal Opportunity clause, and that he will retain such, certification in this file.

_____ _____

Signature Date

_____

Name and title of signer (please type)

[THIS FORM SHALL BE COMPLETED IN FULL AND SUBMITTED WITH THE BID PROPOSAL]

ATTACHMENT 4

NOTICE TO LABOR UNIONS OR OTHER ORGANIZATION OF WORKERS: NON-DISCRIMINATION IN EMPLOYMENT

TO: _____
(name of union or organization of worker)

The undersigned currently holds contract(s) with _____
(name of applicant)
_____ involving funds or credit of the U.S. Government or (a) subcontract(s) with a prime contractor holding such contract(s).

You are advised that under the provisions of the above contract(s) or subcontract(s) and in accordance with Section 202 of Executive Order 11246 dated September 24, 1965, the undersigned is obliged not to discriminate against any employee or applicant for employment because of race, color, creed, or national origin. This obligation not to discriminate in employment includes, but is not limited to, the following:

EMPLOYMENT, UPGRADING, TRANSFER OR DEMOTION

RECRUITMENT AND ADVERTISING
RATES OF PAY OR OTHER FORMS OF COMPENSATION

SELECTION FOR TRAINING INCLUDING APPRENTICESHIP, LAYOFF OR TERMINATION

This notice is furnished you pursuant to the provisions of the above contract(s) or subcontract(s) and Executive Order 11246.

Copies of this notice will be posted by the undersigned in conspicuous places available to employees or applicants for employment.

_____

_____

_____

_____
(contractor or subcontractor(s)

_____
(Date)

008504.00 - NON-COLLUSION AFFIDAVIT

Bidder's Name

_____

Address

_____

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of his knowledge and belief:

1. The Prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor;

3. No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition.

_____
(Firm Name)

_____ _____
(Date) (Signature of Responsible Officer)

(SEAL OF CORPORATION)

_____
(Title)

Subscribed and Sworn to before me, this _____ day of _____, 20___.

My Commission Expires _____.

_____
(Notary Public)

SECTION 010410 - PROJECT COORDINATION AND ADMINISTRATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: Included in this specification are the project requirements and associated responsibilities for the CONTRACTOR and ENGINEER related to project coordination and administration. The requirements and conditions addressed in this section do not in any way amend or change the requirements of other respective sections, but its intent is to support and clarify project coordination and administration functions and/or requirements of the ENGINEER and CONTRACTOR.

PART 2 - PRODUCTS

A. No products are required in this section.

PART 3 - EXECUTION

3.1 PROJECT CORRESPONDENCE

A. General: The CONTRACTOR and ENGINEER shall conform to the following requirements in issuing and receiving project correspondence related to contract conditions. All correspondence, requests, clarifications, submittals, and information shall be addressed directly between the CONTRACTOR and ENGINEER. No other form of communications written or oral shall be permitted between project participants without the CONTRACTOR and/or ENGINEER consent by assigning the responsibility to an authorized agent act in that contractual capacity or role. The transferring of this authority by either party shall be in the written form issued to the other corresponding party that he or she has transferred that specific authority in the contract.

B. Correspondence: All correspondence issued from the ENGINEER or CONTRACTOR shall be identified by a correspondence code numbering system for tracking and referencing specific documents. The correspondence code shall be shown on all documents requiring action by either party (i.e. transmittals, submittals, request for information, request for change and general correspondence). The correspondence code system shall be agreed on by the ENGINEER and CONTRACTOR at the pre-construction conference as to its format and usage on all correspondence.
   a. Code system is comprised of two parts separated by a hyphen (-):
      i. Prefix:
         1. Submittals – Per associated specification section
         2. Requests for Information – “RFI”
         3. Change Order Proposal – “COP”
         4. Field Order – “FO”
      ii. Index:
         1. Original correspondence shall be assigned a unique number (i.e. 1, 2, 3…)
         2. Revised correspondence shall be assigned a revision number (i.e. first, second, and third revisions of correspondence 1 would be indexed as follows: 1.1, 1.2, 1.3)
      iii. Examples:
         1. Submersible turbine pump submittal codes:
            a. Original submittal: 432513-1

b. Revision 1: 432513-1.1
c. Revision 2: 432513-1.2
d. Next original submittal: 432513-2
e. Revision 1: 432513-2.1
f. Revision 2: 432513-2.2

2. Request for Information (RFI) codes:
   a. Original RFI: RFI-1
   b. Revision 1: RFI-1.1
   c. Revision 2: RFI-1.2
   d. Next original RFI: RFI-2
   e. Revision 1: RFI-2.1
   f. Revision 2: RFI-2.2

C. A construction management software (CMS) shall be used on the project at the expense of the Contractor. The construction management software shall be Procore or approved equal. Approved equal must be submitted to Engineer for review prior to preconstruction meeting and software purchase. The correspondence shall include notification of all documents requiring action by either party (i.e. transmittals, submittals, request for information, request for change and general correspondence). The CMS shall include punch list creation, meeting management, project schedule viewing, photo uploading, and construction plans and specifications. All CMS functionalities shall be made available to the ENGINEER. All other correspondence related to the project beyond the listed CMS capabilities above must be completed via email or telephone.

3.2 INFORMATION, REQUEST AND REPORTING

A. Request for Information: RFI can be initiated or requested from any of the project participants but shall be addressed and answered in written correspondence between the CONTRACTOR and ENGINEER before it is considered binding to the contract. The ENGINEER will record all RFI in a RFI log that tracks all request that require response regardless who initiates the request. The RFI Log will be made available to the CONTRACTOR upon his request in writing to the ENGINEER.

B. Request for Change/Contract Modification: RFC can be initiated or requested from any of the project participants but must be addressed and answered in written correspondence between the CONTRACTOR and ENGINEER before it is considered binding to the contract. The ENGINEER will record all RFC in an RFC log that tracks all request that require response regardless who initiates the request. The RFC Log will be made available to the CONTRACTOR upon his request in writing to the ENGINEER.

END OF SECTION 010410

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. The project is funded by the Washington Department of Ecology's State Revolving Fund Loan. The Owner intends to award and complete all work described in the plans and contract documents; however, funding limitations may require reduction in the scope of work or in specific work item quantities.

B. Section Includes:

1. Project information.
2. Contract description.
3. Work by Owner or others.
4. Owner-furnished products.
5. Contractor's use of Site and premises.
6. Work sequence.
7. Work restrictions.
8. Owner occupancy.
9. Permits.
10. Specification and drawing conventions.

1.2 DEFINITIONS

A. Construction Plan - Defines the requirements for a construction project, such as the activities, resources, schedule and budget. A construction plan is created during the construction planning process and includes the following: A written document that defines the methodologies and approach.

1.3 PROJECT INFORMATION

A. Name: Lift Station CC-1 Upgrade.

1. Project Location: Chelan, WA.

B. Owner: City of Chelan.

1. Owner's Representative: City Engineer, City of Chelan.

C. Project Engineer: Ardurra.

1. Engineer's Representative: Resident Project Representative.

D. Engineer's Consultants: Engineer retains the following design professionals, who prepare designated portions of the Contract Documents:

1. Geotechnical Engineer: GeoEngineers.

1.4 CONTRACT DESCRIPTION

A. See Section 001113 – Advertisement for Bids.

1.5 WORK BY OWNER OR OTHERS

A. Coordinate Work with utilities of Owner and public or private agencies.

B. Work under this Contract includes:
1. Work as indicated on Drawings and as specified within the Contract Documents.

1.6 OWNER-FURNISHED PRODUCTS

A. Items furnished by Owner for installation by Contractor:
1. None.

B. Owner's Responsibilities:

1. Review Shop Drawings, Product Data, and Samples.
2. Coordinate with Contractor for readiness to receive products.
3. Coordinate with Seller for delivery to Site.
4. Inspect delivered products for completeness or damage.
5. Arrange for manufacturers' inspections and services.
6. Submit claims for transportation damage and replace damaged, defective, or deficient items.
7. Arrange for repair or replacement items damaged after receipt.
8. Arrange for manufacturer’s warranties.

C. Contractor's Responsibilities:
1. Coordinate with Owner for delivery to Site.
2. Receive and unload delivered products at Site.
3. Handle, store, install, and finish products.

D. All items not specifically described within this section, or on Drawings is the responsibility of the contractor.

1.7 CONTRACTOR'S USE OF SITE AND PREMISES

A. Restricted Use of Site: Contractor shall have limited use of Project Site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Utility Outages and Shutdown:

1. Coordinate and schedule electrical and other utility outages with Owner.
2. Outages: Allowed only at previously agreed upon times.

3. At least one week before scheduled outage, submit outage request plan to Engineer itemizing dates, times, and duration of each requested outage.
4. Contractor to obtain written consent from Owner prior to any utility shutdowns.

C. Construction Plan: Before start of construction, submit construction plan detailing staging areas, access to Work, use of Site, and utility outages for acceptance by Owner. After acceptance of plan, construction operations shall comply with accepted plan unless deviations are accepted by Owner in writing.

1.8 WORK SEQUENCE

A. Construct Work in phases during construction period in order to maintain facility operability throughout entirety of project. Coordinate construction schedule and operations with Engineer.

B. Sequencing of Construction Plan: Contractor to submit phasing plan. Before start of construction the phasing plan must be approved by Engineer and Owner. After acceptance of plan, comply with accepted plan when coordinating construction sequencing unless deviations are accepted by Owner in writing.

C. Refer to Section 011216.

1.9 OWNER OCCUPANCY

A. Owner will occupy Site during entire period of construction.

B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

C. Schedule Work to accommodate Owner occupancy.

1.10 PERMITS

A. Contractor shall furnish necessary permits for construction of Work, including but not limited to the following:
1. Construction Stormwater General Permit (CSWGP).

B. Owner furnished permits, see Attachment J – Owner Furnished Permits:
1. City of Chelan Shoreline Substantial Development Permit (SSDP)

1.11 SPECIFICATION CONVENTIONS

A. These Specifications are written in imperative mood and streamlined form. This imperative language is directed to Contractor unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

B. In case of conflict between the Project Specifications and Project Drawings, the more stringent will apply unless otherwise indicated by Engineer.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 011000

SECTION 011216 - WORK SEQUENCE

PART 1 - GENERAL

1.1 SUMMARY

A. Perform Work in an orderly manner to cause minimal disruption to Owner's wastewater collection and conveyance activities and the operation of existing City of Chelan sewer system facilities.

B. Where necessary to prevent or minimize interruptions of existing facility operations, schedule work for system tie-ins or service transfers in advance with Owner, minimum 72 hours.

C. No claim for an extension of time or for additional costs will be considered for overtime Work performed to comply with the requirements set forth herein.

1.2 SUBMITTALS

A. Submit to Engineer overall plan of construction.

1.3 PROJECT SITE CONDITIONS

A. All access onto the existing lift station sites must be coordinated with Engineer and Owner prior to access. All access points must be secured and remain secured throughout the construction period.

B. Access to existing facilities shall be maintained for Owner throughout the construction period. Owner will need continuous access to the facilities to ensure they are operable.

C. Maintain access for Cambell's Resort maintenance staff throughout the construction period. Any access restrictions shall be coordinated with minimum 7 day notice. Restricted access shall be minimized.

1.4 SEQUENCING AND SCHEDULING

A. The existing facilities comprise a fully functioning sewer collection and lift station conveyance. Conduct all Work in a manner that will not interrupt or jeopardize operations or cause permit violations. Coordinate all required shutdowns and tie-ins with the Owner; provide a minimum of seven (7) days' notice. Contractor shall develop and submit the final sequence of work as part of the Construction Plan/Schedule

B. Construction limits shall be confined to the areas shown in the Contract Documents and shall limit impacts to sidewalks, pedestrian ramps, landscaped areas, driveways, traffic and business signage, and adjacent buildings as applicable. Work limits for Phase 1 shall include Columbia Street and Woodin Avenue right-of-way; Phase 2 limits shall include the north alley and CC-1 plaza area.

C. The intent of the following is to outline a sequence for completing the work. Not all aspects of the following sequence are essential. Some elements of the sequence may be completed in parallel with others. Contractor shall develop and submit final sequence of work within the Construction Plan/Schedule.

1. Sequencing:

a. Contractor to submit a bypass pumping plan prior to starting any work.

b. Phase 1 utility and excavation activities shall be performed during nighttime hours, 8:00 PM – 7:00 AM, to reduce impacts to traffic and business operations. All excavation shall be performed during nighttime hours. Upon completion of each night's excavation, all open trenches and disturbed areas shall be securely covered using steel plates or other methods approved by the Engineer to ensure safety and stability. Prior to 7:00 AM each day the work zone shall be restored to a condition that supports normal traffic operations (including CSBC patching or steel plates as approved). Temporary channelization or temporary striping shall be provided as required. A paving plan shall be submitted to the City at least five (5) working days prior to paving; final roadway paving shall occur during daytime working hours. Phase 1 final paving and striping shall be substantially complete by October 16, 2026.

c. Phase 2 work shall be performed during daytime hours (7:30 AM – 5:00 PM) and shall not impact traffic on public roadways; public roads shall remain fully open and uninterrupted throughout Phase 2 construction. Phase 2 shall be substantially complete by April 30, 2027.

d. Replace proposed collection system piping.

e. Connect proposed piping to existing system. Make final changes necessary to transfer operations from the temporary system to the proposed.

D. Bypass Pumping:

1. Bypass pumping will be required to maintain certain portions of the existing system in operation until portions of the new Work can be brought online and commissioned. See Section 011217 – Temporary Bypasss Pumping System.

E. Construction Constraints:

1. All existing equipment and facilities that are to be replaced with new equipment, or modified and replaced with new equipment, are to remain in undisturbed operable condition until a bypass system is operable. Work to replace equipment is initiated, it shall be carried through to completion. Interruptions to service caused by replacement or modifications of existing equipment must be coordinated with Owner prior and be kept to a minimum time period as practically possible.

2. SCADA System:

a. The instrumentation and controls related to the existing facilities must remain in service with the existing facilities unless specified otherwise. Temporary

controls, panels and wiring, if required, are the responsibility of the Contractor and will be provided at no additional cost to the Owner..

b. Any existing facility connections to new instrumentation components must be coordinated with the Owner and Engineer.

3. Electrical:

a. Electrical facilities must remain in service unless specified otherwise.

b. Temporary electrical service, if required, is the responsibility of the Contractor and will be provided at no additional cost to the Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 011216

SECTION 011217 - TEMPORARY BYPASS PUMPING SYSTEM

PART 1 GENERAL

1.01 SCOPE OF WORK

A. CONTRACTOR shall furnish, install, operate, maintain, and remove a temporary station bypass pumping system in accordance with the Contract Drawings and when necessary for construction activities. Refer to Section 011216 – Work Sequence.

B. Bypass pump systems shall be installed to facilitate continuous operations and continuous sewer conveyance.

1.02 RELATED WORK

A. See CONDITIONS OF THE CONTRACT and Section 011000 - Summary, for information and requirements that apply to the work specified herein and are mandatory for this project.

1.03 SUBMITTALS

A. Submittals shall be in accordance with Section 013300.

B. Submit to ENGINEER for review detailed plans and descriptions outlining all provisions and precautions to be taken by CONTRACTOR to establish compliance with this Section. The bypass pumping system design shall be reviewed and verified by CONTRACTOR's operational vendor, and system layout drawings shall be submitted to ENGINEER for review and approval.

C. Approval of the proposed bypass system design shall not relieve CONTRACTOR from full responsibility for performance of the system.

D. The bypass plan shall include, but is not limited to, the following information:

1. Configuration of pumps, piping and fuel storage;

2. Size, materials, location, elevations, and method of installation of all suction and discharge piping;

3. Bypass pump size, capacity, number of each size to be onsite, and fuel requirements;

4. Pump curves showing pump operating conditions;

5. Level-monitoring and pump control equipment, including critical control and alarm elevations in the junction manhole and alarm response protocols

6. Equipment and pipe supports, anchoring requirements and pipe restraint methods;

7. Method of spill prevention;

8. Method of noise control for each pump; and

9. Schedule of installation and maintenance of bypass pumping equipment and piping.

10. Maintenance of Traffic Plan and Permit for Bypass Operation

1.04 QUALITY ASSURANCE

A. The design, installation and operating of the temporary pumping system shall be CONTRACTOR'S responsibility. CONTRACTOR shall employ the service of an operational vendor who can demonstrate to ENGINEER that they specialize in the design and operations of the temporary bypass pumping system. The vendor shall provide at least five project references of similar size and complexity as this project, performed by vendor's firm within the past three (3) years. The bypass system shall meet the requirements of all codes and regulations by agencies having jurisdiction.

1.05 SYSTEM DESCRIPTION

A. The bypass pumping system shall be capable of pumping at variable rates to approximate flowrates necessary to maintain system operation.

B. CONTRACTOR shall provide all pipeline plugs, pumps of adequate size to handle average and peak flows, controls, monitoring devices, and temporary discharge piping to ensure that the design flows can be safely diverted around the station during the associated work.

PART 2 PRODUCTS

2.01 PUMP SYSTEM

A. All pumps used shall be fully-automatic, self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of influent flows. The pumps shall be diesel powered. CONTRACTOR shall provide diesel fuel for use by the temporary bypass pumps.

B. CONTRACTOR shall provide the necessary instrumentation and controls for starting/stopping each pump and for monitoring wetwell level, pump status, critical engine functions, battery status, fuel level, etc.

C. Local audible and visible alarms shall be provided, and automatic communication for alarms shall be by cellular telephone autodialing system with at least five (5) programmable emergency contact phone numbers.

D. Spare parts for the pumps and piping shall be kept onsite as required. Adequate hoisting equipment for each pump and accessories shall be maintained onsite.

E. All equipment or piping failures or malfunctions shall be corrected immediately.

F. CONTRACTOR is advised that OWNER has no control over the maximum flow that will occur in the sewer.

G. It is essential to the operation of the existing sewer system that there is minimal interruption in the flow of wastewater for the duration of the bypass period. CONTRACTOR shall provide, maintain, and operate all temporary facilities such as pumping equipment, piping, valves, plugs, all necessary power, and all labor and equipment necessary to maintain system operations.

H. CONTRACTOR shall provide all necessary means to safely convey the wastewater past the work area. CONTRACTOR will not be permitted to stop or impede the normal system operations under any circumstance.

I. CONTRACTOR shall protect all water resources, wetlands, and other natural resources from overflows or hazardous liquid spills, including fuels, lubricants and coolants.

2.02 PUMP DISCHARGE

A. The bypass pumps shall manifold into a temporary bypass forcemain that connects to the subsequent, online system element.

B. The temporary bypass piping shall be of sound material and shall not leak during operation. Joints shall be supported and restrained to preclude movement or separation. Under no circumstances will aluminum “irrigation” type piping or solvent-weld PVC pipe be allowed.

C. Pressure test pipe system prior to use to verify that system is leak free.

D. A properly-sized air relief valve shall be provided at each local high point of the temporary bypass piping.

PART 3 EXECUTION

3.01 INSTALLATION

A. System layout shall provide for ready removal and replacement of every pumping unit without affecting the others.

B. Pumps shall be capable of handling solids up to 3” in diameter.

C. Protective barriers and covers shall be installed to prevent debris of any type from entering the piping system. Any debris inadvertently allowed into the system shall be immediately removed.

D. Pumps shall not exceed the noise limit of 85 dBA at a distance of 5 feet from any part of the unit.

E. When working inside the collection system or pump station, CONTRACTOR shall exercise caution and comply with the OSHA requirements for confined spaces and in the potential presence of combustible or oxygen-deficient atmospheres.

F. CONTRACTOR shall be responsible for furnishing the necessary labor and supervision to set up and operate the pumping system. The system shall be fully inspected daily to ensure that the system is working correctly. CONTRACTOR shall coordinate delivery of fuel during the entire bypass period.

3.02 FLOW CONTROL MEASURES

A. CONTRACTOR shall be responsible and liable for any overflows resulting from inadequate construction, maintenance or operation of the bypass system, including reporting to the Washington Department of Ecology and any resulting fines.

3.03 BYPASS SYSTEM MONITORING

A. CONTRACTOR to furnish all Labor, Materials, Equipment, including telemetry, floats and piping for by-pass pumping:

1. Telemetry/ Call-outs:

a. Install normally open contacts in the pumps and wire it to them for the following faults for all three pumps.

i. Pump Fault

ii. Pump not in auto

iii. Pump running

b. The contacts must be wired by the pump representative to operate as follows to be held closed at all times while the power is on, and when one of the faults loses power, it will send a signal back to the SCADA.

c. Provide a field demonstration test with OWNER representative of all I/O within the panel

3.04 REMOVAL AND RESTORATION

A. CONTRACTOR shall remove all pumping system components and restore any modifications to the existing structure as directed by ENGINEER. Any soil containing grease, oil, or fuel from the pump engines shall be removed from the site and replaced with topsoil.

B. All plugs and other bypass system appurtenances shall be removed, and any damage to the station, pipes, manhole, or other structures shall be repaired.

END OF SECTION 011217

SECTION 012000 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDE

A. The Bid Proposal for this Contract shall cover all Work shown on the Drawings and specified herein.

B. All costs for providing labor, materials, equipment, tools, machinery, supplies, supervision, management, coordination and other services to fully complete the Work as shown on the Drawings and specified herein shall be included in the Lump Sum prices listed in the Bid Form.

C. All Work not specifically listed as a pay item in the Bid Form, Schedule of Values or within descriptions shall be considered to be included in the Lump Sum Bid amount.

D. Contractor’s overhead and profit shall be included in the Lump Sum Bid amount.

E. The cost of mobilization shall not exceed ten percent (10%) of the total Bid. Mobilization shall consist of preparatory work and operations necessary for the movement of personnel, equipment, supplies, and incidentals to the Project site; and for other work, operations or cost that are of necessity incurred prior to the beginning of construction. Bond costs, license fees, lump sum insurance premiums, and other such items of expense may be included, but any item that will be subsequently paid for as Project Work or material on hand shall be excluded.

F. Payment for material on hand may only be requested once it has arrived onsite and is placed in its final location or stored onsite in a location the Contractor has sufficiently secured to prevent theft. Any material on hand must be listed as such within Contractor submit and Engineer approved schedule of values.

G. See technical specifications for additional requirements for measurement and payment.

H. Contractor to submit a schedule of values prior to beginning construction that includes the following bid item schedule of values, at a minimum, and any requested by Engineer at time of submittal.

I. Payment shall be at the Contract price as stated in the Bid Form.

J. Each bid item is to be paid on a lump sum basis in accordance with the percent completion and the agreed upon schedule of values.

1.2 BID ITEMS

A. Item No. 1 – Mobilization & Temporary Facilities:

1. Description: All material, equipment, and effort associated with mobilization and other temporary facilities.

2. Schedule of Values:

Item	Description	Quantity	Units
1.1	**Mobilization**	**LS**	**1**
	Temporary Facilities		
	Erosion & Sediment Control		
	Construction Surveying		
	Traffic Control, Temporary Signage, Flagging		
	Temporary Sewer Bypass Pumping		

B. Item No. 2 – Earthwork:

1. Description: All material, equipment, and effort associated with earthwork

2. Schedule of Values:

Item	Description	Quantity	Units
2	**Earthwork**	**LS**	**1**
	Unclassified Excavation Below Subgrade		
	Import & Place Structural Fill		
	Remove & Dispose of Excess Earthwork Off Site		

C. Item No. 3 – Demolition:

1. Description: All material, equipment, and effort associated with removal and disposal of utility lines, utility structures, landscape features, plantings, and retaining wall, surface cutting and disposal of concrete, curb, and asphalt, and demolition of wet well and electrical as detailed within the plans and specifications.

2. Schedule of Values:

Item	Description	Quantity	Units
3	**Demolition**	**LS**	**1**
	Utility Demolition		
	Site Demolition		
	Building Demolition		
	Lift Station Demolition		

D. Item No. 4 – Surfacing and Site Improvements:

1. Description: All equipment and effort associated with hardscape surfacing including but not limited to:
   a. Mobilization.
   b. All necessary surface cutting, subgrade preparation, aggregate base, curb/gutter, asphalt and concrete for walkways, driveways, and roadways.
   c. Subgrade preparation, aggregate base, concrete stairway and railings.
   d. Other ancillary items necessary to the work including but not limited to markings, bollards, and signage.
   e. Third party testing and quality control.

2. Schedule of Values:

Item	Description	Quantity	Units
4.1	**CC-1 Plaza and North Alley Surfacing & Site Improvements**	**LS**	**1**
	Concrete pavement (non-traffic rated)		
	Concrete pavement (traffic rated)		
	Concrete stairs		
	Concrete retaining wall		
	Handrail/ guardrail		
	Fencing and Gates		
4.2	**Roadway Surface Restoration**	**LS**	**1**
	Asphalt pavement		
	Concrete pavement (traffic rated)		
	Curb & gutter		
	Pavers		

E. Item No. 5 – Gravity Sanitary Sewer:

1. Description: All material, equipment, and effort associated with installation, utility coordination/connection, surface cutting, trenching, backfill, and surface restoration as detailed within the plans and specifications.

2. Schedule of Values:

Item	Description	Quantity	Units
5	**Sanitary Sewer**	**LS**	**1**
	Sewer Pipe		
	Manholes (48” dia.)		
	Temporary Sewer Bypass Pumping		

F. Item No. 6 – Storm Drain:

1. Description: All material, equipment, and effort associated with installation, utility coordination/connection, surface cutting, trenching, backfill, and surface restoration as detailed within the plans and specifications.

2. Schedule of Values:

Item	Description	Quantity	Units
6	**Storm Drain**	**LS**	**1**
	Storm Drain piping		
	Drainage Treatment Structure		
	Trench Drain		

G. Item No. 7 – Site Utilities:

1. Description: All equipment and effort associated with site utilities installation.

2. Schedule of Values:

Item	Description	Quantity	Units
7	**Site Utilities**	**LS**	**1**
	Water Utilities		
	Odor Control		
	Sanitary Sewer Force Main		

H. Item No. 8 – Lift Station:

1. Description: All equipment and effort associated with replacement and improvement to the existing CC-1 Lift Station.

2. Schedule of Values:

Item	Description	Quantity	Units
8	**Lift Station**	**LS**	**1**
	Valve vault		
	Wet Well Concrete Lidt/ Risers		
	Access Hatches		
	Wet Well Rehab – Sprayroq coating		
	Submersible Pumps		
	Lift station piping		

I. Item No. 9 – Landscaping:

1. Description: All materials, equipment, and effort associated with landscaping and associated site work including but not limited to interpretive exhibits, features, plantings and irrigation.

2. Schedule of Values:

Item	Description	Quantity	Units
9	**Landscaping**	**LS**	**1**
	Site Furnishings		
	Plantings		
	Irrigation		

J. Item No. 10 – Electrical:

1. Description: All materials, equipment, and effort associated with lift station and site wide electrical improvements.

2. Schedule of Values:

Item	Description	Quantity	Units
10	**Electrical**	**LS**	**1**
	Utility Meter/ Cabinet		
	Generator and ATS		
	Lift Station Electrical Improvements		
	Sitewide Lighting and Electrical		

K. Item No. 11 – Instrumentation & Control:

1. Description: All materials, equipment, and effort associated with Instrumentation and controls improvements.

2. Schedule of Values:

Item	Description	Quantity	Units
11	**Lift Station**	**LS**	**1**
	Telemetry Panel and PLC		
	Controls Equipment		
	Scada Antenna		

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 012000

SECTION 012100 - ALLOWANCES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain materials and equipment are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Lump sum allowances.
2. Unit cost allowances.

1.2 SELECTION AND PURCHASE

A. Contractor to receive written authorization prior to proceeding with any work for which Allowance will be sought. Allowance costs will not be paid for work done prior to written authorization.

B. At the earliest practical date after award of the Contract, advise Engineer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

C. At Engineer’s request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

1.3 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

1.4 UNUSED MATERIALS

A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

B. If requested by Engineer, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Engineer, deliver unused

material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related Work.

3.3 SCHEDULE OF UNIT COST ALLOWANCES

A. Unit Cost Allowance A: Provide unit cost of removing approximately 100 cubic yards of Unsuitable/ contaminated Material (per Section 312316), including excavating, hauling and disposal. Allowance includes taxes, miscellaneous fees, transportation and delivery/handling costs, Contractor’s or Subcontractor’s overhead and profit, and other incidental costs.

END OF SECTION

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain Work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Modify or adjust affected adjacent Work as necessary to completely integrate Work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the Work described under each alternate.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternative 1 – Full-Width Alley Repair

1. Description: Alternative 1 shall consist of the complete removal of all existing concrete within the North Alley, from face of building to face of building. All concrete within this area shall be replaced with traffic rated concrete. All traffic rated concrete shall Incorporate a 5’ x 5’ concrete joint pattern consistent with the CC-1 plaza. The limits of the surface repair work are identified on Sheet C100 and C101 of the Construction Plans.

2. Schedule of Values:

Item	Description	Quantity	Units
Alt. 1	Full Alley Concrete Replacement	**LS**	**1**

END OF SECTION

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Requirements applicable to all substitution requests.
2. Provisions specific to Contractor's substitution requests for:
a. Materials and equipment to be incorporated into the Work.
b. Methods, procedures, and sequences indicated in the Contract Documents.

B. Scope:
1. Contractor shall provide all labor, materials, equipment, tools, services, and incidentals, and pay all costs associated with requests for approval of substitutes.
2. Where the Contract Documents expressly indicate that substitutes are not allowed, are unacceptable, or time-barred, do not submit substitution requests for such items or procedures.
3. Requirements for Contractor's proposal of "or-equals", where allowed by the Contract, are in the General Conditions, as may be modified by the Supplementary Conditions.

1.2 REFERENCES

A. Terminology:
1. The following terminology, although not indicated with initial capital letters, has the following meaning in this Section:
a. "Or-equal", "or equal", "or equivalent" each means material or equipment items to be incorporated into the completed Work as a functioning whole, or method, procedure, or sequence that, in Engineer's sole opinion, are equivalent to that shown or indicated in the Contract Documents.
b. "Substitute" means a proposed materials or equipment to be incorporated into the completed Work as a functioning whole, or a proposed construction method, procedure, or sequence that is not, in Engineer's sole opinion, equivalent to the associated, similar material or equipment item or method, procedure, or sequence shown or indicated in the Contract Documents, but accomplishes the same or similar purpose. Unless expressly indicated otherwise in the Contract Documents, Contractor's proposals for "value engineering" (and similar terms) are substitutes.
c. "Substitution request" means Contractor's written request for Engineer's approval of a proposed substitute, in accordance with this Section. Substitution requests are separate from Shop drawings and other Submittals required by the Contract Documents.

1.3 SUBSTITUTES - GENERAL

A. This Article applies to all substitutes and substitution requests, whether for substitute materials or equipment, or for substitute methods, procedures, or sequences.

B. This Section expands on the provisions on substitutes in the General Conditions, as may be modified by the Supplementary Conditions.

C. Time Limits for Submitting Substitution Requests:
1. Where the Contract allows Contractor's substitution requests, such proposals will be considered by Engineer only during a period of 30 days after the date the Contract Times start to run, unless otherwise indicated.
2. Substitution requests will be accepted for consideration by Engineer after the time limit indicated in the paragraph above this, when materials or equipment shown or indicated, and all associated "or-equals", are either:

a. Unavailable; or
b. Despite Contractor's due diligence, are unavailable in time for the Work to be completed within the Contract Times.

3. The foregoing notwithstanding, substitutes will not be approved when received by Engineer after Contractor has commenced the associated Work at the Site, where approval of the substitute would require rework or removing Work already installed.

D. Design Professional:
1. Engineer is responsible for design of the completed Project as a functioning whole and has responsible charge of the Project except for Work for which design responsibility is expressly delegated by the Contract Documents.
2. Delegated design work includes but is not limited to:
a. Bypass pumping
b. Temporary excavations in excess of 20 vertical feet
c. Pipe supports

E. Contractor's Representations:
1. In submitting each substitution request, Contractor represents that:
a. Contractor has read and understands the Contract's provisions on substitutes, as indicated in the General Conditions, as may be modified by the Supplementary Conditions, this Section, and elsewhere in the Contract Documents.
b. Substitution request is complete and includes all documents and information required by the Contract Documents.
c. Contractor certifications required by the General Conditions, as may be modified by the Supplementary Conditions, and this Section are valid and made with Contractor's full knowledge, information, and belief.
d. Contractor will provide the same or better guarantees and warranties for substitute as for the specified materials, equipment, methods, procedures, and sequences (as applicable).
e. Contractor waives all rights for increasing the Contract Price or extending the Contract Times, related to the substitute, that subsequently may become apparent to Contractor after issuance of the associated Contract modification instrument approving such substitute, except for those associated with differing subsurface or physical conditions or discovery of a previously unforeseen Hazardous Environmental Condition associated with the Work involving the approved substitute.

F. Submittal of Substitution Requests - General:
1. Substitution requests must be submitted by Contractor. Engineer will not accept or review substitution requests from prospective or bona-fide Subcontractors or Suppliers.
2. Submit separate substitution request for each proposed substitute.
3. Submit substitution requests in accordance with requirements for Shop Drawings and other Submittals, as indicated in the General Conditions, as may be modified by the Supplementary Conditions, and Section 01 33 00 - Submittal Procedures.
4. Do not submit substitution requests as any of the following (such substitution requests will be returned by Engineer without review):
a. Shop Drawing, Sample, or other Submittal.
b. Request for approval of an "or-equal".
c. Request for interpretation (RFI) or clarification.
d. Change Proposal without all other, required substitution request elements indicated below.
e. Other oral or written communication not in accordance with this Section.
5. Each substitution request shall include:
a. Transmittal letter (one per substitution request) expressly indicating the communication is a substitution request.

b. Completed substitution request form, on the form (Exhibit A) attached to this Section.
c. Change Proposal, submitted in accordance with the Contract Documents. Clearly indicate the proposed changes in Contract Price and Contract Times if substitute is approved; if none, clearly so indicate on the Change Proposal.
d. Certifications and written representations required by the Contract Documents to accompany substitution requests.
e. Other information: (1) required elsewhere in this Section and in other elements of the Contract Documents, and (2) deemed appropriate by Contractor to support Contractor's substitution request.

6. When Engineer requires additional information to evaluate a substitution request, furnish such information within five days of receipt of Engineer's request, unless additional time is granted by Engineer, in writing.
7. Engineer and Owner have the right to rely upon the completeness and accuracy of information, documents, certifications, and representations in Contractor's substitution request. Contractor accepts full responsibility for completeness and accuracy of substitution requests (except for Engineer's professional liability).

G. Engineer's Review of Substitution Requests:
1. Engineer has no obligation to approve any substitute.
2. Substitutes will not be approved unless all of the following are satisfied for the associated substitute:
a. The Contract supports submittal of such substitution request; and
b. Substitute is reasonably consistent with Engineer's design intent for the Project as a completed, functioning whole; and
c. Substitute will not have an adverse effect on the work of other contractors, or existing or proposed construction; and
d. Substitution request is complete in accordance with the Contract Documents and Engineer's requests, and
e. Owner agrees to the substitute; and
f. Associated changes in Contract Price and Contract Times, if any, are acceptable to Owner.
3. Engineer is not obligated to approve any substitute where such approval is conditioned on an increase in the Contract Price, the Contract Times, or both.
4. Timeliness of Engineer's Review:
a. Allow not less than 14 days for Engineer's review of each substitute. Allow longer for larger, more-complex substitutes.
b. Engineer will endeavor to perform timely review of substitution requests. However, Contractor is responsible for complying with the Contract Times, regardless of whether the substitute is approved.
c. Where approval of a substitute would necessitate other changes to the Project's design, additional time, beyond that indicated above, will be necessary for Engineer's preparation of revisions to the design.
5. When Design Changes are Required with Approval of Substitute:
a. Engineer will advise Contractor promptly following Engineer's review (and Owner's comment, if any) on substitution request to indicate whether the substitute will be acceptable. Engineer's advisory to Contractor will indicate whether changes in Engineer's design are necessary and include a preliminary estimate of Engineer's fee and time required for modifying the design and preparing an associated Proposal Request to Contractor.
b. Engineer's preliminary estimates of fee and time for design modifications will be prepared in good faith, but are not binding on Owner or Engineer.
c. Reimbursement of Engineer's Cost: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a

substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

d. Upon Contractor's receipt of Engineer's estimate of fee and time for design modifications, contractor shall advise Engineer, in writing, within three days whether Contractor will continue pursing approval of the substitute.
e. Engineer may reject a substitute that would require substantial changes in the Project's design.

H. Approval of Substitutes:
1. Substitutes are approved only via issuance of an appropriate Field Order or Change Order in accordance with and the General Conditions, as may be modified by the Supplementary Conditions.
2. Approval of a substitute does not relieve Contractor from obligation to comply with the Contract Documents, including submitting Shop Drawings, Samples, and other Submittals in accordance with the Contract Documents.

1.4 SUBSTITUTE MATERIALS AND EQUIPMENT

A. In addition to other requirements of this Section and elsewhere in the Contract Documents, substitution requests for substitute materials or equipment shall include:
1. Manufacturer and Location:
a. Name and address of manufacturer of the proposed substitute. Indicate country where manufacturer is incorporated and owned.
b. Companies and brands owned by or affiliated with manufacturer.
c. Name of manufacturers of principal component items, such as motors, bearings, and similar items.
d. Location where the items would be manufactured, including country and address. Indicate the total percentage of the items' value that will be manufactured outside of the United States and its territories.
e. Name, address, and driving distance from the Site of:
1) Manufacturer's sales representative.
2) Nearest service center offering full array of service capabilities.
3) Warehouse or other location where spare parts for the proposed substitute are available.
f. Number of years that manufacturer has actively participated the North American market.
2. Proposed Materials and Equipment:
a. Model designation and quantity of each proposed for the Work.
b. Manufacturer's literature for proposed substitute, with description of the materials and equipment.
c. Performance information and representative test data.
d. Indication of reference standards with which materials and equipment comply.
e. Preliminary process and instrumentation diagrams (P&ID), where applicable.
f. Identification of hazardous materials, including Constituents of Concern, used in the materials and equipment, and associated permitting or licensing required.
g. Manufacturer's standard warranty and applicable, proposed special or extended warranties, including indication of specific entities that will be beneficiary of such warranties.
h. Complete list of proposed deviations from requirements of the Contract Documents.
i. Itemized comparison of specified materials and equipment and proposed substitute, indicating:

1) Size (physical dimensions) when: item is in use, when not in use, and space required for routine and major maintenance.
2) Weight and loading at supports, when item is full and empty.
Materials of construction.

3. Operation requirements, including:
   a. Anticipated consumption of each item of: Electricity, other energy sources, water, chemicals (indicate each), and other needs for operation at the Site.
   b. Typical labor required for operation and associated skill level.
   c. Description of remote monitoring and control capabilities, as applicable.
4. Maintenance requirements, including:
   a. Anticipated life in the service and environment required.
   b. Frequency and general scope of routine and major maintenance typically necessary.
   c. Typical labor requirements and general qualifications of personnel performing routine maintenance.
   d. Major, associated equipment necessary for routing and major maintenance, including hoisting equipment type and capacity (when applicable).
   e. Availability, scope, cost, and general conditions of service and maintenance contracts, if any.
5. References for similar projects on which the materials and equipment were used. Indicate for each:
   a. Project owner name, name of facility where installed, and name of project.
   b. City, state, and country of installation.
   c. Model number/size and quantity furnished and installed.
   d. Year of installation.
   e. Contact information for owner and design professional, including telephone numbers.
6. Other information required by the Contract Documents.
7. Other information reasonably requested by Engineer.

1.5 SUBSTITUTE CONSTRUCTION METHODS, PROCEDURES, OR SEQUENCES

A. Provisions of the General Conditions, as may be modified by the Supplementary Conditions, regarding substitutes of materials and equipment are hereby extended to apply to substitute methods, procedures, and sequences as shown or indicated in the Contract Documents.

B. In addition to other requirements of this Section and elsewhere in the Contract Documents, substitution requests for substitute methods, procedures, or sequences shall include:
   1. Clear identification of the method, procedure, or sequence shown or indicated in the Contract Documents for which substitute is requested.
   2. Detailed description of proposed substitute method, procedure, sequence, or combination thereof.
   3. Reasons why substitute is proposed and benefits to the Project should the substitute be approved.
   4. Detailed list of how the proposed substitute deviates from associated method, procedure, or sequence shown or indicated in the Contract Documents.
   5. Impact of the substitute, if approved, on Owner’s or facility manager’s operations, when the Work is at an existing facility.
   6. Effect on other contractors working at the Site, if substitute is approved.
   7. Description of temporary equipment and temporary facilities needed, should the substitute be approved, including quantity of items, capacities, performance characteristics, permitting and approvals required by authorities having jurisdiction, and proposed location at the Site.
   8. Written evaluation of how substitute method, procedure, or sequence complies with Laws and Regulations.
   9. Drawings illustrating method, procedure, or sequence.

10. Materials to be used that contain Constituents of Concern or that have potential to cause or exacerbate a Hazardous Environmental Condition.
11. Other information and data required by the Contract Documents.
12. Other information reasonably required by Engineer.

PART 2 - PRODUCTS - (NOT USED)

PART 3 - EXECUTION

3.1 ATTACHMENTS

A. The following, bound after this Section's "End of Section" designation, are part of this Specifications Section:
   1. Exhibit A - Substitution Request Form (one page).

END OF SECTION

EXHIBIT A

Substitution Request Form

(One Item per each Form)

Project:	Date:	
Substitution Requestor:		
Contractor:		
Specification Section No:	Paragraph No. (i.e. 2.1.A.1.c):	Specified Item:
Proposed Substitution:		

Provide Product Data Sheets, Manufacturer's written installation instructions, drawings, diagrams, or any other information as an attached to this Form that will demonstrate the proposed substitution is an Approved Equal.

State differences between proposed substitutions and specified item. Differences include but are not limited to interrelationship with other items; materials, equipment, function, utility, life cycle costs, applied finished, appearances, and quality.

_____
_____
_____
_____

Document how the proposed substitution is compatible with or modifies other systems, parts, equipment or components of the Project and Work under the Contract.

_____
_____
_____

Describe what effect the proposed substitution has on dimensions indicated on the Drawings and previously reviewed Shop Drawings.

_____
_____
_____

Describe what effect the proposed substitution has on the Construction Schedule and Contract Time.

_____
_____
_____

Describe what effect the proposed substitution has on the Contract Price. This includes all direct, indirect, impact and delay costs.

_____
_____
_____

Manufacturer's guarantees of the proposed and specified items are:

☐ Same ☐ Different (explain on attachment)

The undersigned state that the function, utility, life cycle costs, applied finishes, appearance and quality of the proposed substitution are equal or superior to those of the specified item.

For use by Engineer: ☐ Accepted – eligible for approval via Change Order ☐ Accepted as Noted – approval via Change Order ☐ Not Accepted _____ _____ *Date* *(Telephone)*: _____ Signature of PE, RA, or PG in Responsible Charge	_____ *(Contractor's Signature)* _____ *(Contractor's Firm)* _____ *(Firms Address)* _____ *(Telephone)*

Comments:

SECTION 013000 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Coordination and Project conditions.

B. Preconstruction meeting.

C. Site mobilization meeting.

D. Progress meetings.

E. Preinstallation meetings.

F. Closeout meeting.

G. Alteration procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

A. Coordinate scheduling, submittals, and Work of various Sections of Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
   1. EJCDC forms will be utilized for project coordination and Contract amendments. Forms include but are not limited to:
      a. Notice to Proceed (EJCDC C-550)
      b. Application for Payment (EJCDC C-620)
      c. Contractor’s Affidavit of Payment (006519.13)
      d. Work Change Directive (EJCDC C-940)
      e. Change Order (EJCDC C-941)
      f. Field Order (EJCDC C-942)
      g. Notice of Acceptability (EJCDC C-626)
      h. Certificate of Substantial Completion (EJCDC-625)

B. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various Sections having interdependent responsibilities for installing, connecting to, and placing operating equipment in service.

C. Coordinate space requirements, supports, and installation of mechanical and electrical Work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit as closely as practical; place runs parallel with lines of building. Use spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

   1. Coordination Drawings: Prepare as required to coordinate all portions of Work. Show relationship and integration of different construction elements that require coordination during fabrication or installation to fit in space provided or to function as intended.

Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are important.

D. Coordination Meetings: In addition to other meetings specified in this Section, hold coordination meetings with personnel and Subcontractors as necessary to ensure coordination of Work.

E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean-up of Work of separate Sections in preparation for Substantial Completion.

G. After Substantial Completion, coordinate access to Site with Owner for correction of defective Work and Work not complying with Contract Documents, to minimize disruption of Owner's activities.

1.3 PRECONSTRUCTION MEETING

A. Engineer will schedule and preside over meeting after Notice of Award.

B. Attendance Required: Engineer, Owner, Resident Project Representative, appropriate governmental agency representatives, Construction Manager, major Subcontractors, and Contractor.

C. Minimum Agenda:

1. Execution of Owner-Contractor Agreement.
2. Submission of executed bonds and insurance certificates.
3. Distribution of Contract Documents.
4. Submission of list of Subcontractors, list of products, schedule of values, and Progress Schedule.
5. Designation of personnel representing parties in Contract, and Engineer.
6. Communication procedures.
7. Procedures and processing of requests for interpretations, field decisions, field orders, submittals, substitutions, Applications for Payments, proposal request, Change Orders, and Contract closeout procedures.
8. Scheduling.
9. Critical Work sequencing.
10. Time sensitive submittals:
    a. Electrical equipment including but not limited to:
        1) Automatic Transfer Switch (ATS)
        2) Generator
    b. Motorized equipment including but not limited to:
        1) Pumps
    c. Temporary Traffic Control Plan
    d. Construction Stormwater general Permit
    e. Bypass Pumping Plan
11. Scheduling activities of Field Engineering activities.
12. Prevailing Wage requirements – Weekly payroll.

D. Engineer: Record minutes and distribute within five (5) days after meeting.

1.4 SITE MOBILIZATION MEETING

A. Engineer will schedule and preside over meeting at Project Site prior to Contractor occupancy if Engineer or Owner deem meeting necessary.

B. Attendance Required: Engineer, Owner, Contractor, Contractor's superintendent, and major Subcontractors.

C. Minimum Agenda:

1. Use of premises by Owner and Contractor.
2. Owner's requirements.
3. Construction facilities and controls.
4. Temporary utilities.
5. Survey and building layout.
6. Security and housekeeping procedures.
7. Schedules.
8. Procedures for testing.
9. Procedures for maintaining record documents.
10. Requirements for startup of equipment.
11. Inspection and acceptance of equipment put into service during construction period.

D. Contractor: Record minutes and distribute digital copies to participants within seven days after meeting.

1.5 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at minimum weekly intervals, when required by the Engineer.

B. Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside over meetings.

C. Attendance Required: Job superintendent, major Subcontractors, Contractors and suppliers, Engineer, and Owner as appropriate to agenda topics for each meeting.

D. Minimum Agenda:

1. Review minutes of previous meetings.
2. Safety
3. Review of Work progress.
4. Field observations, problems, and decisions.
5. Identification of problems impeding planned progress.
6. Review of submittal schedule and status of submittals.
7. Review of off-Site fabrication and delivery schedules.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.

10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on Progress Schedule and coordination.
13. Other business relating to Work.

E. Engineer: Record minutes and distribute digital copies to participants within seven days after meeting.

1.6 PREINSTALLATION MEETINGS

A. When required in individual Specification Sections, convene preinstallation meetings at Project Site before starting Work of specific Section.

B. Require attendance of parties directly affecting, or affected by, Work of specific Section.

C. Notify Engineer one week in advance of meeting date.

D. Prepare agenda and preside over meeting:

1. Review conditions of installation, preparation, and installation procedures.
2. Review coordination with related Work.

E. Contractor: Record minutes and distribute digital copies to participants within seven days after meeting.

1.7 CLOSEOUT MEETING

A. Schedule Project closeout meeting with sufficient time to prepare for requesting Substantial Completion. Preside over meeting and be responsible for minutes.

B. Attendance Required: Contractor, major Subcontractors, Engineer, Owner, and others appropriate to agenda.

C. Notify Engineer four days in advance of meeting date.

D. Minimum Agenda:

1. Start-up of facilities and systems.
2. Operations and maintenance manuals.
3. Testing, adjusting, and balancing.
4. System demonstration and observation.
5. Operation and maintenance instructions for Owner's personnel.
6. Contractor's inspection of Work.
7. Contractor's preparation of an initial "punch list."
8. Procedure to request Engineer inspection to determine date of Substantial Completion.
9. Completion time for correcting deficiencies.
10. Inspections by authorities having jurisdiction.
11. Certificate of Occupancy and transfer of insurance responsibilities.
12. Partial release of retainage.
13. Final cleaning.

14. Preparation for final inspection.
15. Closeout Submittals:

    a. Project record documents.
    b. Operating and maintenance documents.
    c. Operating and maintenance materials.
    d. Affidavits.

16. Final Application for Payment.
17. Contractor's demobilization of Site.
18. Maintenance.

E. Contractor: Record minutes and distribute digital copies to participants within seven days after meeting.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 ALTERATION PROCEDURES

A. Designated areas of existing facilities will be occupied for normal operations during progress of construction. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage.

1. Perform Work not to interfere with operations of occupied areas.
2. Keep utility and service outages to a minimum and perform only after written approval of Owner.
3. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

B. Materials: As specified in product Sections; match existing products with new products for patching and extending Work.

C. Employ skilled and experienced installer to perform alteration and renovation Work.

D. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion. Comply with Section 017000 - Execution and Closeout Requirements

E. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

F. Remove debris and abandoned items from area and from concealed spaces.

G. Prepare surface and remove surface finishes to permit installation of new Work and finishes.

H. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

I. Remove, cut, and patch Work to minimize damage and to permit restoring products and finishes to original or specified condition.

J. Where new Work abuts or aligns with existing Work, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Engineer for review.

L. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing other imperfections.

M. Finish surfaces as specified in individual product Sections.

END OF SECTION 013000

SECTION 013216 - CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Definitions

B. Submittals.

C. Quality assurance.

D. Bar chart schedules.

E. Review and evaluation.

F. Updating schedules.

G. Distribution.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
   1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
   2. Predecessor Activity: An activity that precedes another activity in the network.
   3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Engineer.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.
   1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
   2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.

3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled

1.3 SUBMITTALS

A. Post as electronic file to Engineer.

B. Submit bar chart schedules at or prior to preconstruction meeting for Owner/Engineer approval under transmittal letter form specified in Section 013300 - Submittal Procedures.

C. Schedule Updates are to be updated weekly and presented at weekly progress meetings. Schedule updates shall include:

1. Overall percent complete, projected and actual.
2. Completion progress by listed activity and sub-activity, to within five working days prior to submittal.
3. Changes in Work scope and activities modified since submittal.
4. Delays in submittals or resubmittals, deliveries, or Work.
5. Adjusted or modified sequences of Work.
6. Other identifiable changes.
7. Revised projections of progress and completion.

D. Narrative Progress Report:

1. Submit with each monthly submission of Progress Schedule.
2. Summary of Work completed during the past period between reports.
3. Work planned during the next period.
4. Explanation of differences between summary of Work completed and Work planned in previously submitted report.
5. Current and anticipated delaying factors and estimated impact on other activities and completion milestones.
6. Corrective action taken or proposed.

1.4 QUALITY ASSURANCE

A. Review procedures for updating schedule

1.5 BAR CHART SCHEDULES

A. Format: Bar chart Schedule, to include at least:
1. Identification and listing in chronological order of those activities reasonably required to complete the Work, including:
a. Subcontract Work.
b. Major equipment design, fabrication, factory testing, and delivery dates including required lead times.

c. Move-in and other preliminary activities.
d. Equipment and equipment system test and startup activities.
e. Project closeout and cleanup.
f. Work sequences, constraints, and milestones.

2. Listings identified by Specification Section number.
3. Identification of the following:
   a. Horizontal time frame by year, month, and week.
   b. Duration, early start, and completion for each activity and subactivity.
   c. Critical activities and Project float.
   d. Subschedules to further define critical portions of Work.

1.6 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

B. Indicate progress of each activity to date of revision, with projected completion date of each activity. Update schedules to depict current status of Work.

C. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.

D. Upon approval of a Change Order, include the change in the next schedule submittal.

E. Indicate changes required to maintain Date of Substantial Completion.

F. Prepare narrative report to define problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect including effects of changes on schedules of separate Contractors.

1.7 DISTRIBUTION

A. Following joint review, distribute copies of updated schedules to Contractor's Project site file, Subcontractors, suppliers, Engineer, Owner, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 013216

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Within 30 days after the date of Notice to Proceed, Contractor shall submit

1. Schedule of submittals - Schedule of submittals shall
   a. list all material and contractual submittals anticipated for the Project
   b. include submittal code in accordance with 010410 Project Coordination
   c. demonstrate timely submission – coordinate submittals with Construction Progress Schedule taking into account review and resubmittal times.

2. Priority equipment submittals, per Engineer's request, including:
   a. Electrical equipment including but not limited to:
      1) Automatic Transfer Switch (ATS)
      2) Generator
   b. Motorized equipment including but not limited to:
      1) Pumps
      2) Control panel with integral VFD's

B. Submittals shall include, as appropriate, Manufacturer Certificate of American Iron and Steel compliance, stamped detail drawings, supporting information as required to show the product meeting or exceeding the project requirements.

C. Organize submittals by specification section as detailed within 010410 Project Coordination. Submittal shall contain all products and submittal content anticipated for the project associated with any given specification section. Any submittal with missing products or information may be considered incomplete and not reviewed.

D. Submittals shall include:

1. Identify the project, contractor, subcontractor, supplier; pertinent Construction Drawing or detail number, and specifications section as pertinent to the material or product being proposed.
2. Allow space on submittals for Engineer review stamps.
3. When revised for resubmission, identify changes made since previous submission.
4. For products specified only by reference standards or specifications, indicate manufacture, model and reference standard or specification number.

E. AIS Certificate Submittals - Manufacturer Certificate of American Iron and Steel Compliance shall comply with the *AIS Final Guidance 3/20/14* (guidance includes example certificate) and include the 5 key elements:

1. Specific product(s) delivered to the project site.
2. Location(s) of the foundry/mill/factory where the product was manufactured (City and State).
3. Name of the project and/or jurisdiction to which the product was delivered.
4. Signature of company representative.
5. Reference AIS requirements.

F. The Contractor is responsible for scheduling submittals. To expedite the project, deliver to the Engineer during business hours, or submit electronic submittals via email as PDF electronic files. Contractor shall coordinate submission of related items.

1. For each submittal delivered for review, allow 10 business days excluding delivery time to and from the Contractor.
2. Incomplete, illegible, or non-specific submittals will not be reviewed.
3. Submittals not requested will not be recognized nor processed.
4. Do not make “mass submittals” to Engineer. “mass submittals” are defined as six or more submittals or items in one day or 20 or more submittals in one week. If “mass submittals” are received, Engineer’s review time stated above will be extended as necessary to perform proper review. Engineer will review “mass submittals” based on priority determined by Engineer after consultation with Owner and Contractor.
5. Delays resulting from mass submittals, incomplete or non-requested submittals are not the responsibility of the Engineer.

G. Informational submittals, similar data, or submittals not required by Contract documents may be returned without action or review.

H. Submittal approval does not authorize changes to Contract requirements, unless accompanied by Change Order or Field Order.

I. Requests for approval of substitutes, or “Or-Equals” shall comply with Section 012500 - Substitution Procedures

1.2 ELECTRONIC CAD FILES

A. Electronic CAD Files of Project Drawings: May only be used to expedite production of Shop Drawings for the Project. Use for other Projects or purposes is not allowed.

B. Electronic CAD files of Project Drawings: Distributed only under the following conditions:

1. Use of files is solely at the receiver’s risk. Engineer does not warrant accuracy of files. Receiving files in electronic form does not relieve the receiver of responsibilities for measurements, dimensions, and quantities set forth in Contract Documents. In the event of ambiguity, discrepancy, or conflict between information on electronic media and that in Contract Documents, notify Engineer of discrepancy and use information in hard-copy Drawings and Specifications.
2. CAD files do not necessarily represent the latest Contract Documents, existing conditions, and as-built conditions. Receiver is responsible for determining and complying with these conditions and for incorporating addenda and modifications.
3. User is responsible for removing information not normally provided on Shop Drawings and removing references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and will be immediately returned.
4. Receiver shall not hold Engineer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation, or use of this electronic information.
5. Receiver shall understand that even though Engineer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media.

6. Receiver shall not hold Engineer responsible for such viruses or their consequences, and shall hold Engineer harmless against costs, losses, or damage caused by presence of computer virus in files or media.

1.3 TESTING

A. All testing shall adhere to specification requirements unless otherwise indicated.

B. The Contractor is responsible for coordinating and payment of an independent testing agency or laboratory acceptable to Owner to perform specified testing.

1. Contractor is responsible for cooperating with independent firm including but not limited to: furnish samples of materials, design mix, equipment, tools, storage, safe access, and labor.

C. Testing, inspections, and source quality control may occur on or off project site.

D. All testing reports shall be submitted to Engineer, indicating observations and results of tests and compliance or noncompliance with Contract Documents.

1. Submit final report indicating correction of Work previously reported as noncompliant.
2. Date test or inspection was conducted.
3. Date test or inspection results were transmitted to Engineer.
4. Identification of testing agency or special inspector conducting test or inspection.

E. Retesting or re-inspection required because of nonconformance with testing standards, or specified or indicated requirements, shall be performed by the same independent firm at the sole cost of the Contractor.

F. Additional tests may be required to prove adequate meeting of standards or Project Document requirements. Additional tests may be requested by the Owner or Engineer at their discretion. The cost of additional tests shall be considered incidental.

G. Notify and coordinate with the Engineer a minimum of 48-hours prior for any test or required inspection.

1. Failure to notify Engineer prior to test, may void the test or inspection, and require exposing or recompleting the Work to meet project specifications at the discretion of the Engineer. No time extensions shall be granted for project delays because of failed tests. The cost of recompleting the Work, repurchase of materials, or exposing products shall be the sole cost of the Contractor.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 01 33 00

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Quality control.

B. Tolerances.

C. References.

D. Labeling.

E. Testing and inspection services.

F. Manufacturers' field services.

1.2 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. The Contractor shall submit a Quality Control Plan one week prior to the pre-construction conference. Plan shall:
   1. Detail initial and subsequent inspections of Work to ensure that the Work conforms to the Contract Documents.
   2. Designate the person responsible for Contractor’s quality control while Work is in progress, and shall notify Engineer, in writing, prior to any change in quality control representative assignment.

1.3 QUALITY CONTROL

A. Monitor quality control over suppliers, manufacturers, products, services, Site conditions, and workmanship, to produce Work of specified quality.

B. Comply with specified standards as the minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

C. Perform Work using persons qualified to produce required and specified quality.

D. Products, materials, and equipment may be subject to inspection by Engineer at place of manufacture or fabrication. Such inspections shall not relieve Contractor of complying with requirements of Contract Documents.

E. Supervise performance of Work in such manner and by such means to ensure that Work, whether completed or in progress, will not be subjected to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

F. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
   2. Specified tests, inspections, and actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
   3. Requirements for Contractor to provide quality-assurance and -control services required by Engineer, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
   4. Specific test and inspection requirements are not specified in this Section.

G. Contractor Responsibilities:
   1. Tests and inspections that are explicitly identified in the Contract Documents as Owner-provided or Owner-contracted shall be contracted and paid for by Owner. Where the Contract Documents so identify testing or special inspection as Owner-provided, Owner will engage the independent testing agency or special inspector and will pay the costs for the initial testing or inspection.

   2. Tests and inspections not explicitly assigned to Owner remain the Contractor’s responsibility. Where the Contractor is responsible for testing or inspections, the Contractor shall perform or engage a qualified testing agency and pay all associated costs.

   3. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.

   4. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.

      a. Contractor shall not employ the same entity engaged by Owner for Owner-provided testing, unless agreed to in writing by Owner.

   5. Notify Owner and testing agencies at least 24 hours in advance of times when Work that requires Owner-provided or Contractor-provided testing or inspection will be performed. Where Owner-provided testing is required, coordinate schedules and access directly with Owner and Owner's testing agency.

   6. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service to the Engineer. For Owner-contracted testing, Contractor shall receive copies of test reports from the Owner-contracted agency as set forth below.

   7. All testing required unless explicitly asked in addition to the requirements in these Project Documents shall be included in the Bid Price.

a. Cost for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor at no additional cost to Owner.

1.4 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' recommended tolerances and tolerance requirements in reference standards. When such tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.5 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current as of date of Contract Documents except where specific date is established by code.

C. Obtain copies of standards and maintain on Site when required by product Specification Sections.

D. When requirements of indicated reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

E. Neither contractual relationships, duties, or responsibilities of parties in Contract nor those of Engineer shall be altered from Contract Documents by mention or inference in reference documents.

1.6 LABELING

A. Attach label from agency approved by authorities having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label:

1. Model number.
2. Serial number.
3. Performance characteristics.

C. Manufacturer's Nameplates, Trademarks, Logos, and Other Identifying Marks on Products: Not allowed on surfaces exposed to view in public areas, interior or exterior.

1.7 TESTING AND INSPECTION SERVICES

A. Owner-Contracted Testing and Special Inspection.

1. Owner will contract and pay for independent testing, special inspection, and laboratory services that the Contract Documents or authorities having jurisdiction designate as Owner-provided or Owner-contracted. Owner-contracted services will be performed by firms acceptable to Owner and the Engineer.
2. For Owner-contracted tests, the Owner-contracted testing agency will furnish reports directly to the Engineer, Owner, Contractor, and authorities having jurisdiction as required by the Contract Documents.
3. The Contractor shall coordinate with Owner and Owner-contracted testing agencies to provide access, samples, mockups, incidental labor, storage, and any other assistance required to perform the Owner-contracted testing and inspections.
4. Owner shall pay for initial Owner-contracted tests. Retesting or re-inspection required as a result of Contractor’s failure to comply with Contract Documents will be charged to the Contractor, unless otherwise stated in the Contract Documents

B. Independent firm will perform tests, inspections, and other services specified in individual Specification Sections and as required by Engineer or authorities having jurisdiction.

C. Testing, inspections, and source quality control may occur on or off Project Site. Perform off-Site testing as required by Engineer or Owner.

D. Reports shall be submitted by independent firm to Engineer, Contractor, and authorities having jurisdiction, indicating observations and results of tests and compliance or noncompliance with Contract Documents.

1. Submit final report indicating correction of Work previously reported as noncompliant.
2. Date test or inspection was conducted.
3. Description of the Work tested or inspected.
4. Date test or inspection results were transmitted to Engineer.
5. Identification of testing agency or special inspector conducting test or inspection.

E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.

1. Notify Engineer and independent firm 24 hours before expected time for operations requiring services.
2. Make arrangements with independent firm and pay for additional Samples and tests required for Contractor's use.

F. Employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work according to requirements of Contract Documents.

G. Retesting or re-inspection required because of nonconformance with specified or indicated requirements shall be performed by same independent firm on instructions from Engineer. Payment for retesting or re-inspection will be charged to Contractor at no additional cost to owner.

H. Agency Responsibilities:

1. Test Samples of mixes submitted by Contractor.
2. Provide qualified personnel at Site. Cooperate with Engineer and Contractor in performance of services.
3. Perform indicated sampling and testing of products according to specified standards.
4. Ascertain compliance of materials and mixes with requirements of Contract Documents.
5. Promptly notify Engineer and Contractor of observed irregularities or nonconformance of Work or products.
6. Perform additional tests required by Engineer.
7. Attend preconstruction meetings and progress meetings.

I. Agency Reports: After each test, promptly submit copies of report to Engineer, Contractor, and authorities having jurisdiction. When requested by Engineer, provide interpretation of test results. Include the following:

1. Date issued.
2. Project title and number.
3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and Specification Section.
6. Location in Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.
10. Conformance with Contract Documents.

J. Limits on Testing Authority:

1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of Contract Documents.
2. Agency or laboratory may not approve or accept any portion of the Work.
3. Agency or laboratory may not assume duties of Contractor.
4. Agency or laboratory has no authority to stop the Work.

K. Contractor may perform “non-record” testing at their own cost.

1.8 MANUFACTURER'S FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe Site conditions, conditions of surfaces and installation, quality of workmanship, startup of equipment, testing, adjusting, and balancing of equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer is subject to approval of Engineer.

C. Report observations and Site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturer's written instructions.

D. Refer to Section 013300 - Submittal Procedures.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary facilities

B. Temporary Utilities:

1. Temporary electricity.
2. Temporary lighting for construction purposes.
3. Temporary heating.
4. Temporary cooling.
5. Temporary ventilation.
6. Communication services.
7. Temporary water service.
8. Temporary sanitary facilities.

C. Construction Facilities:

1. Staging area(s).
2. Field offices and storage units.
3. Vehicular access.
4. Parking.
5. Progress cleaning and waste removal.
6. Project identification.
7. Traffic regulation.
8. Fire-prevention facilities.

D. Temporary Controls:

1. Barriers.
2. Enclosures and fencing.
3. Security.
4. Water control.
5. Dust control.
6. Erosion and sediment control.
7. Noise control.
8. Pest and rodent control.
9. Pollution control.

E. Removal of utilities, facilities, and controls.

1.2 REFERENCE STANDARDS

A. ASTM International:

1. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
3. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Temporary Facilities Plan: Submit plan prior to Preconstruction Conference. Include Items 1.1.B-1.1.D as applicable.

C. Traffic Control Plan – submit to Authority Having Jurisdiction (AHJ):
   1. Authority Having Jurisdiction (AHJ)
      a. City of Chelan
      b. WSDOT (if proposing changes to WSDOT controlled traffic light)

D. Approved Traffic Control Plan – submit to Engineer.

E. Approved Stormwater Pollution Prevention Plan (SWPPP) – submit plan approved by Washington Department of Ecology to Engineer prior to construction.

1.4 TEMPORARY FACILITIES

A. Temporary Provisions Provided by Contractor:

1. Temporary barriers, barricades, covered walkways, fencing, exterior closures, and interior closures.
2. Temporary field offices.
3. Cleaning during construction.
4. Access roads and approaches.
5. Temporary sanitary facilities.
6. Temporary electrical service and distribution system for power and lighting.
7. Temporary telephone and internet service.

B. Each Subcontractor: Coordinate provisions with Construction Manager and provide the following items as necessary for execution of the Work including associated costs:

1. Construction aids.
2. Temporary fire protection, dust control, erosion and sediment control, water control, noise control, and other necessary temporary controls.
3. Temporary barriers, barricades, and similar devices as necessary for safety and protection of construction personnel and public.
4. On Construction Manager's approval, may provide temporary field office including electrical service and temporary telephone.
5. Temporary tree and plant protection.

6. Electrical service required in addition to temporary service and distribution provided by Construction Manager.
7. Temporary provisions for protection of installed Work.

1.5 TEMPORARY ELECTRICITY

A. Owner shall provide power services required from utility source as needed for construction and operation of portions or all of the improvements.

B. Provide distribution of power services from owner provided utility source.

1.6 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watts/sq ft.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide and maintain 0.25 watt/sq ft HID lighting to interior work areas after dark for security purposes.

D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, lamps, and the like, for specified lighting levels.

E. Maintain lighting and provide routine repairs.

F. Permanent building lighting may be used during construction.

1.7 TEMPORARY HEATING

A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.

B. Before operating permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

C. Maintain minimum ambient temperature of 50 degrees F in conditioned areas where construction is in progress unless indicated otherwise in individual product Sections.

1.8 TEMPORARY COOLING

A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations.

B. Before operating permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated, and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Replace filters at Substantial Completion.

C. Maintain maximum ambient temperature of 80 degrees F in conditioned areas where construction is in progress unless indicated otherwise in individual product Sections.

1.9 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

1.10 COMMUNICATION SERVICES

A. Internet Service: Provide, maintain, and pay for broadband Internet service to field office and Engineer's field office at time of Project mobilization.

1.11 TEMPORARY WATER SERVICE

A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations.

B. Extend branch piping with outlets located so that water is available by hoses with threaded connections. Provide temporary pipe insulation and heat tape to prevent freezing.

C. The Contractor may negotiate with the Owner for use of City provided potable water. Excessive amounts of water drawn from the City are subject to water usage fees.

1.12 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required sanitary facilities and enclosures. Existing facility use is not permitted. Provide facilities at time of Project mobilization.

1.13 STAGING AREAS

A. Contractor shall secure a staging area for the duration of the project. Approval of a Temporary Facilities Plan including staging areas is necessary prior to project mobilization.

B. At end of construction, return existing facilities used for construction operations to same or better condition as original condition.

1.14 FIELD OFFICES AND SHEDS

A. Do not use existing facilities for field offices or for storage.

B. Field Office: Weathertight, with lighting, electrical outlets, heating, cooling, and ventilating equipment, and equipped with sturdy furniture including conference table.

C. Provide space for Project meetings, with table and chairs to accommodate six persons.

D. Locate field offices and sheds a minimum distance of 30 feet from existing and new structures.

E. Do not use permanent facilities for field offices or for storage.

F. Construction: Portable or mobile buildings, or buildings constructed with floors raised aboveground, securely fixed to foundations with steps and landings at entrance doors.

1. Construction: Structurally sound, secure, weathertight enclosures for office and storage spaces. Maintain during progress of Work; remove enclosures at completion of Work.
2. Thermal Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
3. Exterior Materials: Weather-resistant, finished in one color acceptable to Engineer.
4. Interior Materials in Field Offices: Sheet-type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
5. Lighting for Field Offices: 50 lumen/ft^2 at desktop height; exterior lighting at entrance doors.
6. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.

G. Environmental Control:

1. Heating, Cooling, and Ventilating for Offices including Engineer Field Office: Automatic equipment to maintain comfort conditions.
2. Storage Spaces: Heating and ventilating as needed to maintain products according to Contract Documents; lighting for maintenance and inspection of products.

H. Storage Areas and Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and inspection of products to suit requirements in Section 016000 - Product Requirements.

I. Preparation: Fill and grade Sites for temporary structures sloped for drainage away from buildings.

J. Installation:

1. Install field office spaces ready for occupancy 15 days after date established by Owner-Contractor Agreement.

K. Employee Residential Occupancy: Not allowed on Owner's property.

L. Maintenance and Cleaning:

1. Periodic cleaning and maintenance for sheds and storage areas.
2. Maintain walks free of mud, water, snow, and the like.

M. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas to same or better condition as original condition.

1.15 VEHICULAR ACCESS

A. Locate as approved by Engineer.

B. Provide unimpeded access for emergency vehicles. Maintain 16 foot-wide driveways with turning space between and around combustible materials.

C. Provide and maintain access to fire hydrants and control valves free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Use existing on-Site roads for construction traffic.

F. The entrance road must be maintained for the full duration of construction in such a manner that site personnel are provided full access and able to continue to operate their facilities. In the event that inclement weather or construction activities damage the road, or make it impassable in a standard vehicle, contractor shall be required to place compacted road base at a minimum of 4 inches compacted to build and provide an all season access to the plant.

1.16 PARKING

A. Use of existing on-Site streets and driveways used for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

B. Use of existing parking facilities on Woodin Ave by construction personnel is **not** permitted.

C. Do not allow heavy vehicles or construction equipment in parking areas.

D. Permanent Pavements and Parking Facilities:

1. Before Substantial Completion permanent roads and parking areas may be used for construction traffic.
2. Avoid traffic loading beyond paving design capacity. Tracked vehicles are not allowed.
3. Use of permanent parking structures is not permitted.

E. Maintenance:

1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, ice, and the like.
2. Maintain permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

F. Removal, Repair:

1. Remove temporary materials and construction at Substantial Completion.

2. Remove underground Work and compacted materials to depth of 2 feet; fill and grade Site as indicated.
3. Repair permanent facilities damaged by use, to original condition.

1.17 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain Site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from Site periodically and dispose of off-Site. Comply with Section 017419 - Construction Waste Management and Disposal.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.18 PROJECT IDENTIFICATION

A. Project Identification Sign:
1. The project sign shall be in accordance with Section 008501.

2. One painted sign, minimum 12-sq ft area, bottom 4 feet aboveground.
3. Content:

a. Project title, City of Chelan logo, and name of Owner.
b. Names and titles of authorities.
c. Names of funding agencies.
d. Names and titles of Engineer and Consultants.
e. Name of Prime Contractor and major Subcontractors.

4. Graphic Design, Colors, and Style of Lettering: As approved by Engineer.

B. Design sign and structure to withstand 60-mph wind velocity.

C. Sign Painter: Experienced as professional sign painter for minimum of three years.

D. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

E. Show content, layout, lettering, color, foundation, structure, sizes, and grades of members.

F. Sign Materials:

1. Structure and Framing: New wood or metal, structurally adequate.

2. Sign Surfaces: Exterior grade plywood with medium-density overlay, minimum of 3/4 inches thick, standard large sizes to minimize joints.
3. Rough Hardware: Galvanized aluminum or brass.
4. Paint and Primers: Exterior quality, two coats; sign background color as selected.
5. Lettering: Exterior quality paint, contrasting colors as selected.

G. Installation:

1. Install Project identification sign within 15 days after date established by Owner-Contractor Agreement.
2. Erect at location of high public visibility adjacent to main entrance to Site.
3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
4. Install sign surface plumb and level, with butt joints. Anchor securely.
5. Paint exposed surfaces of sign, supports, and framing.

H. Maintenance: Maintain clean signs and supports; repair deterioration and damage.

I. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

J. Submittal: submit sign design for approval by Engineer.

1.19 TRAFFIC REGULATION

A. Traffic Control Plans:
1. All traffic control plans created by the contractor shall be submitted to the Owner, Engineer and AHJ for review and approval. Contractor shall submit traffic control plans prior to construction commencement and after Notice to Proceed. A traffic control plan will not be considered approved until written approval is received by the Owner, the Engineer and AHJ. Contractor must have an approved traffic control plan and provide Engineer and Owner a minimum 48-hour notice prior to any street shutdown or traffic control work. It shall be the Contractor's sole responsibility to notify the appropriate authorities including Engineer and the Owner at least one week in advance of significant changes in traffic patterns or possible hazards due to reductions of travel surface width or other work in public right-of-ways. The Contractor is to coordinate all detours and temporary road closings with the appropriate authorities. Contractor shall not obstruct roadways, sidewalks or other public ways without the appropriate permits.

2. Traffic Control Plans shall be prepared by a qualified Traffic Control Specialist and shall conform to the latest edition of the “Manual of Uniform Traffic Control Devices”; Federal Highways Administration. Traffic Control Plans shall include at a minimum the following; plan view with proposed traffic control devices, legend, sign spacing table, minimum taper length tables, channelizing device spacing tables and buffer space tables, detouring routes and signage.

B. Signs, Signals, and Devices: All traffic signs and devices shall meet Washington Department of Transportation standards.

C. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

D. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

E. Removal:

1. Remove equipment and devices at Substantial Completion.
2. Repair damage caused by installation.
3. Remove post settings to depth of 2 feet.

1.20 FIRE-PREVENTION FACILITIES

A. Prohibit smoking within buildings under construction and demolition. Designate area on Site where smoking is permitted. Provide approved ashtrays in designated smoking areas.

B. Establish fire watch for cutting, welding, and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10-pound capacity, 4A-60B: C UL rating.

1. Provide one fire extinguisher at each stairway on each floor of buildings under construction and demolition.
2. Provide minimum of one fire extinguisher in every construction trailer and storage shed.
3. Provide minimum of one fire extinguisher on roof during roofing operations using heat-producing equipment.

1.21 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of Site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way and for Owner/public access to existing building.

C. Tree and Plant Protection: Preserve and protect existing trees and plants designated to remain. Replace trees and plants damaged by construction operations.

D. Protect non-owned vehicular traffic, stored materials, Site, and structures from damage.

1.22 ENCLOSURES AND FENCING

A. Construction Fence: As necessary to enclose site provide minimum 6-foot-high fence around construction Site; equip with vehicular gates with locks.

B. Exterior Enclosures:

1. Provide temporary insulated weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.
2. Provide temporary roofing as specified in individual Specification Sections.

C. Interior Enclosures:

1. Provide temporary partitions and ceilings to separate work areas from Owner-occupied areas, to prevent penetration of dust and moisture into Owner-occupied areas, and to prevent damage to existing materials and equipment.
2. Construction: Frame and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

    a. Insulated to R-15.
    b. STC rating of 35 according to ASTM E 90.
    c. Surface-Burning Characteristics: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E 84.
    d. Fire-Rated Construction: 1-hour rating.

        1) Tested Rating: Determined according to ASTM E 119.

1.23 SECURITY

A. Security Program:

1. Protect Work on existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Owner's existing security system at Project mobilization.
3. Maintain program throughout construction period until Owner's acceptance precludes need for Contractor's security.

B. Entry Control:

1. Restrict entrance of persons and vehicles to Project Site and existing facilities.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors and make available to Owner on request.
4. Owner will control entrance of persons and vehicles to Owner's operations.

C. Restrictions:
1. Do no work on days indicated in Owner-Contractor Agreement.

1.24 WATER CONTROL

A. Grade Site to drain. Maintain excavations free of water. Provide, operate, and maintain necessary dewatering equipment.

B. Protect Site from puddles or running water. Provide water barriers as required to protect Site from soil erosion.

1.25 DUST CONTROL

A. Execute Work by methods that minimize raising dust from construction operations.

B. Provide positive means to prevent airborne dust from dispersing into atmosphere and into Owner-occupied areas.

1.26 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize surface area of bare soil exposed at one time.

C. Provide temporary measures including berms, dikes, drains, and other devices to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts and clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation. Promptly apply corrective measures.

F. As required by regulations, Contractor shall file construction Stormwater Pollution Prevention Plan (SWPPP) and obtain Construction Stormwater General Permit (CSWGP) from Ecology. The Contractor shall submit the approved SWPPP to Engineer prior to construction and comply with permitting throughout the duration of the Project.

1.27 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations as required by Owner.

1.28 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work or entering permanent facilities.

1.29 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.30 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials before Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet. Grade Site as indicated on Drawings.

C. Clean and repair damage caused by installation or use of temporary Work.

D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 015000

SECTION 015726 - DUST CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included: The work under this section shall include all equipment, labor, and materials necessary to control dust relating to or resulting from performance of the project work.

B. Related information: In addition to the requirements described herein, comply with specific requirements for dust control as may be detailed in other Sections of these specifications or as noted on the Drawings.

1.2 QUALITY ASSURANCE

A. Standards: Comply with all pertinent requirements of Federal, State, and Local agencies which may have jurisdiction over dust control procedures and additives used to aid in dust abatement.

B. Inspection: The Engineer, Contractor, and Owner shall regularly (weekly) review the adequacy of dust control efforts and procedures to assure they are satisfactorily meeting the needs of the project.

1.3 SUBMITTALS

A. Dust control procedure: Prior to commencing the project work the Contractor shall submit a written Dust Control Plan to the Owner and Engineer for review and comments. Included in the proposed Dust Control Plan shall be the Contractor's means and methods to assure compliance with the specific project requirements.

B. Additives: All additives proposed for use as an aid in dust control other than those specified in Section 2.2 shall be reviewed with the Engineer prior to their application. Manufacturer’s literature along with recommended application rates shall be provided.

PART 2 - PRODUCTS

2.1 WATER

Water used for dust control shall be clear and free from chemical contaminants.

2.2 CHEMICAL ADDITIVES

Calcium Chloride: Calcium chloride, if necessary for adequate dust control, shall conform to the requirements of AASHTO M 144 (ASTM-D-98) except that either pellet or flake form shall be acceptable.

PART 3 - EXECUTION

3.1 GENERAL

During the performance of the work required by these specifications or any operations appurtenant thereto, the Contractor shall furnish all labor, equipment, materials and means required, and shall

carry out proper and efficient measures wherever and as often as necessary or as directed to reduce the dust nuisance, and to prevent dust which has originated from his operations from damaging crops, dwellings, or causing a nuisance or safety hazard.

3.2 WATER

A. Procurement: The Contractor shall be responsible for arranging for the necessary supply of suitable water for dust abatement.

B. Application: The Contractor shall apply water and/or water with additives on all access and haul roads, excavations, surfaces of refilled trenches, stockpiles, waste areas and other work areas as may be necessary to adequately control dust.

3.3 WORK AREAS

The Contractor shall make a reasonable effort to keep work areas and adjacent areas free of excessive dirt and mud which may unnecessarily contribute to a dust nuisance.

Pavement or concrete surfaces adjoining work areas shall be kept broomed off and washed clean of excess excavated material.

END OF SECTION 015726

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Products.
B. Product delivery requirements.
C. Product storage and handling requirements.
D. Product options.
E. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. Products shall comply with all requirements as identified in the Instructions to Bidders (Document 002113), funding agency attachment – Specification 008501, and all individual Specification Sections and reference standards including American Iron and Steel. In case of conflict the more stringent will apply.

B. All equipment and materials incorporated into the water system shall be NSF 61 certified and approved for potable water use.

C. Specified products define standard of quality, type, function, dimension, appearance, and performance required.

D. Furnish products of qualified manufacturers that are suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise. Confirm that manufacturer's production capacity can provide sufficient product, on time, to meet Project requirements.

E. Do not use materials and equipment removed from existing premises except as specifically permitted by Contract Documents.

F. Furnish interchangeable components from same manufacturer for components being replaced.

G. Products must comply with all applicable Washington Department of Transportation Standard Specifications (WSDOT), unless otherwise specified.

H. Connection of dissimilar metals with anodic index differential of more than 0.15V by welding or otherwise bare metal connection shall be provided with magnesium cathodic protection. Cathodic protection connection shall be made by copper wire.

1.3 PRODUCT DELIVERY REQUIREMENTS

A. Transport and handle products according to manufacturer's instructions.

B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.

C. Provide equipment and personnel to handle products; use methods to prevent soiling, disfigurement, or damage.

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products according to manufacturer's instructions.

B. Store products with seals and labels intact and legible.

C. Store sensitive products in weathertight, climate-controlled enclosures in an environment suitable to product.

D. For exterior storage of fabricated products, place products on sloped supports aboveground.

E. Provide bonded off-Site storage and protection when Site does not allow for on-Site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store products; use methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Products complying with specified reference standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and complying with Specifications; no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit Request for Substitution for any manufacturer not named, according to Section 012500 - Substitution Procedures.

D. All materials and products listed in the Project Documents may be substituted with “Or Equal” as approved by Engineer prior to purchase and installation. Items that are not approved before hand will not be recognized and be rejected.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Furnish minimum 6-foot long cord and plug including grounding connector for connection to electric wiring system. Cord of longer length may be specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EQUIPMENT LEVELING–

A. Non-shrink grout shall be used to level equipment as necessary.

B. Grout contact surfaces, base plates, rails, anchors, and bolts must be cleaned of all oil, grease, scale, and other foreign matter.

C. Chip away unsound concrete leaving surface rough but level.

D. Mix and place grout per manufacturers recommendations.

E. Contractor to provide forming materials where necessary to retain grout until hardened.

F. Work grout from one side. Avoid trapping air under base plate.

G. Do not load grout until it has reached a minimum of 3000 psi compressive strength.

H. Cure grout as recommended by the manufacturer.

END OF SECTION 016000

SECTION 017000 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. References
B. Field engineering.
C. Closeout procedures.
D. Starting of systems.
E. Demonstration and instruction.
F. Testing, adjusting, and balancing.
G. Project record documents.
H. Operation and maintenance data.
I. Manual for materials and finishes.
J. Manual for equipment and systems.
K. Spare parts and maintenance products.
L. Product warranties and product bonds.
M. Maintenance service.
N. Examination.
O. Preparation.
P. Execution.
Q. Cutting and patching.
R. Protecting installed construction.
S. Final cleaning.

1.2 REFERENCES

A. The State of Washington Criteria for Sewer Works Design.
Use ‘Force Main’ guidance for pressure pipes.

B. Washington State Department of Transportation (WSDOT) Standard Specifications.

C. Consolidated Appropriations Act of 2017 Section 746 of Title VII – American Iron and Steel (AIS).

1.3 FIELD ENGINEERING

A. Employ land surveyor registered in State of Washington and acceptable to Engineer.

B. Locate and protect survey controls and reference points. Promptly notify Engineer of discrepancies discovered.

C. Control datum for survey is indicated on Drawings.

D. Prior to beginning Work, verify and establish floor elevations of existing facilities to ensure that new Work will meet existing elevations in smooth and level alignment except where specifically detailed or indicated otherwise.

E. Verify setbacks and easements; confirm Drawing dimensions and elevations.

F. Provide field engineering services. Establish elevations, lines, and levels using recognized engineering survey practices.

G. Submit copy of Site drawing and certificate signed by land surveyor certifying elevations and locations of the Work are in conformance with Contract Documents.

H. Maintain complete and accurate log of control and survey Work as Work progresses.

I. On completion of foundation walls and major Site improvements, prepare certified survey illustrating dimensions, locations, angles, and elevations of construction and Site Work.

J. Protect survey control points prior to starting Site Work; preserve permanent reference points during construction.

K. Promptly report to Engineer loss or destruction of reference point or relocation required because of changes in grades or other reasons.

L. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Engineer.

M. Final Property Survey: Prior to Substantial Completion, prepare final property survey illustrating locations, dimensions, angles, and elevations of buildings and Site Work that have resulted from construction indicating their relationship to permanent benchmarks and property lines.

1. Show significant features for Project.
2. Include certification on survey, signed by surveyor, that principal metes, bounds, lines, levels, and elevations of Project are accurately shown.

1.4 CLOSEOUT PROCEDURES

A. Prerequisites to Substantial Completion: Complete following items before requesting Certification of Substantial Completion, either for entire Work or for portions of Work:

1. Submit maintenance manuals, Project record documents, digital images of construction photographs, and other similar final record data in compliance with this Section.
2. Complete facility startup, testing, adjusting, balancing of systems and equipment, demonstrations, and instructions to Owner's operating and maintenance personnel as specified in compliance with this Section.
3. Conduct inspection to establish basis for request that Work is substantially complete. Create comprehensive list (initial punch list) indicating items to be completed or corrected, value of incomplete or nonconforming Work, reason for being incomplete, and date of anticipated completion for each item. Include copy of list with request for Certificate of Substantial Completion.
4. Obtain and submit releases enabling Owner's full, unrestricted use of Project and access to services and utilities. Include certificate of occupancy, operating certificates, and similar releases from authorities having jurisdiction and utility companies.
5. Deliver tools, spare parts, extra stocks of material, and similar physical items to Owner.

6. Make final change-over of locks eliminating construction master-key system and transmit keys directly to Owner. Advise Owner's personnel of change-over in security provisions.
7. Discontinue or change over and remove temporary facilities and services from Project Site, along with construction tools, mockups, and similar elements.
8. Perform final cleaning according to this Section.

B. Substantial Completion Inspection:

1. When Contractor considers Work to be substantially complete, submit to Engineer:

   a. Written certificate that Work, or designated portion, is substantially complete.
   b. List of items to be completed or corrected (initial punch list).

2. Within seven days after receipt of request for Substantial Completion, Engineer will make inspection to determine whether Work or designated portion is substantially complete.
3. Should Engineer determine that Work is not substantially complete:

   a. Engineer will notify Contractor with in 7 days in writing, stating reasons for its opinion.
   b. Contractor shall remedy deficiencies in Work and send second written request for Substantial Completion to Engineer.
   c. Engineer will reinspect Work.
   d. Redo and Inspection of Deficient Work: Repeated until Work passes Engineer’s inspection.

4. When Owner finds that Work is substantially complete, Owner will:

   a. Prepare Certificate of Substantial Completion on EJCDC C-625 - Certificate of Substantial Completion, accompanied by Contractor's list of items to be completed or corrected as verified and amended by Engineer and Owner (final punch list).
   b. Submit Certificate to Owner and Contractor for their written acceptance of responsibilities assigned to them in Certificate.

5. After Work is substantially complete, Contractor shall:

   a. Allow Owner occupancy of Project under provisions stated in Certificate of Substantial Completion.
   b. Complete Work listed for completion or correction within time period stipulated.

6. Owner will occupy Site as specified in Section 011000 - Summary.

C. Prerequisites for Final Completion: Complete following items before requesting final acceptance and final payment.

1. When Contractor considers Work to be complete, submit written certification that:

   a. Contract Documents have been reviewed.
   b. Work has been examined for compliance with Contract Documents.
   c. Work has been completed according to Contract Documents.
   d. Work is completed and ready for final inspection.

2. Submittals: Submit following:

    a. Final punch list indicating all items have been completed or corrected.
    b. Final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.
    c. Specified warranties, workmanship/maintenance bonds, maintenance agreements, and other similar documents.
    d. Accounting statement for final changes to Contract Sum.
    e. Contractor's affidavit of payment of debts and claims on Contractors Affidavit of Payment of Debts and Claims.
    f. Contractor affidavit of release of liens on Final Waiver of Lien.
    g. Consent of surety to final payment on Consent of Surety to Final Payment Form.

3. Perform final cleaning for Contractor-soiled areas according to this Section.

D. Final Completion Inspection:

1. Within seven days after receipt of request for final inspection, Owner will make inspection to determine whether Work or designated portion is complete.
2. Should Owner consider Work to be incomplete or defective:

    a. Owner will promptly notify Contractor in writing, listing incomplete or defective Work.
    b. Contractor shall remedy stated deficiencies and send second written request to Owner that Work is complete.
    c. Owner will reinspect Work.
    d. Redo and Inspection of Deficient Work: Repeated until Work passes Owner’s inspection.
    e. Contractor may be charged for Engineer’s time to reinspect work.

1.5 SEQUENCING

A. Section 011216 - Work Sequence contains requirements for sequencing.

B. Sequence Work to complete start up, except for functional testing and Owner's personnel training, before Substantial Completion.

C. For equipment or systems requiring seasonal operation, perform start up for other season within six months of Substantial Completion.

D. For equipment or systems where start up is delayed by unforeseen conditions, perform start up as specified for seasonal operation equipment.

1.6 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Engineer and Owner seven days prior to startup of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify that tests, meter readings, and electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of manufacturer's representative or Contractors' personnel according to manufacturer's instructions.

G. When specified in individual Specification Sections, require manufacturer to provide authorized representative who will be present at Site to inspect, check, and approve equipment or system installation prior to startup and will supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 013300 - Submittal Procedures stating that equipment or system has been properly installed and is functioning correctly.

I. Comply also with Section 019100 – Commissioning.

1.7 DEMONSTRATION AND INSTRUCTION

A. Coordinate manufacturer representatives for startup and commissioning of all products with Owner's personnel two weeks prior to date of Substantial Completion.

B. Develop training schedule listing institution of trainer, trainer name, training topic, estimated time required, and include a copy of handouts.

C. Submit training schedule to Owner 14 days prior to training for approval.

D. Demonstrate Project equipment and instruction in classroom environment located at Owner’s Facility and instructed by authorized representative who is knowledgeable about the Project.

E. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

F. Use operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

G. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

H. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

I. Allot the required instruction time for each item of equipment and system as specified in individual Specification Sections.

1.8 TESTING, ADJUSTING, AND BALANCING

A. Contractor will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing for HVAC.

B. Reports will be submitted by independent firm to Engineer indicating observations, test results, and compliance or noncompliance with requirements of Contract Documents.

1.9 PROJECT RECORD DOCUMENTS

A. Maintain on Site one set of the following record documents; record actual revisions to the Work:

1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other modifications to the Contract.
5. Reviewed Shop Drawings, product data, and Samples.
6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record, at each product Section, description of actual products installed, including the following:

1. Manufacturer's name and product model and number.
2. Product substitutions or alternates used.
3. Changes made by Addenda, bulletin, Change Order, and modifications.
4. Equipment tag numbers.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction as follows:

1. Include Contract modifications such as Addenda, supplementary instructions, change directives, field orders, minor changes in the Work, and change orders.
2. Include locations of concealed elements of the Work.
3. Identify depth of buried utility lines and provide dimensions showing distances from permanent facility components that are parallel to utilities.
4. Dimension ends, corners, and junctions of buried utilities and thrust blocks to permanent facility components using triangulation.
5. Identify and locate existing buried or concealed items encountered during Project.
6. Measured depths of foundations in relation to finish main floor datum.
7. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
8. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.

9. Field changes of dimension and detail.
10. Details not on original Drawings.

G. Submit PDF electronic files of marked-up documents to Engineer before Substantial Completion.

1.10 OPERATION AND MAINTENANCE DATA

A. DRAFT Operations and Maintenance Manual:
1. Submit DRAFT Operation and Maintenance Manual in PDF composite electronic indexed file to Owner and Engineer for approval.
2. Allow 14 days for Owner and Engineer to review each DRAFT submission.

B. FINAL Operations and Maintenance Manual:
1. Submit in PDF composite electronic indexed file.
2. Submit data bound in 8-1/2 x 11-inch text pages, three D-side ring binders with durable plastic covers. Diagrams or figures included on 11 x 17-inch pages shall be folded once to fit within binder.
3. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project, and subject matter of binder when multiple binders are required.
4. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
5. Drawings:
   a. Folded and place in binder pouch, or;
   b. Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
6. Contents: Prepare table of contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
   a. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors, and major equipment suppliers.
   b. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Include the following:
      1) Significant design criteria.
      2) List of equipment.
      3) Parts list for each component and spare part recommendations.
      4) Operating instructions including equipment function, normal operating characteristics, equipment limitations and troubleshooting guidelines.
      5) Maintenance instructions for equipment and systems.
      6) Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
      7) Safety precautions to be taken when operating and maintaining or working near equipment.
      8) Equipment Record Sheets including Manufacturer's field service report and testing data.
   c. Part 3: Project documents and certificates, including the following:
      1) Shop Drawings and product data.
      2) Air and water balance reports.

3) Certificates.
4) Originals or Photocopies of warranties and bonds.

1.11 MANUAL FOR MATERIALS AND FINISHES

A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Engineer will review draft and return one copy with comments.

B. For equipment or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit in PDF composite electronic indexed file of completed volumes before Substantial Completion. Copy of completed volumes, with Engineer comments, will be returned after Substantial Completion. Revise content of document sets as required prior to final submission.

D. Submit in PDF composite electronic indexed file of final volumes within 10 days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom-manufactured products.

F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: As specified in individual product Specification Sections.

I. Include listing in table of contents for design data, with tabbed fly sheet and space for insertion of data.

1.12 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit in PDF a composite electronic indexed file of preliminary draft or proposed formats and outlines of contents less than 30 days after shop drawing approval. Engineer will review draft and return with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit in PDF composite electronic indexed file of completed volumes before Substantial Completion. Include start up information. Copy of completed volumes, with Engineer comments, will be returned after Substantial Completion. Revise content of document sets as required prior to final submission.

D. Submit 3 sets of revised final volumes within 10 days after final inspection.

E. Submit in PDF composite electronic indexed file of final volumes within 10 days after final inspection.

F. Equipment and Systems: Include description of each unit or system and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

G. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

H. Include color-coded wiring diagrams as installed.

I. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.

J. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

K. Include servicing and lubrication schedule and list of lubricants required.

L. Include manufacturer's printed operation and maintenance instructions.

M. Include sequence of operation by controls manufacturer.

N. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

O. Include control diagrams by controls manufacturer as installed.

P. Include Contractor's coordination drawings indicating installed color-coded piping diagrams.

Q. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

R. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

S. Include test and balancing reports as specified in Section 014000 - Quality Requirements.

T. Additional Requirements: As specified in individual product Specification Sections.

U. Include listing in table of contents for design data with tabbed dividers and space for insertion of data.

1.13 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.

B. Deliver to Project Site and place in location as directed by Owner; obtain receipt prior to final payment.

1.14 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible Subcontractors, suppliers, and manufacturers within ten days after completion of applicable item of Work.

B. Warranties and bonds shall be effective on the date of final project acceptance as indicated on the Notice of Acceptability.

C. Execute and assemble transferable warranty documents and bonds from Subcontractors, suppliers, and manufacturers.

D. Verify documents are in proper form, contain full information, and are notarized.

E. Co-execute submittals when required.

F. Include table of contents and assemble in three D side ring binder with durable plastic cover.

G. Submit prior to final Application for Payment.

H. Time of Submittals:

1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
2. Make other submittals within ten days after date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

1.15 MAINTENANCE SERVICE

A. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

B. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.

C. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of Owner.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing Site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

C. Examine and verify specific conditions described in individual Specification Sections.

D. Verify that utility services are available with correct characteristics and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance according to manufacturer's instructions.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer-required or -recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

3.3 EXECUTION

A. Comply with manufacturer's installation instructions, performing each step in sequence. Maintain one set of manufacturer's installation instructions at Project Site during installation and until completion of construction.

B. When manufacturer's installation instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Verify that field measurements are as indicated on approved Shop Drawings or as instructed by manufacturer.

D. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1. Secure Work true to line and level and within specified tolerances, or if not specified, industry-recognized tolerances.
2. Physically separate products in place and provide electrical insulation or protective coatings to prevent galvanic action or corrosion between dissimilar metals.
3. Exposed Joints: Provide uniform joint width and arrange to obtain best visual effect. Refer questionable visual effect choices to Engineer for final decision.

E. Allow for expansion of materials and building movement.

F. Climatic Conditions and Project Status: Install each unit of Work under conditions to ensure best possible results in coordination with entire Project.

1. Isolate each unit of Work from incompatible Work as necessary to prevent deterioration.
2. Coordinate enclosure of Work with required inspections and tests to minimize necessity of uncovering Work for those purposes.

G. Mounting Heights: Where not indicated, mount individual units of Work at industry-recognized standard mounting heights for particular application indicated.

1. Refer questionable mounting height choices to Engineer for final decision.
2. Elements Identified as Handicap Accessible: Comply with applicable codes and regulations.

H. Adjust operating products and equipment to ensure smooth and unhindered operation.

I. Clean and perform maintenance on installed Work as frequently as necessary through remainder of construction period. Lubricate operable components as recommended by manufacturer.

3.4 CUTTING AND PATCHING

A. Employ skilled and experienced Installers to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting the following:

1. Structural integrity of element.
2. Integrity of weather-exposed or moisture-resistant elements.
3. Efficiency, maintenance, or safety of element.
4. Visual qualities of sight-exposed elements.
5. Work of Owner or separate Contractor.

C. Execute cutting, fitting, and patching, including excavation and fill to complete Work and to:

1. Fit the several parts together, to integrate with other Work.
2. Uncover Work to install or correct ill-timed Work.
3. Remove and replace defective and nonconforming Work.
4. Remove samples of installed Work for testing.
5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods to avoid damage to other Work and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products according to requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetrations of fire-rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material to full thickness of penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

K. Identify the hazardous substances or conditions exposed during the Work to Engineer for decision or remedy.

3.5 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate Work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Use durable sheet materials to protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic from landscaped areas.

3.6 FINAL CLEANING

A. Execute final cleaning prior to final Project assessment.

1. Employ experienced personnel or professional cleaning firm.

B. Clean interior and exterior glass and surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces; and vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to sanitary condition with appropriate cleaning materials.

D. Clean filters of operating equipment.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean Site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from Site.

END OF SECTION 017000

SECTION 01 71 23 - CONSTRUCTION SURVEYING

(CONTRACTOR FURNISHED CONSTRUCTION SURVEYING AND STAKING)

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contractor's responsibilities for surveying and Field Engineering necessary to construct the work. The Work shall Consist of staking lines and grades for earthwork, pipes, manholes, clean outs, valves, hydrants and other appurtenances. It shall also include remeasurement or reestablishment work, as required, if the Engineer determines that any portion of the work has not been completed in conformity with line, grade and dimensions shown on the plans or as directed by the Engineer.

B. All surveying and construction staking shall be under the direction and supervision of a qualified surveyor knowledgeable of construction surveying and volumetric calculation for the work described in this specification. The surveyor shall be licensed in the state of Washington. The Contractor shall submit evidence and qualifications of the surveyor(s) competency to the Engineer for review and comment at the preconstruction conference and prior to commencing with any surveying or staking activities at the site.

1.2 RELATED SECTIONS

A. General Conditions, Section 4.03.

PART 2 MATERIALS

2.1 OWNER

A. The Owner shall provide horizontal and vertical control points from which the Contractor’s Surveyor shall establish all additional control points and related staking needed to construct the facilities identified in these specifications and drawings.

2.2 CONTRACTOR'S SURVEYOR

A. The Surveyor shall provide all field notebooks and forms to be used for construction staking. The field notebooks and forms shall become the property of the Engineer upon completion of the work. The field notebooks used for the work shall be made available to the Engineer upon request at any time during the execution of the work. Such request may be made verbally or in a written form and shall be complied with immediately by the Contractor or his Surveyor.

B. The Surveyor shall furnish all stakes, surveying equipment, and other devices necessary for establishing, setting, marking and maintaining the required control and reference points to construct the work. All lumber shall have the following minimum dimensions in inches:

Hubs	1"x2"x8"
Stakes	1"x2"x16"
Lath	½"x2"x48"

1. Plastic marking flagging and paint shall be highly visible type supplied in the colors of red, white, blue, yellow and orange.

PART 3 WORKMANSHIP

3.1 CONSTRUCTION STAKING

A. Construction staking by the Surveyor shall include the horizontal and vertical control points to set benchmarks, water pipes, sewer pipes, valves, manholes, clean outs and any other control or elevations deemed necessary for proper control to construct the work. The positional tolerances for staking shall conform to the following guidelines:

Description	Vertical Tolerance	Horizontal Tolerance
Excavation	0.02+/- foot	0.5 +/- foot
Embankment	0.02+/- foot	0.5 +/- foot
Slope Stakes	0.1+/- foot	0.1+/- foot
Paving Surfaces	0.02+/- foot	N/A
Piping and Other Structures	0.01+/- foot	0.1+/- foot

B. Field notes shall be kept in a standard format on forms supplied by the Surveyor and acceptable to the Engineer. Lettering shall be at least 0.15 inch and legible from a distance of 1.5-feet. Errors shall be deleted by lining the errors out and erasures in the field notes will not be an acceptable practice of correcting errors. After completion and acceptance of the work, the Surveyor shall submit to the Engineer all survey and design data. Crew names, positions, and dates shall be recorded in the field books on the beginning sheet of each day's work. All notes, including the originals, shall be signed and sealed by the licensed Surveyor and become the property of the Engineer. The Surveyor is required to complete daily diaries detailing the work completed each day, along with people on the project. Copies of all field notes and diaries shall be submitted to the Engineer on a weekly basis or as directed by the Engineer.

C. The Surveyor shall employ sufficient qualified personnel experienced in construction surveying to conduct the work as required. Supervision of such personnel is the responsibility of the Surveyor, and any error or omission by such personnel shall be corrected at the expense of the Contractor by his Surveyor. The Surveyor is responsible for the calculations of the grades and alignment for all staking. Any discrepancies in grade, alignment locations, and/or dimensions detected by the Surveyor shall immediately be brought to the attention of the Engineer. Major differences found between the horizontal or vertical alignment data shown on the plans and the alignment observed on the ground shall be referred to the Engineer immediately. Staking of these areas shall be deferred until these differences are reconciled by the Engineer. The Surveyor shall compare the staked centerline cut and fill depth with the design data. Differences exceeding one foot at any two or more consecutive points shall be reported to the Engineer for possible evaluation and correction.

D. The Engineer may check the accuracy of the Surveyor's construction stakes, lines, grades and layouts, but will not assume responsibility for the accuracy of the final result of the construction stakes, lines, grades and layouts. All stakes shall be legibly marked with a stake pencil that leaves a depression or a waterproof black marker. The top two inches of all slope, guard, reference, clearing and structure stakes shall be painted or marked with plastic flagging. Stakes shall be painted or marked with the following colors:

Types of Stakes	Colors
Right of Way	Yellow
Control Points	Red/White/Blue
Misc. Stakes	Red/White
Slope Stakes	White

Conduit Stakes	Orange/White
Centerline Stakes	Red
Reference Points/Easements	Orange

1. The Contractor and Surveyor shall maintain and protect all construction stakes and marks until the work is completed and accepted by the Engineer. In the event that the construction staking or control points are obliterated during the execration of the work the Surveyor shall establish or reestablish all construction stakes and controls points, as necessary.

Minimum Control Points	
PI	Point of Intersection of Tangents
PC	Point of Curvature
POC	Point on Curve
PT	Point of Tangency
POT	Point on Tangent
RP	Reference Point
BM	Benchmark
TBM	Temporary Benchmark

3.2 SURVEYING CONTROL ITEMS (MINIMUM REQUIREMENTS)

A. Vertical benchmarks established for the project by the Owner shall be checked and/or reestablished by the Surveyor. Benchmarks falling within the clearing limits of the project shall be reset in a safe location by the Surveyor. After resetting any bench marks a level circuit meeting the precision of the original survey shall be run to all benchmarks and datum elevations computed and/or checked.

B. Centerline stakes shall be set at 50-foot intervals (including all 100-foot stations), at significant breaks in the ground, at conduit locations, at PC's and PT's, points of radiuses, and at approaches. Stakes shall be marked with appropriate identification or location on the side of the stake facing the initial station on the project.

C. Cross-section measurements, original and remeasure, shall be taken at locations necessary for computing pay items that require volume calculations. This data shall be computed, checked, and plotted into cross-section format using both the original and remeasured section data by the Surveyor and signed and sealed by the Surveyor. The purpose of these cross-sections is for measurement and payment of quantities. The Surveyor shall compute the earthwork cut and fill volume quantities and submit these calculations to the Engineer to support the respective progress payment request by the Contractor.

D. Subgrade stakes shall be established at cut and fill catch points on both sides of centerline at every staked point in the centerline system. The cut or fill to subgrade, shoulder, back-of sidewalk or curb along with distance to centerline and offset distance to centerline shall be marked on the stakes and recorded in the field notebooks. Each centerline station stake shall have at least one reference point on the same cross-section line as the slope stake. The stake at the reference point shall refer to the same point as the slope stake and shall be marked with sufficient information to enable reestablishment of the slope stake.

E. Finishing stakes shall be set when subgrade or base course is within 0.2 foot of the final grade. The stakes shall be set to the nearest 0.02 foot of the measured grade line. Finishing stakes shall be required for all surfaces requiring finish grading including (but not limited to) subgrade, base courses, approaches and pavement surfaces, as required. Finishing stakes shall be hubs placed transversely on the roadway template line at 12-foot intervals, in addition to

centerline and at each shoulder. The finishing stakes shall be marked with guard stakes or with plastic blue top flags or chasers.

F. All water and sewer lines shall be staked on 15-foot offset line at 100-foot intervals and at manholes, valves, fittings and other appurtenances. Guard stakes shall also be set and marked with the following:

1. Diameter, length and type of conduit.
2. The vertical and horizontal distance from the hub/nail to the invert of the conduit.
3. Flow line grade of the conduit.

The hub shall be referenced to both horizontal and vertical control well beyond the anticipated construction limits and cut of the flow line, as necessary.

G. Curb and gutter shall be staked with an offset hub and tack line for both line and grade. Stakes shall be placed at a maximum of 50-foot intervals for tangent lines and 25-foot intervals for curves. A guard stake shall be placed at each hub and shall be marked with both the offset distance and vertical cut or fill to the top back of curb.

H. Major structures (bridges and retaining walls) shall be staked by setting hubs and tacks with guard stakes on each side of the structural components, or as requested by the Engineer. Minor structures (headwalls, drop inlets and manholes) shall be staked by setting a hub with guard stake on each side of the culvert on-line with the face or center of the structure.

I. Staking will be required for location and installation of all illumination and traffic control facilities including, but not limited to poles, conduits, boxes, traffic signs, etc.

3.3 DRAWINGS OF RECORD

A. The Contractor will be furnished one complete set of prints of all of the Contract Drawings upon which the Contractor shall maintain a neat and accurate record of all contract work. The Contractor shall promptly record the as-built quantities and dimensions of all contract work as it is performed on this set of prints. At the completion of project work, the entire set of prints plus any additional drawings necessary shall be submitted to the Engineer for review and comment. The Contractor shall correct or amplify information and assist the Engineer as may be required to complete the as-built record in a manner satisfactory to the Engineer.

B. The Contractor's record shall include for example, locations of fittings, connections, service lines and manholes. Locations are to be established by three-point ties to physical objects, which will remain undisturbed, where feasible. Materials and fittings used; relative placement of fittings, with dimensions; depths of conduit and location of lines or other important items which enter into structures or pass under foundation walls or paved surfaces are to be clearly defined.

END OF SECTION 017123

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Construction waste management plan.

1.2 PLAN REQUIREMENTS

A. Develop and implement construction waste management plan as approved by Engineer.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures contains requirements for submittals.

B. Construction Waste Management Plan: Submit construction waste management plan describing methods and procedures for implementation and monitoring compliance including the following:

1. Transportation company hauling construction waste to waste processing facilities.
2. Recycling or reuse processing facilities and waste type each facility will accept.
3. Construction waste materials anticipated for recycling or reuse.

C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

D. Asbestos Cement Pipe (ACP) Chain of Custody: Contractor submit all chain-of-custody documentation and landfill receipts to Owner and Engineer prior to payment when applicable.

1.4 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Implement construction waste management plan at start of construction.

B. Review construction waste management plan at preconstruction meeting and progress meetings specified in Section 013000 - Administrative Requirements.

C. Distribute approved construction waste management plan to Subcontractors and others affected by plan requirements.

D. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.

E. Purchase products to prevent waste by:

1. Ensuring correct quantity of each material is delivered to Site.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION

3.1 CONSTRUCTION WASTE COLLECTION

A. Collect construction waste materials in marked bins or containers and arrange for transportation to disposal facilities.

3.2 CONSTRUCTION WASTE DISPOSAL

A. Deliver construction waste to waste processing facilities. Obtain receipt for deliveries.

B. Dispose of construction waste not capable of being recycled or reused by delivery to landfill, incinerator, or other legal disposal facility. Obtain receipt for deliveries.

END OF SECTION 017419

022623 - ASBESTOS ASSESSMENT

Asbestos Survey
Chelan CC-1 Lift Station Rehab Demolition Project
117 E. Wapato Avenue
Chelan, Washington 98816



Project No.: MC-25-491

By
McCrink Consulting, LLC
660 E. Sand Wedge Drive
Post Falls, Idaho 83854
Phone: (509) 991-7357

October 23, 2025

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- 5.1 Asbestos Containing Materials
- 5.2 Non-Asbestos Materials

APPENDIX

- Appendix A: Inspector Certification
- Appendix B: Bulk Asbestos Analytical Results
- Appendix C Laboratory Certification

1.0 Executive Summary

McCrink Consulting, LLC was retained by City of Chelan, the property owner, to conduct an asbestos survey for the Chelan CC-1 Lift Station Rehab project located at 117 E. Wapato Avenue, in Chelan, Washington. The survey was conducted on October 2nd, 2025.

Project Area General Building Observations

The survey included the Chelan CC-1 Lift Station building located at 117 E. Wapato Avenue, Chelan, Washington. The building was developed in two phases. The original north section of the building is poured-in-place concrete with concrete walls and ceiling. The interior ceiling is finished with cementitious stucco on steel mesh. The walls are untextured gypsum board. The floor is concrete and finished with rubber cove base. A cast-in-place concrete dry pit is located below the floor of the structure. The south section of the building is a CMU block structure with no basement and contains an emergency generator. The building interior has untextured gypsum board walls and ceiling. The floor is concrete and finished with rubber cove base. A CMU wall divides the two building spaces. The entire building has a wood framed, peaked roof system with corrugated metal roof panels.

Asbestos Containing Materials

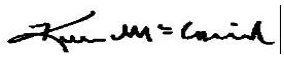
The materials that were sampled and analyzed and found to contain asbestos consist of the following.

Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue- Asbestos Materials

None of the materials sampled and analyzed were found to contain asbestos.

NOTE; There is a potential for historically-applied roofing or roof sealer on the original exterior concrete ceiling of the north building section. This area is not currently accessible for inspection due to the existing roofing system. This area should be destructively exposed and inspected for these potential materials prior to building demolition.

Reference the Asbestos Findings section and the analytical appendix of this report for specific sample information.



Signed,
Kevin McCrink
AHERA/EPA Accredited Inspector #ON-4644-9601-032325. Expires March 23, 2026
AHERA/EPA Accredited Project Designer #ON-184435-9601-072925. Expires July 29, 2026
OSHA Hazardous Waste Operations & Emergency Response Supervisor

2.0 Introduction

2.1 Purpose

The purpose of the asbestos survey was to provide information on the 117 E. Wapato Avenue, Chelan CC-1 Lift Station Rehab project for asbestos containing materials.

2.2 Scope of Work

The scope of work consisted of conducting a visual inspection and sampling survey in accordance with OSHA 29 CFR 1926.1101 and NESHAPS 40 CFR part 61 guidelines to determine the presence of suspected asbestos containing building materials (ACBM) which were exposed and/or accessible.

The bulk samples collected from the work area were analyzed at an accredited laboratory to determine the presence and concentrations of asbestos.

2.3 Authorization

Authorization to perform this survey was given the City of Chelan, the property owner, on September 25, 2025.

2.4 Warranty

The field and laboratory results reported herein are considered sufficient in detail and scope to determine the presence of expose and/or accessible suspect asbestos containing building materials in the building at the time of the inspection. McCrink Consulting, LLC warrants that the findings contained herein have been prepared in the general accordance with accepted professional practices at the time of its preparation as applied by similar professionals in the industry. Changes in the state of the art or in applicable regulations cannot be anticipated and have not been addressed in this report.

The survey and analytical methods have been used to provide the client with information regarding the presence of accessible and/or exposed suspect asbestos containing building materials existing in the building at the time of the inspection. There is a distinct possibility that conditions may exist which were not apparent during the site visit. This inspection covered only those areas that were exposed and/or accessible to the inspector. The investigation is also limited to the information available from the client at the time of the investigation. No other warranties are implied or expressed.

3.0 Methodology

3.1 Inspection Procedures

On October 2nd, 2025, Kevin McCrink, AHERA accredited inspector #ON-4644-9601-032325 conducted the asbestos survey. The initial inspection consisted of the inspector walking through the building in order to determine the general building lay out, draw a site sketch and to determine the presence of exposed and/or reasonably accessible suspect asbestos containing materials. The suspect materials were then grouped into homogenous material groups that were collected during the sampling phase.

3.2 Sampling Procedures

Following the inspection phase, the materials that were identified and grouped into homogenous suspect asbestos materials were then sampled. The sampling was limited to those materials which

were exposed and/or accessible and which did not require extensive destructive access in order to sample.

The sampling protocol followed was consistent with the guidelines set forth in OSHA 29 CFR 1926.1101 and NESHAPS 40 part 61. Efforts were made to select random sampling locations, but preference was given to damaged or disturbed areas in order to minimize the damage to the building finished surfaces. The sampling and inspection were conducted in the least disruptive manor as possible to the suspect building materials.

A copy of the Inspector's accreditation can be found in Appendix A.

4.0 Laboratory Methodology

4.1 Method of Analysis

The analysis of the bulk samples for asbestos was performed by EPA method 600/M4-82-020. The bulk samples were prepared for visual examination and identification by polarizing light microscopy. Following the preparation of the material on a glass slide the samples were analyzed for asbestos forms of chrysotile, crocidolite, anthophyllite, actinolite/tremolite, amosite and non-asbestos components that totaled 100 % of the sample volume. Asbestos and non-asbestos elements of each sample were identified utilizing, the unique optical properties associated with them. The identification consisted of identifying specific optical and physical characteristics that included refractive indices, color, pleochroism, birefringence, extinction angles, and sign of elongation and morphology. The volume percentage of each component in the sample was determined by visually estimating the percentage.

4.2 Laboratory Quality Assurance

The asbestos bulk samples collected for the building in this project were sent to EMC Laboratories, Inc. located in Phoenix, Arizona for analysis. EMC Laboratories, Inc. is a NVLAP accredited analytical laboratory.

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5.0 Findings

5.1 Asbestos Containing Materials

OSHA/EPA defines a material to be an asbestos containing material (ACM) in the material contains greater than one percent (>1%) asbestos. Multiple samples are collected and if one sample out of the homogenous sampling group is found to contain asbestos then the material is determined to be an asbestos containing material.

Specific materials sampled from the **Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue, Project** that were **found to contain asbestos** and can be found in the following table.

Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue- Asbestos Materials

None of the materials sampled and analyzed were found to contain asbestos.

NOTE; There is a potential for historically-applied roofing or roof sealer on the original exterior concrete ceiling of the north building section. This area is not currently accessible for inspection due to the existing roofing system. This area should be destructively exposed and inspected for these potential materials prior to building demolition.

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5.2 Non-Asbestos Containing Materials

Specific materials sampled from the **Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue, Chelan, Washington Project** that were found **not to contain asbestos** and can be found in the following table.

Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue, – Non-Asbestos Materials

Homogenous Material Location	Material Description	Sample Number	Friable Yes/No	Asbestos	Type	Condition
North building section interior ceiling	Gray cement stucco	1031-1, 1031-2, 1031-3	No	No Cement stucco: N.D.	Surfacing	Fair
North building section interior walls	White joint compound/ tape/ light brown gypsum board	1031-4, 1031-5, 1031-6	No	No Joint compound: N.D. Tape: N.D. Gypsum board: N.D.	Miscellaneous	Poor
North building section interior walls	Black cove base/ beige mastic/ joint compound	1031-7, 1031-8	No	No Cove base: N.D. Mastic: N.D. Joint compound: N.D.	Miscellaneous	Fair
North building section wall cavities	Light blue foam wall insulation	1031-9, 1031-10	No	No Foam wall insulation: N.D.	Miscellaneous	Poor
North building section subfloor dry pit walls	Beige interior dry pit paint	1031-11, 1031-12, 1031-13	No	No Interior dry pit paint: N.D.	Miscellaneous	Poor
South building section interior ceiling and walls	White joint compound/ light brown gypsum board	1031-14, 1031-15, 1031-16	No	No Joint compound: N.D. Gypsum board: N.D.	Miscellaneous	Fair
South building section interior walls	Black cove base/ beige mastic/ joint compound	1031-17, 1031-18	No	No Cove base: N.D. Mastic: N.D. Joint compound: N.D.	Miscellaneous	Fair
South building section interior floor seams	Brown expansion joint	1031-19, 1031-20	No	No Expansion joint: N.D.	Miscellaneous	Fair
Lift station building exterior east wall	Brown sealer (east door frame)	1031-21, 1031-21	No	No Sealer: N.D.	Miscellaneous	Fair
Lift station building exterior east wall	Brown sealer (east vent frame)	1031-23, 1031-24	No	No Sealer: N.D.	Miscellaneous	Fair
Lift station building exterior west wall	Clear sealer (west round vent frame)	1031-25, 1031-26	No	No Sealer: N.D.	Miscellaneous	Fair
Lift station building exterior west wall	Brown sealer (west square vent frame)	1031-27, 1031-28	No	No Sealer: N.D.	Miscellaneous	Fair
Lift station building, south section exterior walls	Gray CMU block	1031-29, 1031-30	No	No CMU block: N.D.	Miscellaneous	Poor

Lift station building, south section exterior walls	Gray mortar	1031-31, 1031-32	No	No Mortar: N.D. Paint; N.D.	Miscellaneous	Poor
Lift station building, north section exterior walls, ceiling and building foundation	Gray concrete	1031-33, 1031-34	No	No Concrete: N.D.	Miscellaneous	Fair

N.D. = None Detected,
End of section.

Appendix A
Inspector's Certification

THE ASBESTOS INSTITUTE

Certifies that

Kevin Mccrink

has attended and received instruction in the EPA approved course

AHERA Building Inspector Refresher

on

March 23, 2025

and successfully completed and passed the competency exam.

Certificate:
ON-188748-9601-032325

Date of Examination:
23-Mar-2025
Date of Expiration:
23-Mar-2026

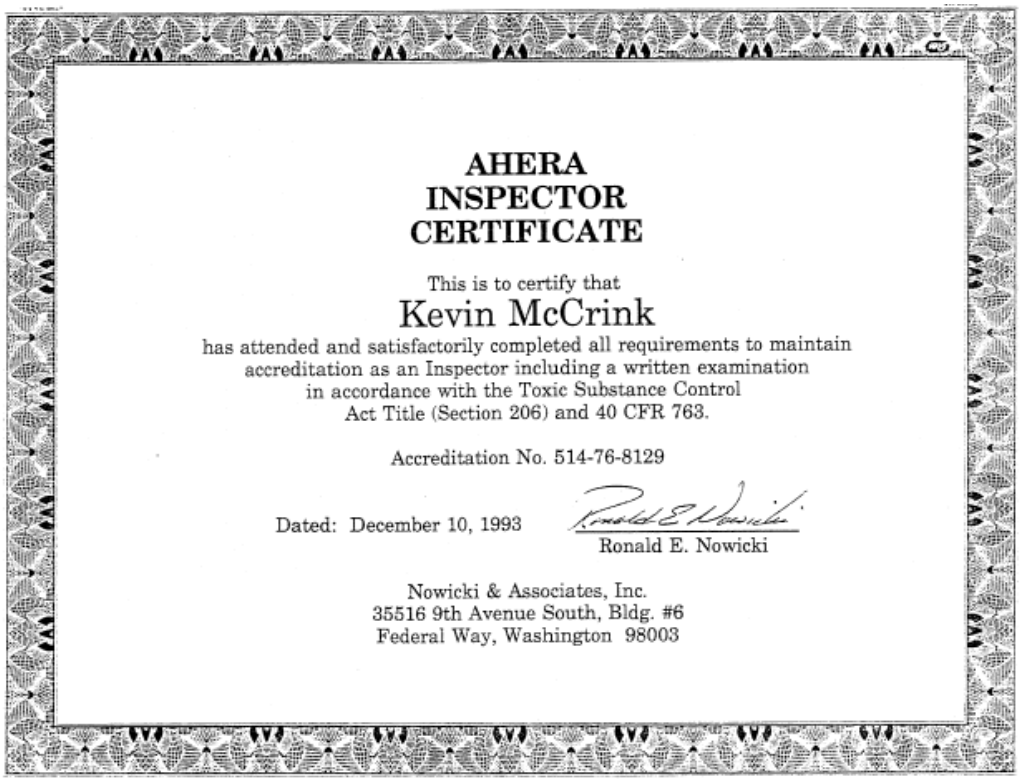
A. Zwanenburg
Director

Approved Instructor

THE ASBESTOS INSTITUTE
20033 N. 19th Ave, Building 6, Phoenix, AZ 85027
602-864-6564 – www.theasbestosinstitute.com

FL Course # CRS228

The person receiving this certificate has completed the requisite training for asbestos accreditation under TSCA Title II.



AHERA
INSPECTOR
CERTIFICATE

This is to certify that
Kevin McCrink
has attended and satisfactorily completed all requirements to maintain accreditation as an Inspector including a written examination in accordance with the Toxic Substance Control Act Title (Section 206) and 40 CFR 763.

Accreditation No. 514-76-8129

Dated: December 10, 1993

Ronald E. Nowicki

Nowicki & Associates, Inc.
35516 9th Avenue South, Bldg. #6
Federal Way, Washington 98003

THE ASBESTOS INSTITUTE

Certifies that

Kevin Mccrink

has attended and received instruction in the EPA approved course

AHERA Project Designer Refresher

on

July 29, 2025

and successfully completed and passed the competency exam.

Certificate:
ON-184435-9601-072925

Date of Examination:
29-Jul-2025
Date of Expiration:
29-Jul-2026

A. Zwanenburg
Director

Approved Instructor

THE ASBESTOS INSTITUTE
20033 N. 19th Ave, Building 6, Phoenix, AZ 85027
602-864-6564 – www.theasbestosinstitute.com

FL Course # CRS257

The person receiving this certificate has completed the requisite training for asbestos accreditation under TSCA Title II.



Appendix B
Asbestos Analytical Results

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0339638

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP# 101926-0

Client:	McCRINK CONSULTING, LLC	Job# / P.O. #:	
Address:	660 E. SAND WEDGE DRIVE	Date Received:	10/08/2025
	POST FALLS,, ID 83854	Date Analyzed:	10/13/2025
Collected:	10/02/2025	Date Reported:	10/13/2025
Project Name:	CHELAN CC-1 LIFT STATION REHAB, 117 E. WAPATO AVENUE, CHELAN, WASHINGTON 98816	Submitted By:	KEVIN McCRINK
		Collected By:	
Address:			
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-001 1031-1		Cement Stucco, Lt. Gray/ Yellow/ White	No	None Detected	Gypsum Quartz Non-Fibrous Binder/Filler 100%
0339638-002 1031-2		Cement Stucco, Lt. Gray/ White	No	None Detected	Hair <1% Quartz Gypsum Non-Fibrous Binder/Filler 99%
0339638-003 1031-3		Cement Stucco, Lt. Gray/ White	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%
0339638-004 1031-4		LAYER 1 Joint Compound, White/ Off White Note: Very small amount of compound	No	None Detected	Cellulose Fiber <1% Carbonates Perlite Non-Fibrous Binder/Filler 99%
		LAYER 2 Gypsum Board, Lt. Brown/ Brown	No	None Detected	Cellulose Fiber 10% Gypsum Carbonates Non-Fibrous Binder/Filler 90%

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		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0339638-005 1031-5		LAYER 1 Joint Compound, White/ Off White Note: Very small amount of compound	No	None Detected	Cellulose Fiber Carbonates Perlite Non-Fibrous Binder/Filler	<1% 99%
		LAYER 2 Gypsum Board, Lt. Brown/ Brown	No	None Detected	Cellulose Fiber Gypsum Carbonates Non-Fibrous Binder/Filler	10% 90%
0339638-006 1031-6		LAYER 1 Joint Compound, White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler	 100%
		LAYER 2 Gypsum Board, Lt. Brown/ Brown	No	None Detected	Cellulose Fiber Gypsum Carbonates Non-Fibrous Binder/Filler	10% 90%
		LAYER 3 Tape, Off White	No	None Detected	Cellulose Fiber Carbonates	95% 5%

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Address:			
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-007 1031-7		LAYER 1 Cove Base, Black	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Beige	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 3 Joint Compound, White	No	None Detected	Gypsum Carbonates Quartz Non-Fibrous Binder/Filler 100%
0339638-008 1031-8		LAYER 1 Cove Base, Black	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Beige	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 3 Joint Compound, White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler 100%
0339638-009 1031-9		Foam Wall Insulation, Lt. Blue	No	None Detected	Foam 100%

EMC LABS, INC.

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Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents	
0339638-010 1031-10		Foam Wall Insulation, Lt. Blue	No	None Detected	Foam	100%
0339638-011 1031-11		Interior Tank Paint, Lt. Gray	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler	100%
0339638-012 1031-12		Interior Tank Paint, Lt. Gray	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler	100%
0339638-013 1031-13		Interior Tank Paint, Lt. Gray	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler	100%
0339638-014 1031-14		LAYER 1 Joint Compound, White/ Off White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler	100%
		LAYER 2 Gypsum Board, Lt. Brown/ Brown	No	None Detected	Cellulose Fiber Gypsum Carbonates Non-Fibrous Binder/Filler	10% 90%

EMC LABS, INC.

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		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-015 1031-15		LAYER 1 Joint Compound, White/ Off White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler 100%
		LAYER 2 Gypsum Board, Lt. Brown/ Brown	No	None Detected	Cellulose Fiber 10% Gypsum Carbonates Non-Fibrous Binder/Filler 90%
0339638-016 1031-16		LAYER 1 Joint Compound, White/ Off White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler 100%
		LAYER 2 Gypsum Board, Lt. Brown/ Brown	No	None Detected	Cellulose Fiber 10% Gypsum Carbonates Non-Fibrous Binder/Filler 90%
0339638-017 1031-17		LAYER 1 Cove Base, Black	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Beige	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 3 Joint Compound, White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler 100%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0339638

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP# 101926-0

Client:	McCRINK CONSULTING, LLC	Job# / P.O. #:	
Address:	660 E. SAND WEDGE DRIVE	Date Received:	10/08/2025
	POST FALLS,, ID 83854	Date Analyzed:	10/13/2025
Collected:	10/02/2025	Date Reported:	10/13/2025
Project Name:	CHELAN CC-1 LIFT STATION REHAB, 117 E. WAPATO AVENUE, CHELAN, WASHINGTON 98816	Submitted By:	KEVIN McCRINK
		Collected By:	
Address:			
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-018 1031-18		LAYER 1 Cove Base, Black	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 2 Mastic, Beige	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
		LAYER 3 Joint Compound, White	No	None Detected	Carbonates Perlite Non-Fibrous Binder/Filler 100%
0339638-019 1031-19		Expansion Joint, Brown/ Black	No	None Detected	Cellulose Fiber 40% Quartz Carbonates Non-Fibrous Binder/Filler 60%
0339638-020 1031-20		Expansion Joint, Brown/ Black	No	None Detected	Cellulose Fiber 40% Carbonates Gypsum Non-Fibrous Binder/Filler 60%
0339638-021 1031-21		Sealer, Brown/ Black	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%

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Laboratory Report
0339638

Bulk Asbestos Analysis by Polarized Light Microscopy

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Project Name:	CHELAN CC-1 LIFT STATION REHAB, 117 E. WAPATO AVENUE, CHELAN, WASHINGTON 98816	Submitted By:	KEVIN McCRINK
		Collected By:	
Address:			
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID / Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-022 1031-22		Sealer, Brown/ Black	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0339638-023 1031-23		Sealer, Brown	No	None Detected	Silicone Carbonates Non-Fibrous Binder/Filler 100%
0339638-024 1031-24		Sealer, Brown	No	None Detected	Silicone Carbonates Non-Fibrous Binder/Filler 100%
0339638-025 1031-25		Sealer, Clear	No	None Detected	Silicone Carbonates Non-Fibrous Binder/Filler 100%
0339638-026 1031-26		Sealer, Clear	No	None Detected	Silicone Carbonates Non-Fibrous Binder/Filler 100%
0339638-027 1031-27		Sealer, Brown	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%

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Laboratory Report
0339638

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP# 101926-0

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Project Name:	CHELAN CC-1 LIFT STATION REHAB, 117 E. WAPATO AVENUE, CHELAN, WASHINGTON 98816	Submitted By:	KEVIN McCRINK
		Collected By:	
Address:			
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-028 1031-28		Sealer, Brown	No	None Detected	Carbonates Quartz Non-Fibrous Binder/Filler 100%
0339638-029 1031-29		CMU Block, Gray	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%
0339638-030 1031-30		CMU Block, Gray	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%
0339638-031 1031-31		Mortar, Gray	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%
0339638-032 1031-32		Mortar, Gray	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%
0339638-033 1031-33		Concrete, Gray	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%

EMC LABS, INC.

9830 S. 51st Street, Suite B109, Phoenix, AZ 85044
Phone: 800-362-3373 or 480-940-5294 - Fax: (480) 893-1726

Laboratory Report
0339638

Bulk Asbestos Analysis by Polarized Light Microscopy

NVLAP# 101926-0

Client:	McCRINK CONSULTING, LLC	Job# / P.O. #:	
Address:	660 E. SAND WEDGE DRIVE	Date Received:	10/08/2025
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Project Name:	CHELAN CC-1 LIFT STATION REHAB, 117 E. WAPATO AVENUE, CHELAN, WASHINGTON 98816	Submitted By:	KEVIN McCRINK
		Collected By:	
Address:			
		EPA Method:	App.E to Sub.E of 40 CFR Part 763 and EPA/600/R-93/116

Lab ID Client ID	Sample Location	Layer Name / Sample Description	Asbestos Detected	Asbestos Type (%)	Non-Asbestos Constituents
0339638-034 1031-34		Concrete, Gray	No	None Detected	Quartz Gypsum Non-Fibrous Binder/Filler 100%

Analyst - Matt Kettler

Signatory - Lab Director - Kurt Kettler

Distinctly stratified, easily separable layers of samples are analyzed as subsamples of the whole and are reported separately for each discernible layer. All analyses are derived from calibrated visual estimate and measured in area percent unless otherwise noted. The report applies to the standards or procedures identified and to the sample(s) tested. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. This report is for the exclusive use of the addressed client and will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. The report shall not be reproduced except in full, without written approval by our laboratory. The samples not destroyed in testing are retained a maximum of sixty days. The laboratory measurement of uncertainty for the test method is approximately less than 1 by area percent. Accredited by the National Institute of Standards and Technology, Voluntary Laboratory Accreditation Program for selected test method(s) for asbestos. The Client/Customer supplies the following information for this report: The Project Name, Address, Collection Date/Time, Sample Collector, Job/PO Number, Client Sample Identification and Sample Location. The accreditation or any reports generated by this laboratory in no way constitutes or implies product certification, approval, or endorsement by the National Institute of Standards and Technology. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

CHAIN OF CUSTODY

EMC Laboratories
9830 S. 51ST St., Ste R-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 339638
TAT: 3 day
Rec'd OCT 0 8 A.M.

COMPANY NAME: McCrink Consulting, LLC
660 E. Sand Wedge Drive
Post Falls, ID 83854
CONTACT: Kevin McCrink
Phone/Fax: (509) 991-7357
Email: envriskmgm@aol.com

BILL TO: (If Different Location)

Now Accepting: VISA – MASTERCARD

Price Quoted: $___ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

1. **TURNAROUND TIME:** [4hr rush] [8hr rush] [1-Day] [2-Day] **[3-Day]** [5-Day] [6-10 Day]

****Prior confirmation of turnaround time is required
****Additional charges for rush analysis (please call marketing department for pricing details)
****Laboratory analysis may be subject to delay if credit terms are not met

2. **TYPE OF ANALYSIS:** **[Bulk-PLM]** [Air-PCM] [Lead] [Point Count] [Fungi: AOC, W-C, Bulk, Swab, Tape]
3. **DISPOSAL INSTRUCTIONS:** [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

Project Name: Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue, Chelan, Washington 98816
P.O. Number: Project Number: MC-25-501

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No
1	1031-1	10/2/25	Gray cement stucco	(Y) N
2	1031-2	10/2/25	Gray cement stucco	Y N
3	1031-3	10/2/25	Gray cement stucco	Y N
4	1031-4	10/2/25	White joint compound/ light brown gypsum board	Y N
5	1031-5	10/2/25	White joint compound/ light brown gypsum board	Y N
6	1031-6	10/2/25	White joint compound/ light brown gypsum board	Y N
7	1031-7	10/2/25	Black cove base/ beige mastic/ joint compound	Y N
8	1031-8	10/2/25	Black cove base/ beige mastic/ joint compound	Y N
9	1031-9	10/2/25	Light blue foam wall insulation	Y N
10	1031-10	10/2/25	Light blue foam wall insulation	Y N
11	1031-11	10/2/25	Beige interior tank paint	Y N
12	1031-12	10/2/25	Beige interior tank paint	Y N
13	1031-13	10/2/25	Beige interior tank paint	Y N
14	1031-14	10/2/25	White joint compound/ light brown gypsum board	Y N
15	1031-15	10/2/25	White joint compound/ light brown gypsum board	Y N

SPECIAL INSTRUCTIONS:

Sample Collector: (Print) Kevin McCrink (Signature) Kevin McCrink

Relinquished by: Kevin McCrink Date/Time: 10/7/25 Received by: Doreen Celaya Date/Time: 10/8/25

Relinquished by: Doreen Celaya Date/Time: 10/8/25 Received by: [signature] Date/Time: OCT 0 8 2025

Relinquished by: _____ Date/Time _____ Received by: _____ Date/Time: _____

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

CHAIN OF CUSTODY

EMC Laboratories
9830 S. 51ST St., Ste R-109
Phoenix, AZ 85044
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LAB#: 339638
TAT:
Rec'd:

COMPANY NAME: McCrink Consulting, LLC
660 E. Sand Wedge Drive
Post Falls, ID 83854
CONTACT: Kevin McCrink
Phone/Fax: (509) 991-7357
Email: envriskmgm@aol.com

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Now Accepting: VISA – MASTERCARD

Price Quoted: $___ / Sample $_____ / Layers

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Project Name: Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue, Chelan, Washington 98816
P.O. Number: Project Number: MC-25-501

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No
16	1031-16	10/2/25	White joint compound/ light brown gypsum board	Y N
17	1031-17	10/2/25	Black cove base/ beige mastic	Y N
18	1031-18	10/2/25	Black cove base/ beige mastic	Y N
19	1031-19	10/2/25	Brown expansion joint	Y N
20	1031-20	10/2/25	Brown expansion joint	Y N
21	1031-21	10/2/25	Brown sealer (east door frame)	Y N
22	1031-22	10/2/25	Brown sealer (east door frame)	Y N
23	1031-23	10/2/25	Brown sealer (east vent frame)	Y N
24	1031-24	10/2/25	Brown sealer (east vent frame)	Y N
25	1031-25	10/2/25	Clear sealer (west round vent frame)	Y N
26	1031-26	10/2/25	Clear sealer (west round vent frame)	Y N
27	1031-27	10/2/25	Brown sealer (west square vent frame)	Y N
28	1031-28	10/2/25	Brown sealer (west square vent frame)	Y N
29	1031-29	10/2/25	Gray CMU block	Y N
30	1031-30	10/2/25	Gray CMU block	Y N

SPECIAL INSTRUCTIONS:
Sample Collector: (Print) Kevin McCrink (Signature)
Relinquished by: Date/Time: 10/7/25 Received by: Doreen Celaya Date/Time: 10/8/25
Relinquished by: Doreen Celaya Date/Time: 10/8/25 Received by: Date/Time: OCT 08 2025
Relinquished by: Date/Time Received by: Date/Time:

** In the event of any dispute between the above parties for these services or otherwise, parties agree that jurisdiction and venue will be in Phoenix, Arizona and prevailing party will be entitled to attorney's fees and court costs.

CHAIN OF CUSTODY

EMC Laboratories
9830 S. 51ST St., Ste R-109
Phoenix, AZ 85044
(800) 362-3373 Fax (480) 893-1726

LAB#: 339638
TAT:
Rec'd:

COMPANY NAME: McCrink Consulting, LLC
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CONTACT: Kevin McCrink
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Email: envriskmgm@aol.com

BILL TO: (If Different Location)

Now Accepting: VISA – MASTERCARD

Price Quoted: $___ / Sample $_____ / Layers

COMPLETE ITEMS 1-4: (Failure to complete any items may cause a delay in processing or analyzing your samples)

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3. **DISPOSAL INSTRUCTIONS:** [Dispose of samples at EMC] / [Return samples to me at my expense]
(If you do not indicate preference, EMC will dispose of samples 60 days from analysis.)

Project Name: Chelan CC-1 Lift Station Rehab, 117 E. Wapato Avenue, Chelan, Washington 98816
P.O. Number: Project Number: MC-25-501

EMC SAMPLE #	CLIENT SAMPLE #	DATE & TIME SAMPLED	LOCATION/MATERIAL TYPE	Samples Accepted Yes / No
31	1031-31	10/2/25	Gray mortar	Y N
32	1031-32	10/2/25	Gray mortar	Y N
33	1031-33	10/2/25	Gray concrete	Y N
34	1031-34	10/2/25	Gray concrete	Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N
				Y N

SPECIAL INSTRUCTIONS:
Sample Collector: (Print) Kevin McCrink (Signature)
Relinquished by: Date/Time: 10/7/25 Received by: Doreen Celaya Date/Time: 10/8/25
Relinquished by: Doreen Celaya Date/Time: 10/8/25 Received by: Date/Time: OCT 08 2025
Relinquished by: Date/Time Received by: Date/Time:

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Appendix C
Laboratory Certification

022623 - ASBESTOS ASSESSMENT

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 101926-0

EMC Labs, Inc.

Phoenix, AZ

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique on ISO/IEC 17025).

2024-07-01 through 2025-06-30

Effective Dates

For the National Voluntary Laboratory Accreditation Program

022626.01 - DRY PIT LEAD ASSESSMENT

Dry Pit Interior Total Lead Paint Sampling

Chelan CC-1 Lift Station Rehab

117 E. Wapato Avenue
Chelan, Washington 98816



Project No.: MC-25-491

By
McCrink Consulting, LLC
660 E. Sand Wedge Drive
Post Falls, Idaho 83854
Phone: (509) 991-7357

October 27, 2025

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- 2.1 Purpose
- 2.2 Scope of services
- 2.3 Authorization
- 2.4 Warranty

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- 3.2 Sampling Procedure

4.0 LEAD PAINT FINDINGS 2

- 4.1 Total Lead Analysis of Paint Chip Sample 2

5.0 CONCLUSIONS 2

APPENDIX

- Appendix A: Lead Paint Chip Analytical Results

1.0 Project Summary

McCrink Consulting, LLC was retained by City of Chelan, the property owner, to conduct Paint Chip Total Lead sampling for the Chelan CC-1 Lift Station dry pit rehab project located at 117 E. Wapato Avenue, in Chelan, Washington. The survey was conducted on October 2nd, 2025.

2.0 Introduction

2.1 Purpose

The purpose of the limited lead paint sampling was to provide information regarding the presence of paint containing lead in accordance with the Occupational Safety and Health Administration (OSHA) Lead General Industry Standards: 29 CFR 1910.1025, OSHA's Lead in Construction 29 CFR 1926.62 and Washington Administration Code (WAC) General Occupational Health Standards: 296-62-07521: Lead.

2.2 Scope of Work

The paint chip sample was collected from the painted dry pit interior walls that may be disturbed during the dry pit rehabilitation process and to identify lead painted surfaces for worker protection and waste characterization.

The bulk paint chip sample collected was analyzed at an accredited laboratory to determine the presence and concentration of lead in the Chelan CC-1 Lift Station dry pit paint sample.

2.3 Authorization

Authorization to perform this survey was given by City of Chelan.

2.4 Warranty

The field and laboratory results reported herein are considered sufficient in detail and scope to determine the presence of exposed and/or accessible suspect lead containing painted materials at the time of the inspection. McCrink Consulting, LLC warrants that the findings contained herein have been prepared in the general accordance with accepted professional practices at the time of its preparation as applied by similar professionals in the industry. Changes in the state of the art or in applicable regulations cannot be anticipated and have not been addressed in this report.

The sampling and analytical methods have been used to provide the client with information regarding the presence of accessible and/or exposed lead-containing paint existing on the materials identified for disturbance at the time of the inspection. There is a distinct possibility that conditions may exist which were not apparent during the site visit. This inspection covered only those areas that were exposed and/or accessible to the inspector. The investigation is also limited to the information available from the client at the time of the investigation. No other warranties are implied or expressed.

3.0 Methodology

3.1 Method of Analysis-Lead

The paint chip sample collected from the dry pit interior walls was sent to EMC Labs, Inc. by proper chain-of-custody. The sample was prepared at the laboratory and analyzed by EPA method SW-846 Method 7420 utilizing flame atomic absorption to determine the total lead content.

3.2 Laboratory Quality Assurance

The total lead paint sample collected for this project was sent to EMC Labs, Inc. located in Phoenix, Arizona. EMC Labs, Inc. is accredited by the American Industrial Hygiene Association (AIHA).

4.0 Lead Paint Findings

The American Society for Testing Materials defines lead paint as paint containing 2 parts per million of lead.

The Consumer Products Safety Commission determined that paint with greater than 600 parts per million of lead may not be used in household applications. Such paint is still sold for marine and other uses.

HUD defines lead paint as having greater than 1 microgram per square centimeter of surface or 0.5% by weight.

OSHA and Sate of Washington Labor & Industries do not define lead paint based on content. Any detectable lead in paint makes it lead paint for purposes of complying with OSHA regulations to determine worker exposure under OSHA's Lead in Construction Standard: 29 CFR 1926.62 and Washington Administration Code (WAC) General Occupational Health Standards: 296-62-07521: Lead.

4.1 Paint Chip Analysis Results

The following table indicates the findings for the analysis of the paint chip sample collected from the Chelan CC-1 Lift Station dry pit interior.

Chelan CC-1 Lift Station Dry Pit Interior Total Lead Paint Analytical Result

Material Location	Sample Number	Pb Result in % by weight	Total Pb in P.P.M	Detection Limit % by weight
Beige interior dry pit paint	1031-Pb-1	BRL (Below Reporting Limit)	BRL (Below Reporting Limit)	0.010%

BRL=Below Reporting Limit

5.0 Conclusions

The Chelan CC-1 Lift Station dry pit interior paint chip sample had an analytical result below the detection limit. See the Total Lead analytical report in Appendix A of this report for analytical information.

Appendix A
Lead Paint Chip Analytical Results

EMC LABS, INC.

9830 South 51st Street, Suite B-109 / PHOENIX, ARIZONA 85044 / 480-940-5294 or 800-362-3373 / FAX 480-893-1726
emclab@emclabs.com

LEAD (Pb) IN PAINT CHIP SAMPLES

EMC SOP METHOD #L01/1 EPA SW-846 METHOD 7420

EMC LAB #:	L112247	**DATE RECEIVED:**	10/08/2025
CLIENT:	McCrink Consulting, LLC	**REPORT DATE:**	10/13/2025
		DATE OF ANALYSIS:	10/09/2025
CLIENT ADDRESS:	660 E. Sand Wedge Drive Post Falls, ID 83854	**P.O. NO.:**	
PROJECT NAME:	Chelan CC-1 Lift Station Rehab, 117 E. Wapato Ave Chelan, Washington 98816	**PROJECT NO.:**	MC-25-501

EMC # L112247-	SAMPLE DATE /25	CLIENT SAMPLE #	DESCRIPTION	REPORTING LIMIT (%Pb by weight)	%Pb BY WEIGHT
1	10/02	1031-Pb-1	Beige Interior Tank Paint	0.010	BRL

^ = Dilution Factor Changed ***** = Excessive Substrate May Bias Sample Results **BRL** = Below Reportable Limits **#** = Very Small Amount Of Sample Submitted, May Affect Result

This report applies to the standards or procedures identified and to the samples tested only. The test results are not necessarily indicative or representative of the qualities of the lot from which the sample was taken or of apparently identical or similar products, nor do they represent an ongoing quality assurance program unless so noted. Unless otherwise noted, all quality control analyses for the samples noted above were within acceptable limits.

Where it is noted that a sample with excessive substrate was submitted for laboratory analysis, such analysis may be biased. The lead content of such sample may, in actuality, be greater than reported. EMC makes no warranty, express or implied, as to the accuracy of the analysis of samples noted to have been submitted with excessive substrate. Resampling is recommended in such situations to verify original laboratory results. EMC Labs, Inc. (ID 101586) is accredited by the AIHA Laboratory Accreditation Programs, LLC (AIHA-LAP, LLC) in the Environmental Lead accreditation program(s) for Paint, Settled Dust by Wipe, Soil and Airborne Dust Fields of Testing as documented by the Scope of Accreditation Certificate and associated Scope. AIHA-LAP, LLC accreditation complies with the ISO/IEC Standard 17025**:2017** requirements. The customer provides the Project number, name, address, sampling date, identification, and description. EMC Labs, Inc. is an EPA Recognized Testing Lab.

These reports are for the exclusive use of the addressed client and are rendered upon the condition that they will not be reproduced wholly or in part for advertising or other purposes over our signature or in connection with our name without special written permission. Samples not destroyed in testing are retained a maximum of sixty (60) days.

ANALYST: Jason Thompson

QA COORDINATOR: Kurt Kettler

Ver. 11/30/08 Revision 08/14/2021

022626.02 - BUILDING LEAD ASSESSMENT

Building Demolition TCLP Lead Sampling

Chelan CC-1 Lift Station Rehab
Demolition Project
117 E. Wapato Avenue
Chelan, Washington 98816



Project No.: MC-25-491

By
McCrink Consulting, LLC
660 E. Sand Wedge Drive
Post Falls, Idaho 83854
Phone: (509) 991-7357

October 23, 2025

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4.0 TCLP-LEAD 2

APPENDIX

Appendix A: TCLP-Lead Analytical Results

1.0 Project Summary

McCrink Consulting, LLC was retained by City of Chelan, the property owner, to conduct TCLP-Lead sampling for the Chelan CC-1 Lift Station Rehab building demolition project located at 117 E. Wapato Avenue, in Chelan, Washington. The survey was conducted on October 2nd, 2025 to comply with the EPA 40 CFR 261.24 -- Toxicity Characteristic waste stream disposal designation.

General Building Observations
The sampling included the interior and exterior components of the building. The building was developed in two phases. The original north section of the building is poured-in-place concrete with concrete walls and ceiling. The interior ceiling is finished with cementitious stucco on steel mesh. The walls are untextured gypsum board. The floor is concrete and finished with rubber cove base. A cast-in-place concrete dry pit is located below the floor of the structure. The south section of the building is a CMU block structure with no basement. The building interior has untextured gypsum board walls and ceiling. The floor is concrete and finished with rubber cove base. A CMU wall divides the two building spaces. The entire building has a wood framed, peaked roof system with corrugated metal roof panels.

2.0 Introduction

2.1 Purpose

The purpose was to perform TCLP-Lead sampling of the scheduled demolition debris from the Chelan CC-1 Lift Station Rehab building demolition project to comply with the EPA 40 CFR 261.24 -- Toxicity Characteristic waste stream disposal designation.

2.2 Scope of Work

The building TCLP-Lead sample collected was analyzed at an accredited laboratory to determine the presence and concentration of leachable lead of the building waste streams for waste characterization.

2.3 Authorization

Authorization to perform this survey was given by City of Chelan on September 25, 2025.

2.4 Warranty

The TCLP sampling was limited to the information available from the client at the time of the investigation. No other warranties are implied or expressed.

3.0 Methodology

3.1 Method of Analysis-Lead

The TCLP-Lead sample collected from the Chelan CC-1 Lift Station Rehab building demolition project was sent to Eurofin Laboratories, Inc. by proper chain-of-custody. The sample was prepared at the laboratory and analyzed by EPA method 1311/3010A/6010C TCLP to determine the leachable lead content.

3.2 Laboratory Quality Assurance

Eurofin Laboratories, Inc. is located in Spokane Valley, Washington. Eurofin Laboratories, Inc is accredited by the EPA and the State of Washington Solid/Hazardous Waste Program.

4.0 TCLP-Lead, Lead-Containing Debris Disposal:

EPA 40 CFR 261.24 -- Toxicity Characteristic waste stream disposal designation requires lead containing materials above the 0.010% by weight or 100 p.p.m. threshold to be treated as a hazardous waste until TCLP (toxic characterization leaching procedure bulk waste stream testing has been performed and the leachable lead concentration does not meet the 5 mg/L threshold for characterization as a hazardous waste.

The Chelan CC-1 Lift Station Rehab building demolition project TCLP-Lead sampling analytical result was below the EPA threshold for leachable lead of 5 mg/L and is not classified as a hazardous waste and can be disposed of as general construction debris as summarized in the table below.

Chelan CC-1 Lift Station Rehab Building Demolition Project

Sample Number	Result: mg/L	Result: P.P.M.	Reporting Limit
CC!-TCLP-1	N.D: , <0.60 mg/L	N.D. <0.60 p.p.m.	0.060 mg/L, or 0.60 p.p.m.

See TCLP Lead Analytical report in Appendix A of this report for analytical information.

Appendix A
TCLP-Lead Analytical Result

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ANALYTICAL REPORT

PREPARED FOR

Attn: Kevin McCrink
McCrink Consulting LLC
660 E Sandwedge Drive
Post Falls, Idaho 83854

Generated 10/17/2025 3:42:21 PM

JOB DESCRIPTION

CC1 Lift Station

JOB NUMBER

590-33733-1

Eurofins Spokane
11922 East 1st Ave
Spokane WA 99206

See page two for job notes and contact information.

022626.02 - BUILDING LEAD ASSESSMENT

my EQL

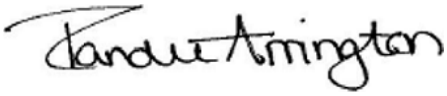
Eurofins Spokane

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

Authorization



Generated
10/17/2025 3:42:21 PM

Authorized for release by
Randee Arrington, Business Unit Manager
Randee.Arrington@et.eurofinsus.com
(509)924-9200

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Job ID: 590-33733-1 — Eurofins Spokane

Job Narrative
590-33733-1

The analytical test results presented in this report meet all requirements of the associated regulatory program listed on the Accreditation/Certification Summary Page, unless otherwise noted. Data qualifiers and/or narrative comments are included to explain any exceptions, if applicable. Regulated compliance samples (e.g. SDWA, NPDES) must comply with associated agency requirements/permits.

- Matrix-specific batch QC (e.g., MS, MSD, SD) may not be reported when insufficient sample volume is available or when site-specific QC samples are not submitted. In such cases, a Laboratory Control Sample Duplicate (LCSD) may be analyzed to provide precision data for the batch.
- For samples analyzed using surrogate and/or isotope dilution analytes, any recoveries falling outside of established acceptance criteria are re-prepared and/or re-analyzed to confirm results, unless the deviation is due to sample dilution or otherwise explained in the case narrative.

Receipt
The sample was received on 10/14/2025 12:20 PM. Unless otherwise noted below, the sample arrived in good condition, and, where required, properly preserved and on ice. The temperature of the cooler at receipt time was 19.0°C.

Metals
No additional analytical or quality issues were noted, other than those described above or in the Definitions/ Glossary page.

Sample Summary

Client: McCrink Consulting LLC
Project/Site: CC1 Lift Station

Job ID: 590-33733-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Sample Origin
590-33733-1	CC1-TCLP-1	Solid	10/02/25 11:00	10/14/25 12:20	Idaho

Client: McCrink Consulting LLC
Job ID: 590-33733-1
Project/Site: CC1 Lift Station

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample Results

Client: McCrink Consulting LLC
Project/Site: CC1 Lift Station

Job ID: 590-33733-1

Client Sample ID: CC1-TCLP-1
Date Collected: 10/02/25 11:00
Date Received: 10/14/25 12:20

Lab Sample ID: 590-33733-1
Matrix: Solid

Method: SW846 6010D - Metals (ICP) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.060		mg/L		10/17/25 10:56	10/17/25 13:20	1

Client: McCrink Consulting LLC
Project/Site: CC1 Lift Station

Job ID: 590-33733-1

Method: 6010D - Metals (ICP)

Lab Sample ID: LCS 590-57175/1-A
Matrix: Solid
Analysis Batch: 57178

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 57175

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Lead			1.00	0.981		mg/L		98	80 - 120		

Lab Sample ID: LB 590-57166/1-B
Matrix: Solid
Analysis Batch: 57178

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 57175

Analyte	LB Result	LB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Lead	ND		0.060		mg/L		10/17/25 10:56	10/17/25 12:44	1

Lab Chronicle

Client: McCrink Consulting LLC
Project/Site: CC1 Lift Station

Job ID: 590-33733-1

Client Sample ID: CC1-TCLP-1
Date Collected: 10/02/25 11:00
Date Received: 10/14/25 12:20

Lab Sample ID: 590-33733-1
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			100.29 g	2000.55 mL	57166	10/16/25 18:10	AMB	EET SPK
TCLP	Prep	3010A			50 mL	50 mL	57175	10/17/25 10:56	AMB	EET SPK
TCLP	Analysis	6010D		1			57178	10/17/25 13:20	AMB	EET SPK

Laboratory References:

EET SPK = Eurofins Spokane, 11922 East 1st Ave, Spokane, WA 99206, TEL (509)924-9200

Accreditation/Certification Summary

Client: McCrink Consulting LLC
Project/Site: CC1 Lift Station

Job ID: 590-33733-1

Laboratory: Eurofins Spokane

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-025	01-07-26
Oregon	NELAP	4137	12-07-25
Washington	State	C569	01-06-26

Method Summary

Client: McCrink Consulting LLC
Project/Site: CC1 Lift Station

Job ID: 590-33733-1

Method	Method Description	Protocol	Laboratory
6010D	Metals (ICP)	SW846	EET SPK
1311	TCLP Extraction	SW846	EET SPK
3010A	Preparation, Total Metals	SW846	EET SPK

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

EET SPK = Eurofins Spokane, 11922 East 1st Ave, Spokane, WA 99206, TEL (509)924-9200

Eurofins Spokane
11922 E 1st Avenue

Spokane, WA 99206-5302
phone 509.924.9200 fax 509.924.9290

Chain of Custody Record

eurofins | Environment Testing

Regulatory Program ☐DW ☐NPDES ☐RCRA ☐Other:

Eurofins Environment Testing America

Client Contact	Project Manager: K. MCCRINK	Site Contact: K. MCCRINK	Date 10-13-25	COC No:
Your Company Name here MCCRINK CONSULTING LLC	Email:	Lab Contact:	Carrier:	____ of ____ COCs
Address 660 E. SAND WEDGE DRIVE	Tel/Fax			TALS Project #:
City/State/Zip POST FALLS, ID 83854	Analysis Turnaround Time			Sampler:
(xxx) xxx-xxxx Phone 509 991-7357	☐CALENDAR DAYS ☐WORKING DAYS			For Lab Use Only:
(xxx) xxx-xxxx FAX	TAT if different from Below 3-Day			Walk-in Client:
Project Name: CC1 LIFT STATION	☐ 2 weeks			Lab Sampling
Site: 117 E. WAPATO AVE, CHELAN, WA	☐ 1 week			
PO #	☐ 2 days			Job / SDG No.
	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	TCLP - LEAD	Sample Specific Notes:
CC1-TCLP-1	10-2-25	11:00	C	S	1			X	

590-33733 Chain of Custody

Preservation Used: 1=Ice; 2=HCl; 3=H2SO4; 4=HNO3; 5=NaOH; 6=Other ____

Possible Hazard Identification
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☑Non-Hazard ☐Flammable ☐Skin Irritant ☐Poison B ☐Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐Return to Client ☐Disposal by Lab ☐Archive for ____ Months

Special Instructions/QC Requirements & Comments

189 18.0 IR006

Custody Seals Intact: ☐Yes ☐No	Custody Seal No	Cooler Temp. (°C): Obs'd. ____ Corr'd. ____	Therm ID No.: ____
Relinquished by:	Company: MCCRINK CONSULTING	Date/Time: 10-13-25	Received by:	Company: ESTSD	Date/Time: 10/14/25 12:20
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company:	Date/Time:

Login Sample Receipt Checklist

Client: McCrink Consulting LLC

Job Number: 590-33733-1

Login Number: 33733

List Source: Eurofins Spokane

List Number: 1

Creator: Desimone, Carson

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

023200 - GEOTECHNICAL ENGINEERING EVALUATION

Geotechnical Engineering Evaluation

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

for
Ardurra Group, Inc.

December 31, 2025

523 East Second Avenue
Spokane, Washington 99202
509.363.3125

GeoEngineers

Geotechnical Engineering Evaluation

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

File No. 28238-001-00
December 31, 2025

Prepared for:

Ardurra Group, Inc.
1717 South Rustle Street
Spokane, Washington 99224

Attention: Jake Bender, Senior Project Manager

Prepared by:

GeoEngineers, Inc.
523 East Second Avenue
Spokane, Washington 99202
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Justin D. Orr
Project Environmental Geologist 2

David R. Lauder, PE
Associate Engineer



12/31/25

JDO:DRL:lmm

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Appendix D. Report Limitations and Guidelines for Use

1.0 Introduction

This report presents the results of our geotechnical engineering evaluation for the City of Chelan CC1 Sewer Lift Station located at 109 East Wapato Avenue in Chelan, Washington (herein referred to as "site"). The project site is located approximately as shown on the Vicinity Map, Figure 1.

The site is located in the northwest portion of the Chelan Riverwalk Park (the Park) near Lake Chelan and consists of the Chelan Public Utilities District (PUD) Pump Station Number (No.) 1 pump house (Pump House), We understand that Ardurra Group, Inc. (Ardurra) is preparing design plans and specifications to demolish the existing Pump House and construct an underground lift station and install surface improvements at the site. Proposed surface improvements will include new hot mix asphalt (HMA) and portland cement concrete (PCC) pavement in pedestrian and vehicular areas, retaining walls with heights in the range of about 4 to 5 feet, and equipment pedestals. A central feature of the project will include a circular pedestrian plaza area measuring about 25 feet in diameter centered near the existing Pump House. We further understand that conceptual plans include reusing the existing wet well, if possible. Some shallow below-grade vaults might be constructed as part of modifications to the lift station. Based on review of preliminary site plans, we anticipate fills in the range of about 2 to 4 feet will be required to achieve final site grades.

GeoEngineers performed soil and groundwater assessments at the site for the Washington State Department of Ecology (Ecology) between 2021 and 2025 to investigate a past release of diesel fuel from an underground storage tank (UST) removed in the 1990's. The UST was located south of the existing Pump House. Assessment activities included advancing soil borings to depths of about 18 feet to 25 feet below site grades, collecting soil and grab groundwater samples for environmental testing, installing permanent monitoring wells and conducting groundwater monitoring events (GeoEngineers 2025). Based on the results of GeoEngineers' assessments, diesel-range petroleum hydrocarbons (DRPH) are present at concentrations greater than the Washington State Model Toxics Control Act (MTCA) Method A cleanup level in groundwater near the existing Pump House. Additionally, diesel-impacted soil might be present beneath the Pump House. Site preparation and earthwork activities should be completed in accordance with a Soil and Groundwater Management Plan (SGMP) prepared specifically for this project.

2.0 Scope of Services

Our services were conducted in accordance with the scope of services presented in our proposal dated August 1, 2025. The purpose of the geotechnical services was to provide geotechnical recommendations for the design and construction of the underground lift station and surface improvements at the site based on subsurface explorations, laboratory testing and engineering analysis. Our scope of services included the following:

1. A preliminary visit to the site to identify and mark the proposed exploration locations and notify the State of Washington Utility Notification service to assess possible presence or absence of underground utilities at our proposed boring locations.
2. Developing a job hazard analysis (JHA) to address potentially contaminated soil and/or groundwater that might be encountered during subsurface explorations to guide GeoEngineers' personnel during field activities.

3. Exploration of soil conditions at the site by advancing four exploration using hand tools and conducting four dynamic cone penetration (DCP) tests.
4. Laboratory testing to assess select physical and engineering properties of the soil encountered.
5. Providing recommendations for:
   - Site preparation and fill placement, including criteria for clearing, stripping and grubbing; an evaluation of the suitability of on-site soil for use as structural fill; gradation criteria for imported fill, if required; guidance for preparation of subgrade soil, which will support slab-on-grade floors, and criteria for structural fill placement and compaction.
   - Temporary and permanent slope inclinations.
   - Discussion of geotechnical considerations associated with installation of a new wet well and below-grade equipment, including results of previous groundwater level measurements and typical lake levels, and their impact on excavation and design for buoyancy (uplift).
   - Design and construction of concrete pavement to support vehicular and pedestrian traffic including PCC thickness, base course gradation and compaction criteria.
   - Evaluation of the feasibility of on-site disposal of stormwater. Our assessment will be based on conditions encountered during site exploration. Lab data will be used to estimate infiltration rates based on correlations to soil grain-size provided in the Washington State Department of Ecology (Ecology), Stormwater Management Manual for Eastern Washington (SMMEW). Feasibility of on-site disposal of stormwater also will be dependent on environmental conditions at the site.

3.0 Field Explorations and Laboratory Testing

GeoEngineers advanced four explorations (EX-1 through EX-4) using a hand auger at the site on November 6, 2025. The exploration locations are shown in the Site Plan, Figure 2. Refusal was encountered at depths ranging from approximately 1½ feet below ground surface (bgs) to 3 feet bgs. The hand auger explorations were terminated due to refusal on gravel or cobbles. Four DCP tests (DC-1 through DC-4) also were completed at the locations of EX-1 through EX-4, respectively, using a Wildcat® Dynamic Cone Penetrometer. A detailed discussion of our field explorations and laboratory testing programs, along with exploration logs, and test results are provided in Appendix A. Explorations using hand-portable equipment were selected due to site access constraints and the presence of underground utilities.

The locations of previous direct push borings and groundwater monitoring wells completed by GeoEngineers as part of the previous environmental soi and groundwater sampling activities are shown in Figure 2. Logs of the previous explorations are presented in Appendix B.

4.0 Site Conditions

4.1 SURFACE CONDITIONS

The Pump House (measuring about 15 feet by 15 feet in plan dimension) currently occupies the center of the project site. A grassy landscaped area was located between the Pump House and Lake Chelan, and a paved access road and concrete walking path was located on the west side of the Park. The Park generally slopes down to the north and west toward Lake Chelan. The ground surface within the project site ranges from about Elevation 1104 to 1110 feet (North American Vertical Datum of 1988 [NAVD 88]).

4.2 SUBSURFACE CONDITIONS

4.2.1 Soil

At the locations of our recent hand auger explorations EX-1 through EX-4, we encountered silty sand to the depths explored. Minor amounts of brick and asphalt debris were observed in soil from some of the explorations, which indicate that the soil observed was fill material consistent with the location of the site in the heavily developed city limits. Results of grain-size analyses on four representative samples indicate the fines (silt- and clay-sized soil particles passing the U.S. No. 200 sieve) content is in the range of about 16 to 42 percent. Previous direct push explorations completed by GeoEngineers at the site as part of the remedial investigation also encountered layers of silty sand, sandy silt, sand, and gravel to the depths explored (18 to 25 feet bgs). The DCP probes indicate that site soils range in relative density from very loose to medium dense.

4.2.2 Groundwater

Groundwater was not encountered in EX-1 through EX-4. Previous investigations indicate that groundwater depths in existing monitoring wells at the site range from about 7 to 9 feet bgs to more than 18 feet bgs and are highly influenced by the elevation of Lake Chelan (GeoEngineers 2025). Results of groundwater measurements obtained from site monitoring wells are presented in Appendix C. Note that groundwater level measurements were collected in monitoring wells GEI066-MW-1 through GEI066-MW-4 between October 25, 2024 and August 29, 2025.

Groundwater levels at GEI066-MW-1 and GEI066-MW-2 closely matched the water level of Lake Chelan. Groundwater levels measured in GEI066-MW-3 and GEI-066-MW-4 were higher than water levels measured in GEI066-MW-1 and GEI066-MW-2 between the start of monitoring in October 2024 through August 2025, indicating a general groundwater flow direction from northeast to southwest across the site (from upland areas towards the lake). Starting in late March, groundwater levels in each of the monitoring wells increased before establishing relatively constant elevations in late June between approximately Elevation 1100.5 and 1102 feet. There was significantly less seasonal variation in water levels in GEI066-MW-3 and GEI066-MW-4 (approximately 7 feet of variation) than in GEI-066-MW-1 and GEI066-MW-2 (approximately 13.5 feet of variation) during the measurement period.

5.0 Conclusions and Recommendations

5.1 SUMMARY

Based on the results of our explorations, laboratory testing, and engineering analyses, it is our opinion that proposed improvements can be constructed from a geotechnical standpoint, provided recommendations presented in this report are followed during design and construction. The following presents a brief summary of our conclusions.

- Groundwater levels fluctuate seasonally beneath the site. Groundwater level measurements from site monitoring wells indicate that although groundwater levels immediately adjacent to the lake closely match the water level of the lake, groundwater level measurements from the wells located inland of the shoreline indicate that during periods of lower lake levels, groundwater levels inland of the

shoreline are higher than the lake level and exhibit less seasonal fluctuation. Therefore, it is possible that groundwater could be encountered in site excavations during periods of low lake levels.

- Contamination related to the historical release of diesel fuel from a former UST is likely present in soil and groundwater beneath the site (GeoEngineers 2025). Contaminated soil and groundwater, if encountered, should be handled in accordance with the site-specific SGMP that will be provided under separate cover.
- Existing monitoring wells at the site should either be protected during construction or decommissioned prior to construction and replaced after construction in accordance with applicable Washington State regulations.
- Site soil is suitable for support of pavement and hardscape.
- Due to the variations in soil and relative density observed in our explorations, we recommend that proposed site retaining walls be supported on a bearing pad of imported structural fill to provide more uniform bearing conditions and reduce the potential for unacceptable differential settlement.
- Surficial site soil is moisture sensitive and will be difficult to work or compact if the moisture content is not near optimum at the time of earthwork.
- The site is suitable for infiltration of post-development stormwater. However, new stormwater infiltration facilities should not inject stormwater runoff into contaminated soil and groundwater. Based on existing information, contamination is generally limited to south of the existing Pump House. Therefore, new infiltration facilities should be located either east, west, or north of the existing Pump House. Alternatively, existing contaminated soil could be removed and properly disposed of off-site. In that case, new infiltration facilities could be located south of the existing Pump House.

5.2 RETAINING WALLS

5.2.1 Foundation Support

5.2.1.1 FOUNDATION GRADE PREPARATION

We recommend that foundation grades be prepared as recommended in the Subgrade Preparation and Structural Fill sections of this report and observed by GeoEngineers to evaluate whether the work is completed in accordance with our recommendations and whether the subsurface conditions are as anticipated. Specifically, retaining wall foundations should bear on a minimum 2-foot-thick bearing pad of imported structural fill overlying properly prepared site soil.

If soft areas are present at the footing subgrade elevation where the gravel unit is present, the soft areas should be removed to a depth of 3 feet below foundation grade or firm bearing, whichever is less, and replaced with approved structural fill at the direction of GeoEngineers.

5.2.1.2 ALLOWABLE BEARING PRESSURE

We recommend retaining wall footings consisting of cast-in-place concrete be designed with a minimum width of 18 inches. We also recommend proposed foundations be constructed at a minimum depth of at least 24 inches below the nearest adjacent exterior finished grade to protect against frost heave.

Retaining wall foundations on level ground prepared as described in this report may be designed using an allowable net soil bearing pressure of 2,500 pounds per square foot (psf) for dead plus long-term live loads.

Retaining wall foundations located on 2H:1V (horizontal to vertical) slopes prepared as recommended in this report may be designed using an allowable net bearing pressure of 1,500 psf. These values include a safety factor of about 2. The weight of the footings may be neglected when estimating foundation loads.

5.2.1.3 LATERAL RESISTANCE

The soil resistance available to resist lateral foundation loads is a function of the frictional resistance against the foundation base and the passive resistance which can develop on the face of below-grade elements of the structure as those elements move horizontally into the soil. For foundation grade prepared as recommended herein, the allowable frictional resistance may be computed using a coefficient of friction of 0.35. This value should be applied to vertical dead load forces for the contact between the bottom of the footing and supporting material. This value includes a safety factor of about 1.5.

We recommend using a maximum allowable equivalent fluid density for the passive earth pressure of 275 pounds per cubic foot (pcf) for footings backfilled with structural fill compacted to at least 90 percent of maximum dry density. Lateral movement of the retaining wall foundation will be required to engage the passive resistance. For a 2-foot-thick foundation element, the lateral movement required to engage the allowable passive resistance should be on the order of about ½ inch.

5.2.1.4 SETTLEMENT

Based on conceptual plans provided by Ardurra, the proposed improvement area will be about 25 feet in diameter and will include raising grade approximately 2 to 4 feet. We estimate construction of the proposed fill pad will result in ground settlement in the range of about 1 to 2 inches. We anticipate that settlement will be larger near the center of the fill pad, decreasing towards the perimeter. We estimate that settlement of the proposed perimeter retaining walls will be about 1 inch. Differential settlement along approximately 20 feet of wall length should be about half of the total settlement.

Settlement should occur as loads are applied. Loose soil not removed from footing excavations, or disturbance of soil at foundation grade during construction could result in larger settlements than estimated. Potential settlement should be reevaluated if the final design grading is greater than described in this report.

5.2.1.5 LATERAL EARTH PRESSURES

Active earth pressures should be used for walls that are free to rotate or translate. We recommend using an equivalent fluid density of 35 pcf, triangular distribution, for the active earth pressure state of stress. If wall movement will be less than about 0.001H (where H is the height of the wall), then at-rest static earth pressures should be used for wall design. We recommend using an equivalent fluid density of 55 pcf, triangular distribution, for the at-rest earth pressure state of stress.

5.2.1.6 SOIL PARAMETERS FOR BLOCK WALL DESIGN

If site walls will consist of stacked modular block walls or mechanically stabilized earth (MSE) walls, we recommend using soil parameters presented in Table 1 for design.

TABLE 1. SOIL PARAMETERS FOR WALL DESIGN

LOCATION	SOIL TYPE	UNIT WEIGHT MOIST/BOUYANT (PCF)	FRICTION ANGLE (DEG)	COHESION (PSF)
Foundation Soil (Below Structural Fill Bearing Pad)	On-site Soil	115/53	30	0
Wall Backfill and Bearing Pad	Imported Structural Fill	125/63	34	0

5.2.1.7 WALL DRAINAGE

The earth pressures provided above are based on drained conditions behind the abutment walls. Walls should be provided with suitable drainage to prevent hydrostatic pressures from developing behind the walls. This could include installation of pre-fabricated drainage mats or a minimum 6-inch-wide chimney drain of washed rock located behind the wall connected to a minimum 4-inch-dimater perforated drainpipe. The drainpipe should be surrounded by at least 4 inches of washed drain rock. The drain rock should be separated from general wall backfill by a non-woven geotextile separation fabric (Mirafi 160N or equivalent). The drainpipe should daylight to a suitable discharge point. For below-grade walls that will be located below potential high groundwater, the walls should be designed for hydrostatic pressures.

5.3 PAVEMENT

5.3.1 Materials

We recommend pavement materials conform to applicable sections of the Washington State Department of Transportation (WSDOT) Standard Specifications.

5.3.2 Thickness Design

Thickness design of pavement depends on several factors, including subgrade supporting conditions and anticipated vehicle loads. Based on the results of our field explorations and laboratory testing, properly prepared subgrade soil should have a California Bearing Ratio (CBR) of about 10. We anticipate that pavements used for vehicle access will support occasional heavy truck loads. On this basis, we recommend that pavement designed to support pedestrian and vehicular loads be designed as presented in Table 2.

TABLE 2. RECOMMENDED MINIMUM PAVEMENT THICKNESS

LOCATION	FLEXIBLE PAVEMENT		RIGID PAVEMENT	
	HMA (INCHES)	CSBC (INCHES)	PCC (INCHES)	CSBC (INCHES)
Pedestrian Pathways (not subject to vehicular loads	2.5	6	4	4
Vehicle Access	4	6	6	4

Note that pavement thickness recommendations presented in this report are based on assumed loading conditions. If pavements will support other types of vehicles or other static loads, such as outriggers for

maintenance vehicles or similar special loads, we should be informed to review and revise our thickness recommendations, as appropriate.

HMA should be compacted to at least 92 percent of the theoretical (Rice) density. We recommend HMA consist of Class ⅜" or ½" aggregate with a binder grade of PG 64-28.

For PCC pavement, the civil engineer should layout appropriate joint spacing. Preliminarily, we recommend a maximum joint spacing of 9 feet.

The recommended pavement sections presented in this report are based on the condition that a pavement maintenance program is implemented during the life of the pavement. This includes periodic sealing of cracks, seal coating of HMA pavements, and possible full depth repair of isolated potholes or fatigued pavement.

5.4 PUMP STATION DESIGN AND CONSTRUCTION CONSIDERATIONS

We understand current plans include reusing existing below-grade infrastructure to the extent possible. Based on the results of previous groundwater monitoring activities, conducting below-grade earthwork and construction activities could require temporary dewatering or "working in the wet". The lowest groundwater elevations at the site likely occur between mid to late winter before lake levels begin to rise. Although groundwater elevations (as measured in site wells GEI066-MW-1 and GEI066-MW-2) immediately adjacent to the lakeshore closely match lake levels, groundwater elevations further away from shore (as measured in site wells GEI066-MW-3 and GEI066-MW-4) appear to exhibit less seasonal fluctuation. For estimating possible groundwater elevations during below-grade work at the site, we recommend using GEI-066-MW-3 and GEI066-MW-4 as references for possible groundwater elevations near the Pump House.

Given the presence of contaminated groundwater below the site, dewatering likely will require planning, permitting, detention, testing, and either treatment or disposal at a regulated facility that can accept the water.

The maximum lake level is controlled by Lake Chelan dam. Therefore, for design of below-grade structures to resist uplift (buoyant) forces, we recommend using a design groundwater elevation of 1102 feet (NAVD88).

We recommend uplift resistance initially be calculated based solely on the weight of the structure (and any soil directly overlying the structure, where present) for uplift resistance (i.e., ignore side friction). Where structures include an enlarged foundation and structural backfill, the effective unit weight of the soil overlying the enlarged foundation may be included when estimating uplift resistance. Additional side friction resistance also may be considered to resist uplift force. Side friction will be a function of the installation method and materials present at the interface between the vault and surrounding soil and can be provided upon request. We anticipate this effort will be an iterative process between the design engineer and the contractor.

The typical safety factor for evaluating uplift resistance is 1.25 when relying solely on the weight of the structure if the design groundwater level is at a relatively well-defined depth below the top of structure. A safety factor of 1.1 is typically used when relying solely on the weight of the structure and the groundwater level is at the ground surface. This case can occur if the groundwater level seasonally reaches the ground

surface, or during a design flood event, particularly if the structure is located within a designated Federal Emergency Management Agency (FEMA) flood zone. If side friction is used, we recommend using a safety factor of 2.

Increased uplift resistance, if needed, can be achieved by increasing the width of footings to engage more soil, by increasing the weight of the structure, or by using tiedown anchors. We should be contacted to provide recommendations for tiedown anchors if they are used.

The log of DC-1 also indicates that soil near the existing Pump House is very loose below a depth of about 13 feet bgs. Depending on planned excavation depths, constructing a working pad might be beneficial to accommodate construction equipment. A working pad could consist of geotextile separation fabric, biaxial geogrid, and crushed surfacing base course to provide a stable working platform. Alternatively, a rat slab consisting of at least 3 inches of concrete could be used.

5.5 STORMWATER

5.5.1.1 DESIGN CRITERIA

Stormwater infiltration facilities should be designed in accordance with the 2024 Ecology SMMEW.

5.5.1.2 SITING CRITERIA

Stormwater infiltration facilities should be designed in consideration of site contamination. Stormwater facilities should not inject infiltrated stormwater directly into contaminated soil or groundwater. Based on existing information, contamination is generally limited to south of the existing Pump House. Therefore, preliminarily, new infiltration facilities should be located either east, west, or north of the existing Pump House. However, the SGMP should be consulted for additional information regarding site contamination and siting of infiltration facilities. Alternatively, existing contaminated soil could be removed and properly disposed of off-site. In that case, new infiltration facilities could be located south of the existing Pump House.

Per the SMMEW, a minimum vertical separation of 5 feet should be maintained between the bottom of proposed infiltration facilities and seasonal high groundwater. On this basis, we recommend infiltration facility bottoms should not extend below Elevation 1107 feet. This might require using other means of stormwater treatment and disposal depending on planned site grades and infiltration facilities for portions of the site where this separation cannot be achieved.

5.5.1.3 INFILTRATION RATE

We used procedures outlined in the SMMEW to estimate the infiltration rates of site soil, specifically, we estimated the hydraulic conductivity of site soil using correlations to soil grain-size. Table 3 presents a summary of the recommended infiltration rate for site soil.

TABLE 3. RECOMMENDED INFILTRATION RATE

APPROIXIATE AVERAGE ESTIMATED SATURATED HYDRAULIC CONDUCTIVITY (K_{SAT}) (IN/HR)	CORRECTION FACTORS			DESIGN (LONG-TERM) INFILTRATION RATE (IN/HR)
	SITE VARIABILITY CF_V	TEST METHOD CF_T	DEGREE OF INFLUENT CONTROL CF_M	
3	0.5	0.4	0.9	**0.5**

5.5.1.4 TREATMENT CAPACITY

We submitted two soil samples to an agricultural laboratory for analyses of cation exchange capacity (CEC) and organic matter content to assess feasibility of reusing on-site soil within the treatment zone of for shallow infiltration swales. Results are summarized in Table 4. Results should be compared to treatment criteria listed in the SMMEW.

TABLE 4. SWALE SOIL CATION EXCHANGE CAPACITY AND ORGANIC MATTER SUMMARY

SAMPLE LOCATION	CEC (MEQ/100G)	ORGANIC MATTER CONCENT (% BY WEIGHT)
EX-1 at 0.25 to 1 feet	6.1	1.3
EX-2 at 2.5 feet	7.8	1.1

Notes:
meq/100 g = milliequivalents per 100 grams

5.6 SITE PREPARATION AND EARTHWORK

5.6.1 Impacted Soil

Due to historic petroleum leaks, portions of the soil and groundwater underlying the site are impacted by petroleum hydrocarbons. Handling and disposal of on-site soil excavated as part of this project should be conducted in accordance with a SGMP prepared for this project, which will be provided under separate cover.

5.6.2 General

We understand that final site grades within the proposed improvement areas will generally be at or higher than existing site grades. Site grades for the proposed circular plaza area surrounding the existing Pump House will be raised about 2 to 4 feet. Excavations likely will be required during construction for various underground utility modifications.

Site preparation activities likely will include: 1) demolition of the existing Pump House; 2) excavation for underground utility upgrades; 3) possible excavation to remove contaminated soil; and 4) clearing, stripping, and grubbing within existing landscaped areas. Demolition debris should be disposed of off-site at a suitable disposal location. Based on our explorations, we anticipate stripping depths to remove topsoil should be less than about 6 to 12 inches. Tree roots greater than ½-inch in diameter should be thoroughly grubbed. Deeper stripping and grubbing depths might be encountered at other locations not explored.

We expect that grading can be accomplished with conventional earthmoving equipment. It is possible that cobbles and boulders could be encountered, particularly as excavations approach the lakeshore, based on the presence of cobbles and boulders exposed along the shoreline.

5.6.3 Temporary Slopes

In our opinion, excavations in the on-site soil are susceptible to sloughing and caving. Excavations should be shored or sloped at stable inclinations if workers are required to enter such excavations. Shoring for excavations must conform to provisions of Title 296 Washington Administrative Code (WAC), Part N, "Excavation, Trenching and Shoring."

In our opinion, native site soil classifies as Type C for excavation purposes (Chapter 296-155-664 WAC). The maximum allowable temporary slope for Type C soil is 1.5H:1V for simple excavations less than 20 feet deep.

Temporary cut slope guidance assumes that surface loads are kept a minimum distance of at least one-half the depth of the cut away from the top of the slope. Flatter slopes will be necessary if surface loads are imposed above the cuts a distance equal to or less than one-half the depth of the cut, or if groundwater seepage is encountered. It is the contractor's responsibility to monitor and adjust the inclination of temporary excavated slopes and assure site safety during the proposed construction.

Alternatively, temporary shoring should be installed if space constraints limit the depth and/or inclination of cut slopes. Regardless of the soil type encountered in the excavation, shoring, trench boxes or sloped sidewalls will be required under Washington Industrial Safety and Health Administration (WISHA) regulations, as applicable.

While this report describes certain approaches to excavation, the contract documents should specify that the contractor is responsible for selecting excavation methods, monitoring the excavations for safety, reducing temporary slope inclinations to improve stability, and providing shoring, as required, to protect personnel.

5.6.4 Permanent Slopes

Permanent cut and fill slopes should be at an inclination no steeper than 2H:1V. Flatter slopes might be required for stormwater swales in order to meet accessibility and for ease of maintenance. Permanent cut and fill slopes should be seeded, sodded, or armored as soon as practical following construction to reduce the potential for erosion. Some sloughing and erosion should be expected until vegetation matures.

5.6.5 Subgrade Preparation

Results of our explorations indicate that the relative density of site soil is variable. In order to provide more uniform bearing conditions below retaining walls and other site structures, we recommend providing a bearing pad of imported structural fill below foundations. The bearing pad should be at least 2 feet thick. This might require overexcavation of existing site soil depending on planned foundation grade relative to existing site grades. The bearing pad should extend at least 2 feet laterally beyond footing perimeters.

After initial demolition, stripping and grubbing, and excavation activities are complete and before placing structural fill, the upper 12 inches of soil at working subgrade should be moisture conditioned (as necessary) to within 3 percentage points of optimum moisture content and compacted to the minimum

density requirements based on the ASTM D 1557 laboratory test procedure (modified Proctor), as listed below:

- Soil at working subgrade more than 2 feet below finished subgrade in pavement and hardscape areas: at least 90 percent of maximum dry density (MDD).
- Soil at working subgrade below retaining wall and structure foundations (regardless of depth) and in pavement and hardscape areas at 2 feet or less below final subgrade: at least 95 percent of MDD.

In areas where imported structural fill is placed below Elevation 1102 feet (NAVD88), we recommend the structural fill be separated from existing site soil by a non-woven geotextile separation fabric (Mirafi 160N or equivalent).

5.6.6 Observation and Testing

A representative of GeoEngineers should evaluate soil conditions at working subgrade. Evaluation of subgrade preparation should be accomplished through in-place density testing of the prepared areas. Alternatively, visual observations, probing, and/or proof-rolling may be used. The most appropriate method for evaluating subgrade preparation should be determined by the geotechnical engineer-of-record at the time earthwork is performed.

5.6.7 Structural Fill

5.6.7.1 ON-SITE SOIL

The suitability of on-site soil for use as structural fill depends on soil gradation and moisture content at the time of compaction. As the amount of fines increases, soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult to achieve. The on-site soil contains a relatively high percentage of silt and thus is highly moisture sensitive. It will only be suitable for reuse as structural fill during extended periods of warm dry weather. On this basis, we recommend project plans and budget include contingencies for off-site disposal of excavated soil and replacement with imported structural fill. Additionally, suitability of on-site soil for reuse should conform to criteria established by the SGMP developed for this project.

5.6.7.2 IMPORTED STRUCTURAL FILL

Depending on the intended use, imported structural fill should meet the specifications of the 2025 WSDOT Standard Specifications described below, unless otherwise approved by GeoEngineers:

- Imported structural fill placed as a bearing pad below foundations should consist of a well-graded gravel, or sand and gravel mixture with less than 10 percent passing the No. 200 sieve. Soil meeting criteria for “Gravel Borrow [Section 9-03.14(1)], “Gravel Backfill for Walls” [Section 9-03.12(2)], and “Crushed Surfacing” [Section 9-03.9(3)] of the WSDOT Standard Specifications generally meets these criteria. If structural fill is placed during wet weather, the structural fill should consist of soil conforming to “Gravel Borrow” but with less than 5 percent fines.
- Imported structural fill placed as crushed surfacing below pavements and hardscape should meet the criteria for “Crushed Surfacing,” as described in Section 9-03.9(3) of the WSDOT Standard Specifications. Either “Base Course” or “Top Course and Keystone” may be used.

- Imported structural fill placed as general structural fill to raise site grades should consist of a well-graded sand or sand and gravel mixture with less than 10 percent fines. “Gravel Borrow” generally meets these requirements. If structural fill is placed during wet weather, the structural fill should consist of soil conforming to “Gravel Borrow” but with less than 5 percent fines.
- Imported structural fill placed to backfill utility trenches beyond the pipe zone bedding area should meet the criteria described in Section 9-03.19 “Bank Run Gravel for Trench Backfill.” Alternatively, “Gravel Borrow” may be used.
- Imported structural fill that is placed below the water table at the time of placement should consist of free draining aggregate meeting criteria for “Permeable Base” per Section 9-03.9(2) of the WSDOT Standard Specifications.

5.6.8 Structural Fill Placement and Compaction Criteria

Structural fill should be placed in loose lifts and mechanically compacted to a dense condition. The actual loose lift thickness might vary to achieve the designated degree of compaction based on the contractor’s equipment. For example, the maximum loose lift for small walk-behind equipment should generally be limited to 4 to 6 inches, depending on the compactive energy of the equipment; the lift thickness compacted by larger self-propelled equipment could be increased to 8 to 12 inches, with 12 inches being the maximum loose lift thickness. The loose lift thickness and the compaction equipment used should be sufficient to achieve the required minimum density. Although, the earthwork contractor should take care not to damage nearby utilities, pavement, and structures. Each lift should be moisture conditioned to within 3 percentage points of the optimum moisture content and compacted to the specified percent of the MDD, as determined in Section 2-03.3(14) of the WSDOT Standard Specifications, before placing subsequent lifts. We recommend that structural fill be compacted to the following criteria:

- Structural fill placed below foundation grade, regardless of depth, should be compacted to at least 95 percent of the MDD.
- Structural fill placed as crushed surfacing base course (CSBC) or crushed surfacing top course (CSTC) should be compacted to at least 95 percent of the MDD.
- Structural fill placed more than 2 feet below finished subgrade elevations within pavement and hardscape areas should be compacted to at least 90 percent of MDD, while structural fill placed 2 feet or less below finished subgrade should be compacted to at least 95 percent of MDD.
- Non-structural fill, such as fill placed in landscaped areas, should be compacted to a maximum of about 85 percent of the MDD. In areas intended for future development, a higher degree of compaction should be considered to reduce the settlement potential of the fill soil.

We recommend a representative of GeoEngineers be on site during earthwork operations to observe site preparation and fill placement. Soil conditions should be evaluated by in-place density tests, visual evaluation, probing and/or proof-rolling of the structural fill and compacted lower gravel unit as it is prepared to check for compliance with the contract documents and recommendations in this report. The most appropriate method for evaluating soil compaction should be determined by a representative of GeoEngineers at the time the site work is performed.

5.6.9 Structural Fill Placement Below Groundwater

If structural fill will be placed below the groundwater table at the time of construction, we recommend the following:

- The excavation bottom and sidewalls should be lined with a non-woven geotextile separation fabric (Mirafi 160N or equivalent).
- The excavation should be backfilled with free-draining permeable base as recommended in Section 5.6.7.2 of this report.
- Free draining permeable base should be placed to an elevation approximately 6 inches above the water table at the time of construction.
- The aggregate should be seated in place by several passes of a vibratory plate compactor or roller.
- The free-draining aggregate should be separated from overlying structural fill by two layers of a non-woven geotextile separation fabric (Mirafi 160N or equivalent).

5.6.10 Temporary Dewatering

Depending on the groundwater levels at the time of construction and depth of proposed utilities, excavations could extend below the groundwater table. Additionally, because groundwater in the site vicinity is contaminated, significant effort could be required to collect, temporarily store, test, and coordinate suitable disposal of water generated from dewatering activities. Temporary dewatering, if required, should be conducted in accordance with appliable regulations and the SGMP prepared for this project. Temporary dewatering should be maintained until structures have sufficient uplift resistance.

5.6.11 Weather Considerations

Site soil is moisture sensitive. If site grading is performed during or following extended periods of rainfall or snow melt, the moisture content of the exposed soil could be significantly above optimum. This condition, if encountered, could delay grading by creating difficulties with respect to control of the soil moisture content during compaction. Typical remedial measures include disking and aerating the soil during dry weather, mixing the soil with dryer materials, removing and replacing the soil with an approved structural fill material, or mixing the soils with an approved hydrating agent such as a lime or cement product. GeoEngineers should be consulted before implementing remedial measures to observe the unstable subgrade condition and provide site specific recommendations.

6.0 Limitations

We have prepared this report for Ardurra for the City of Chelan CC1 Sewer Lift Station project in Chelan, Washington. Ardurra may distribute copies of this report to the City of Chelan and other authorized agents and regulatory agencies as may be required for the project.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. The conclusions, recommendations and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table and/or figure), if provided, and any attachments should be considered a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

Please refer to Appendix D, Report Limitations and Guidelines for Use, for additional information pertaining to use of this report.

7.0 References

GeoEngineers, Inc. 2025. "Remedial Investigation, Chelan Sewer Pump Station No. 1, 117 Wapato Avenue, Chelan, Washington." March 25, 2025.

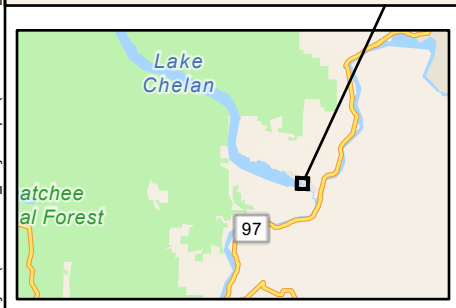
Tabor, R.W., et al. 1987. "Geologic Map of the Chelan 30-Minute by 60-Minute Quadrangle, Washington." Obtained from United States Geological Survey.

Washington State Department of Ecology. "Stormwater Management Manual for Eastern Washington." 2024.

Washington State Department of Transportation. Standard Specifications for Road, Bridge and Municipal Construction. 2025.

Figures





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0 1,000

Feet

Source(s):
- ESRI

Coordinate System: NAD 1983 UTM Zone 10N

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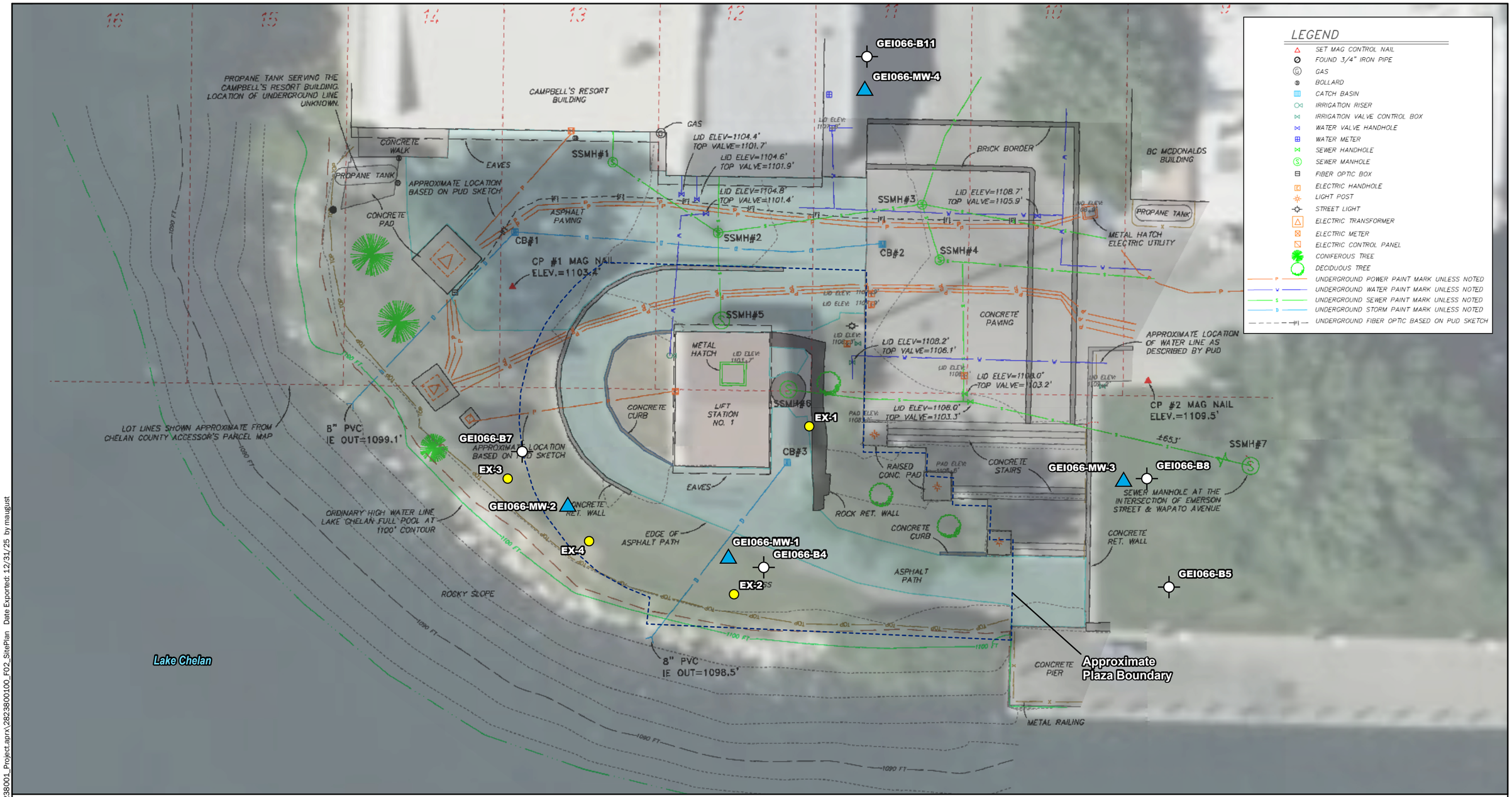
Vicinity Map

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure 1

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Source(s):
- Azure Maps

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Legend

- 2025 Exploration conducted by GeoEngineers
- 2024 Monitoring Well installed by GeoEngineers
- 2024 Exploration conducted by GeoEngineers

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Site Plan

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure 2

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Appendices

Appendix A
Field Explorations and Laboratory Testing

Appendix A
Field Explorations and Laboratory Testing

FIELD EXPLORATIONS

We explored soil conditions at the site on November 6, 2025, by advancing four explorations (EX-1 through EX-4) using a hand auger and four probes (DC-1 through DC-4) using Wildcat® Dynamic Cone Penetrometer (DCP). Hand auger explorations were advanced to depths ranging from 1½ feet below ground surface (bgs) to 3 feet bgs, where refusal was encountered. DCP tests were advanced to depths of about 3 feet to 33 feet bgs. The approximate locations of borings are shown on Site Plan, Figure 2.

Our field representative conducted the explorations, reviewed and classified the soil encountered, obtained representative samples and logged each exploration. We visually classified soil samples in the field using ASTM International (ASTM) Test Method D 2488 (Practice for Description and Identification of Soils) and the classification chart listed in Key to Exploration Logs, Figure A-1. The hand auger exploration logs are presented in Logs of Hand Augers, Figures A-2 through A-5. The logs are based on interpretation of the field observations and indicate the depth at which subsurface materials, or their characteristics change, although those changes might actually be gradual. The DCP logs are presented in Figures A-6 through A-9.

We selected the exploration locations based on coordination with Ardurra based on the locations of proposed site improvements and in consideration of site access constraints and underground utilities. We established the final exploration locations in the field by taping from existing site features. Exploration locations should be considered accurate to the degree implied by the method used.

LABORATORY TESTING

We returned soil samples obtained from our explorations to our laboratory for further review and testing. Representative soil samples were selected for laboratory tests to evaluate select geotechnical engineering characteristics of the site soil, and to confirm or revise our field classification. The soil samples were classified visually and by laboratory testing using the Unified Soil Classification System (USCS) and ASTM classification methods. ASTM test method D 2488 was used to visually classify the soil samples while ASTM D 2487 (Classification of Soils for Engineering Purposes) was used to classify soil samples based on the laboratory tests results, when applicable.

The test procedures were performed in general accordance with the applicable ASTM test procedures (“in general accordance” means certain local and common descriptive practices and methodologies have been followed). The laboratory soil testing program is summarized in Table A-1 below.

TABLE A-1. SUMMARY OF LABORATORY TESTING

STANDARD TEST METHOD FOR:	TEST METHOD DESIGNATION	TOTAL TESTS PERFORMED	RESULTS LOCATION
Sieve Analysis of Fine and Coarse Aggregates	ASTM C 136	1	Presented in Figure A-10. Fines content presented on the exploration logs in the “Fines Content (%)” column at the respective sample depths.

STANDARD TEST METHOD FOR:	TEST METHOD DESIGNATION	TOTAL TESTS PERFORMED	RESULTS LOCATION
Sieve and Hydrometer Analyses	ASTM D 422	4	Presented in Figure A-11. Fines content presented on the exploration logs in the "Fines Content (%)" column at the respective sample depths.
Moisture/Density (Modified Proctor)	ASTM D 1557	1	Presented in Figure A-12.
California Bearing Ratio	ASTM D 1883	1	Presented in Figure A-13.
Moisture Content	ASTM D 2216	5	Moisture content presented on the exploration logs at the respective sample depths.

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- Modified California Sampler (6-inch sleeve) or Dames & Moore
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

- Measured groundwater level in exploration, well, or piezometer
- Measured free product in well or piezometer

Graphic Log Contact

- Distinct contact between soil strata
- Approximate contact between soil strata

Material Description Contact

- Contact between geologic units
- Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

Key to Exploration Logs

GeoEngineers

Figure A-1

Date Excavated 11/6/2025	Total Depth (ft) 1.5	Logged By AN Checked By JDO	Excavator GeoEngineers, Inc. Equipment Hand Auger	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					SM	Silty Sand with Gravel (SM), very loose to loose, brown, moist; mostly fine to medium sand. [Fill]			
	1		1 SA				14	25	

Hand auger refusal at approximately 1½ feet on gravel

Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on N/A.

Log of Hand Auger EX-1

GeoEngineers

Project: City of Chelan - CC1 Sewer Lift Station
Project Location: Chelan, Washington
Project Number: 28238-001-00

Figure A-2
Sheet 1 of 1

Date:12/30/25 Path:P:\28\28238001\GINT\28238001 00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Date Excavated 11/6/2025	Total Depth (ft) 3	Logged By AN Checked By JDO	Excavator GeoEngineers, Inc. Equipment Hand Auger	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
				TS	Silty Sand (SM), very loose to loose, dark brown, moist; organics. [Topsoil]			
		1 SA		SM	Silty Sand with Gravel (SM), loose to medium dense, green-gray, moist; mostly fine to medium sand; contains asphalt and brick debris. [Fill]	17	22	
1								
2		2			Becomes medium dense to dense.			
3					Hand auger refusal at approximately 3 feet on cobble			

Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on N/A.

Log of Hand Auger EX-2

GeoEngineers

Project: City of Chelan - CC1 Sewer Lift Station
Project Location: Chelan, Washington
Project Number: 28238-001-00

Figure A-3
Sheet 1 of 1

Date:12/30/25 Path:P:\28\28238001\GINT\28238001 00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

Date Excavated 11/6/2025	Total Depth (ft) 3	Logged By AN Checked By JDO	Excavator GeoEngineers, Inc. Equipment Hand Auger	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet)	Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
					TS	Silty Sand (SM), very loose to loose, dark brown, moist; organics. [Topsoil]			
			1 SA		SM	Silty Sand (SM), medium dense, brown, moist; mostly fine to medium sand; trace organics and gravel. [Fill]	22	42	
	1					Grades with gravel; becomes gray-brown.			
	2		2 SA				5	16	
	3					Becomes dense.			
						Hand auger refusal at approximately 3 feet on coarse gravel			

Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on N/A.

Log of Hand Auger EX-3

GeoEngineers

Project: City of Chelan - CC1 Sewer Lift Station
Project Location: Chelan, Washington
Project Number: 28238-001-00

Figure A-4
Sheet 1 of 1

Date:12/30/25 Path:P:\28\28238001\GINT\28238001 00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

023200 - GEOTECHNICAL ENGINEERING EVALUATION

Date Excavated 11/6/2025	Total Depth (ft) 3	Logged By AN Checked By JDO	Excavator GeoEngineers, Inc. Equipment Hand Auger	Groundwater not observed Caving not observed
Surface Elevation (ft) Vertical Datum Undetermined		Easting (X) Northing (Y)	Coordinate System Horizontal Datum	

Elevation (feet) / Depth (feet)	SAMPLE: Testing Sample	SAMPLE: Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Moisture Content (%)	Fines Content (%)	REMARKS
				TS	Silty Sand (SM), very loose to loose, dark brown, moist; organics. [Topsoil]			
				SM	Silty Sand with Gravel (SM), loose to medium dense, dark gray, moist; mostly fine to medium sand; organics; asphalt debris. [Fill]			
1								
2								
		1 SA				9	20	
3					Becomes dense.			
					Hand auger refusal at approximately 3 feet on gravel			

Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on N/A.

Log of Hand Auger EX-4

GeoEngineers

Project: City of Chelan - CC1 Sewer Lift Station
Project Location: Chelan, Washington
Project Number: 28238-001-00

Figure A-5
Sheet 1 of 1

Date:12/30/25 Path:P:\28\28238001\GINT\28238001GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_TESTPIT_1P_GEOTEC_%F

WILDCAT DYNAMIC CONE LOG

GeoEngineers
600 Dupont Street
Bellingham, WA 98225

PROJECT NUMBER: 28238-001-00
DATE STARTED: 11-06-2025
DATE COMPLETED: 11-06-2025

HOLE #: DC-1
CREW: Alex Navarra
PROJECT: CC-1 Lift Station
ADDRESS: 109 E Wapato Ave
LOCATION: Chelan, WA

SURFACE ELEVATION: Undetermined
WATER ON COMPLETION: Undetermined
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	3	13.3	•••	3	VERY LOOSE	SOFT
- 1 ft	4	17.8	•••••	5	LOOSE	MEDIUM STIFF
-	10	44.4	••••••••••••	12	MEDIUM DENSE	STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 2 ft	9	40.0	••••••••••	11	MEDIUM DENSE	STIFF
-	9	40.0	••••••••••	11	MEDIUM DENSE	STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 3 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 m	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	4	15.4	••••	4	VERY LOOSE	SOFT
- 4 ft	6	23.2	••••••	6	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
- 5 ft	5	19.3	•••••	5	LOOSE	MEDIUM STIFF
-	8	30.9	•••••••••	8	LOOSE	MEDIUM STIFF
-	13	50.2	••••••••••••••	14	MEDIUM DENSE	STIFF
- 6 ft	10	38.6	••••••••••	11	MEDIUM DENSE	STIFF
-	8	30.9	•••••••••	8	LOOSE	MEDIUM STIFF
- 2 m	10	38.6	••••••••••	11	MEDIUM DENSE	STIFF
- 7 ft	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
-	5	17.1	••••	4	VERY LOOSE	SOFT
-	8	27.4	•••••••	7	LOOSE	MEDIUM STIFF
- 8 ft	9	30.8	•••••••••	8	LOOSE	MEDIUM STIFF
-	12	41.0	••••••••••	11	MEDIUM DENSE	STIFF
-	10	34.2	•••••••••	9	LOOSE	STIFF
- 9 ft	10	34.2	•••••••••	9	LOOSE	STIFF
-	10	34.2	•••••••••	9	LOOSE	STIFF
-	14	47.9	••••••••••••••	13	MEDIUM DENSE	STIFF
- 3 m 10 ft	10	34.2	•••••••••	9	LOOSE	STIFF
-	14	42.8	••••••••••••	12	MEDIUM DENSE	STIFF
-	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	10	30.6	•••••••••	8	LOOSE	MEDIUM STIFF
- 11 ft	15	45.9	••••••••••••••	13	MEDIUM DENSE	STIFF
-	28	85.7	••••••••••••••••••••••••••	24	MEDIUM DENSE	VERY STIFF
-	8	24.5	•••••••	6	LOOSE	MEDIUM STIFF
- 12 ft	9	27.5	•••••••	7	LOOSE	MEDIUM STIFF
-	15	45.9	••••••••••••••	13	MEDIUM DENSE	STIFF
-	8	24.5	•••••••	6	LOOSE	MEDIUM STIFF
- 4 m 13 ft	5	15.3	••••	4	VERY LOOSE	SOFT

Dynamic Cone Penetrometer Logs – DC-1

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-6

28238-001-00 Date Exported: 12/15/25

HOLE #: DC-1 **WILDCAT DYNAMIC CONE LOG** Page 2 of 3

PROJECT: CC-1 Lift Station PROJECT NUMBER: 28238-001-00

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	5	13.9	••••	3	VERY LOOSE	SOFT
-	7	19.4	•••••	5	LOOSE	MEDIUM STIFF
- 14 ft	7	19.4	•••••	5	LOOSE	MEDIUM STIFF
-	7	19.4	•••••	5	LOOSE	MEDIUM STIFF
-	5	13.9	••••	3	VERY LOOSE	SOFT
- 15 ft	6	16.6	••••	4	VERY LOOSE	SOFT
-	6	16.6	••••	4	VERY LOOSE	SOFT
-	6	16.6	••••	4	VERY LOOSE	SOFT
- 16 ft	7	19.4	•••••	5	LOOSE	MEDIUM STIFF
- 5 m	8	22.2	••••••	6	LOOSE	MEDIUM STIFF
-	8	20.3	•••••	5	LOOSE	MEDIUM STIFF
- 17 ft	9	22.9	••••••	6	LOOSE	MEDIUM STIFF
-	6	15.2	••••	4	VERY LOOSE	SOFT
-	5	12.7	•••	3	VERY LOOSE	SOFT
- 18 ft	3	7.6	••	2	VERY LOOSE	SOFT
-	3	7.6	••	2	VERY LOOSE	SOFT
-	3	7.6	••	2	VERY LOOSE	SOFT
- 19 ft	3	7.6	••	2	VERY LOOSE	SOFT
-	4	10.2	••	2	VERY LOOSE	SOFT
- 6 m	4	10.2	••	2	VERY LOOSE	SOFT
- 20 ft	6	14.0	••••	3	VERY LOOSE	SOFT
-	6	14.0	••••	3	VERY LOOSE	SOFT
-	4	9.3	••	2	VERY LOOSE	SOFT
- 21 ft	3	7.0	••	1	VERY LOOSE	VERY SOFT
-	4	9.3	••	2	VERY LOOSE	SOFT
-	4	9.3	••	2	VERY LOOSE	SOFT
- 22 ft	4	9.3	••	2	VERY LOOSE	SOFT
-	4	9.3	••	2	VERY LOOSE	SOFT
-	7	16.3	••••	4	VERY LOOSE	SOFT
- 7 m 23 ft	7	16.3	••••	4	VERY LOOSE	SOFT
-	10	21.6	••••••	6	LOOSE	MEDIUM STIFF
-	9	19.4	•••••	5	LOOSE	MEDIUM STIFF
- 24 ft	10	21.6	••••••	6	LOOSE	MEDIUM STIFF
-	12	25.9	•••••••	7	LOOSE	MEDIUM STIFF
-	14	30.2	••••••••	8	LOOSE	MEDIUM STIFF
- 25 ft	42	90.7	••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	36	77.8	••••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
-	12	25.9	•••••••	7	LOOSE	MEDIUM STIFF
- 26 ft	13	28.1	••••••••	8	LOOSE	MEDIUM STIFF
- 8 m	12	25.9	•••••••	7	LOOSE	MEDIUM STIFF
-	11	22.1	••••••	6	LOOSE	MEDIUM STIFF
- 27 ft	10	20.1	•••••	5	LOOSE	MEDIUM STIFF
-	14	28.1	••••••••	8	LOOSE	MEDIUM STIFF
-	12	24.1	••••••	6	LOOSE	MEDIUM STIFF
- 28 ft	13	26.1	•••••••	7	LOOSE	MEDIUM STIFF
-	11	22.1	••••••	6	LOOSE	MEDIUM STIFF
-	10	20.1	•••••	5	LOOSE	MEDIUM STIFF
- 29 ft	12	24.1	••••••	6	LOOSE	MEDIUM STIFF
-	14	28.1	••••••••	8	LOOSE	MEDIUM STIFF
- 9 m	12	24.1	••••••	6	LOOSE	MEDIUM STIFF

Dynamic Cone Penetrometer Logs – DC-1 (continued)

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-6

28238-001-00 Date Exported: 12/15/25

HOLE #: DC-1 **WILDCAT DYNAMIC CONE LOG** Page 3 of 3

PROJECT: CC-1 Lift Station PROJECT NUMBER: 28238-001-00

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
- 30 ft	12	22.7	••••••	6	LOOSE	MEDIUM STIFF
-	10	18.9	•••••	5	LOOSE	MEDIUM STIFF
-	12	22.7	••••••	6	LOOSE	MEDIUM STIFF
- 31 ft	14	26.5	•••••••	7	LOOSE	MEDIUM STIFF
-	16	30.2	••••••••	8	LOOSE	MEDIUM STIFF
-	12	22.7	••••••	6	LOOSE	MEDIUM STIFF
-	17	32.1	•••••••••	9	LOOSE	STIFF
- 32 ft	17	32.1	•••••••••	9	LOOSE	STIFF
-	13	24.6	•••••••	7	LOOSE	MEDIUM STIFF
- 10 m	14	26.5	•••••••	7	LOOSE	MEDIUM STIFF
- 33 ft						
- 34 ft						
- 35 ft						
- 11 m 36 ft						
- 37 ft						
- 38 ft						
- 39 ft						
- 12 m						
- 40 ft						
- 41 ft						
- 42 ft						
- 13 m						
- 43 ft						
- 44 ft						
- 45 ft						
- 14 m 46 ft						

Dynamic Cone Penetrometer Logs – DC-1 (continued)

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-6

28238-001-00 Date Exported: 12/15/25

WILDCAT DYNAMIC CONE LOG

GeoEngineers
600 Dupont Street
Bellingham, WA 98225

PROJECT NUMBER: 28238-001-00
DATE STARTED: 11-06-2025
DATE COMPLETED: 11-06-2025

HOLE #: DC-2
CREW: Alex Navarra
PROJECT: CC-1 Lift Station
ADDRESS: 109 E Wapato Ave
LOCATION: Chelan, WA

SURFACE ELEVATION: Undetermined
WATER ON COMPLETION: Undetermined
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	8	35.5	••••••••••	10	LOOSE	STIFF
- 1 ft	10	44.4	•••••••••••	12	MEDIUM DENSE	STIFF
-	10	44.4	•••••••••••	12	MEDIUM DENSE	STIFF
-	5	22.2	••••••	6	LOOSE	MEDIUM STIFF
- 2 ft	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
-	26	115.4	••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 3 ft			REFUSAL			
- 1 m						
-						
- 4 ft						
-						
-						
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

Dynamic Cone Penetrometer Logs – DC-2

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-7

28238-001-00 Date Exported: 12/15/25

WILDCAT DYNAMIC CONE LOG

GeoEngineers
600 Dupont Street
Bellingham, WA 98225

PROJECT NUMBER: 28238-001-00
DATE STARTED: 11-06-2025
DATE COMPLETED: 11-06-2025

HOLE #: DC-3
CREW: Alex Navarra
PROJECT: CC-1 Lift Station
ADDRESS: 109 E Wapato Ave
LOCATION: Chelan, WA

SURFACE ELEVATION: Undetermined
WATER ON COMPLETION: Undetermined
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	13	57.7	••••••••••••••••	16	MEDIUM DENSE	VERY STIFF
-	12	53.3	••••••••••••••	15	MEDIUM DENSE	STIFF
-	12	53.3	••••••••••••••	15	MEDIUM DENSE	STIFF
- 2 ft	22	97.7	••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
-	28	124.3	••••••••••••••••••••••••••••••••	25+	DENSE	HARD
-	34	151.0	••••••••••••••••••••••••••••••••••••	25+	DENSE	HARD
- 3 ft	24	106.6	••••••••••••••••••••••••••	25+	MEDIUM DENSE	VERY STIFF
- 1 m	20	88.8	••••••••••••••••••••••	25	MEDIUM DENSE	VERY STIFF
-	20	77.2	••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
- 4 ft	20	77.2	••••••••••••••••••••	22	MEDIUM DENSE	VERY STIFF
-	46	177.6	••	25+	DENSE	HARD
-			REFUSAL			
- 5 ft						
-						
-						
- 6 ft						
-						
- 2 m						
- 7 ft						
-						
-						
- 8 ft						
-						
-						
- 9 ft						
-						
-						
- 3 m 10 ft						
-						
-						
-						
- 11 ft						
-						
-						
- 12 ft						
-						
-						
- 4 m 13 ft						

Dynamic Cone Penetrometer Logs – DC-3

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-8

28238-001-00 Date Exported: 12/15/25

WILDCAT DYNAMIC CONE LOG

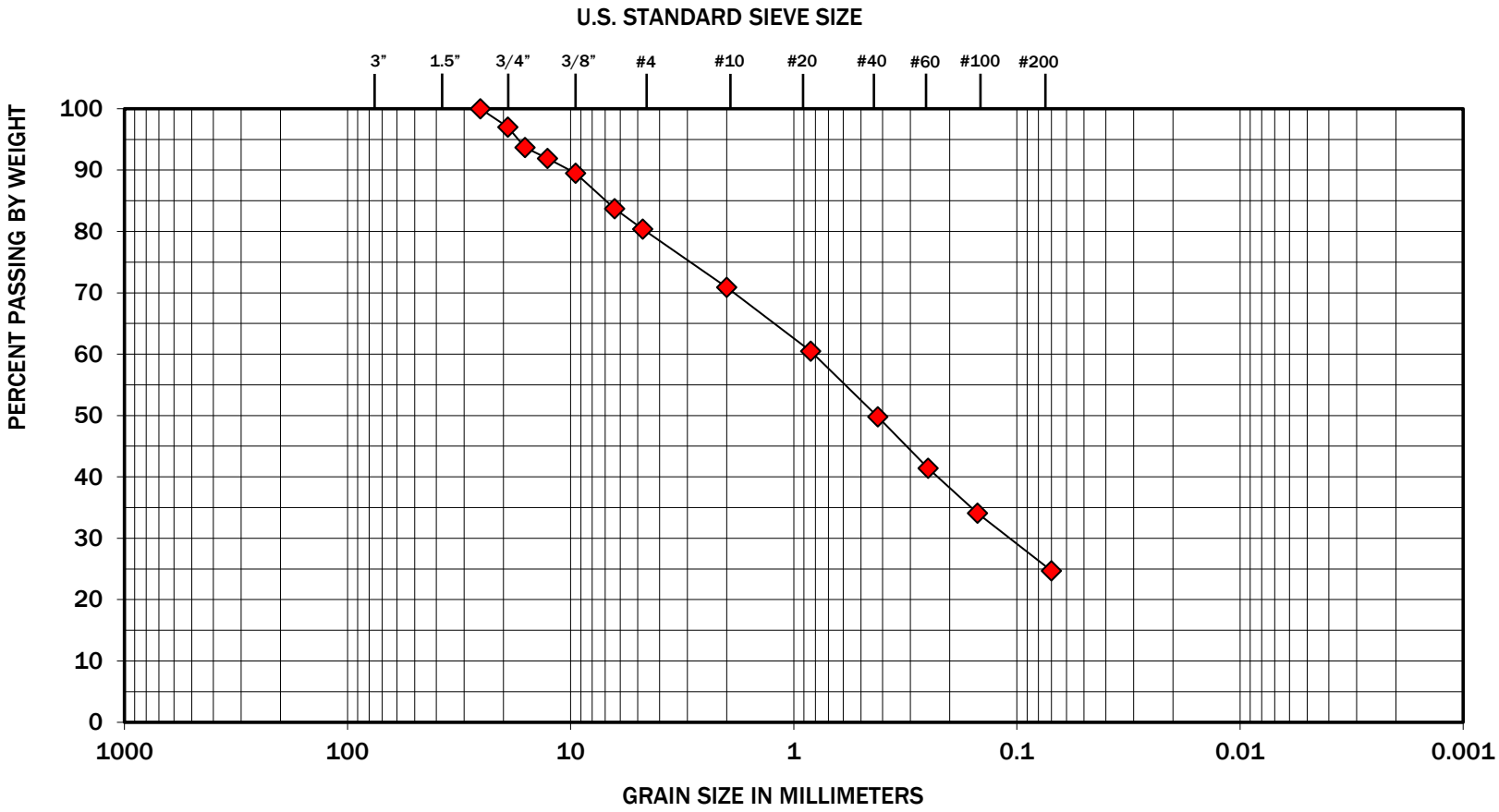
GeoEngineers
600 Dupont Street
Bellingham, WA 98225

PROJECT NUMBER: 28238-001-00
DATE STARTED: 11-06-2025
DATE COMPLETED: 11-06-2025

HOLE #: DC-4
CREW: Alex Navarra
PROJECT: CC-1 Lift Station
ADDRESS: 109 E Wapato Ave
LOCATION: Chelan, WA

SURFACE ELEVATION: Undetermined
WATER ON COMPLETION: Undetermined
HAMMER WEIGHT: 35 lbs.
CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY NON-COHESIVE	TESTED CONSISTENCY COHESIVE
-	3	13.3	•••	3	VERY LOOSE	SOFT
-	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
- 1 ft	11	48.8	••••••••••••••	13	MEDIUM DENSE	STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
-	7	31.1	•••••••••	8	LOOSE	MEDIUM STIFF
- 2 ft	6	26.6	•••••••	7	LOOSE	MEDIUM STIFF
-	9	40.0	••••••••••••	11	MEDIUM DENSE	STIFF
-	8	35.5	••••••••••	10	LOOSE	STIFF
- 3 ft	43	190.9	•••••••••••••



COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	

Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	EX-1	1 - 1.5	14	Silty sand with gravel (SM)

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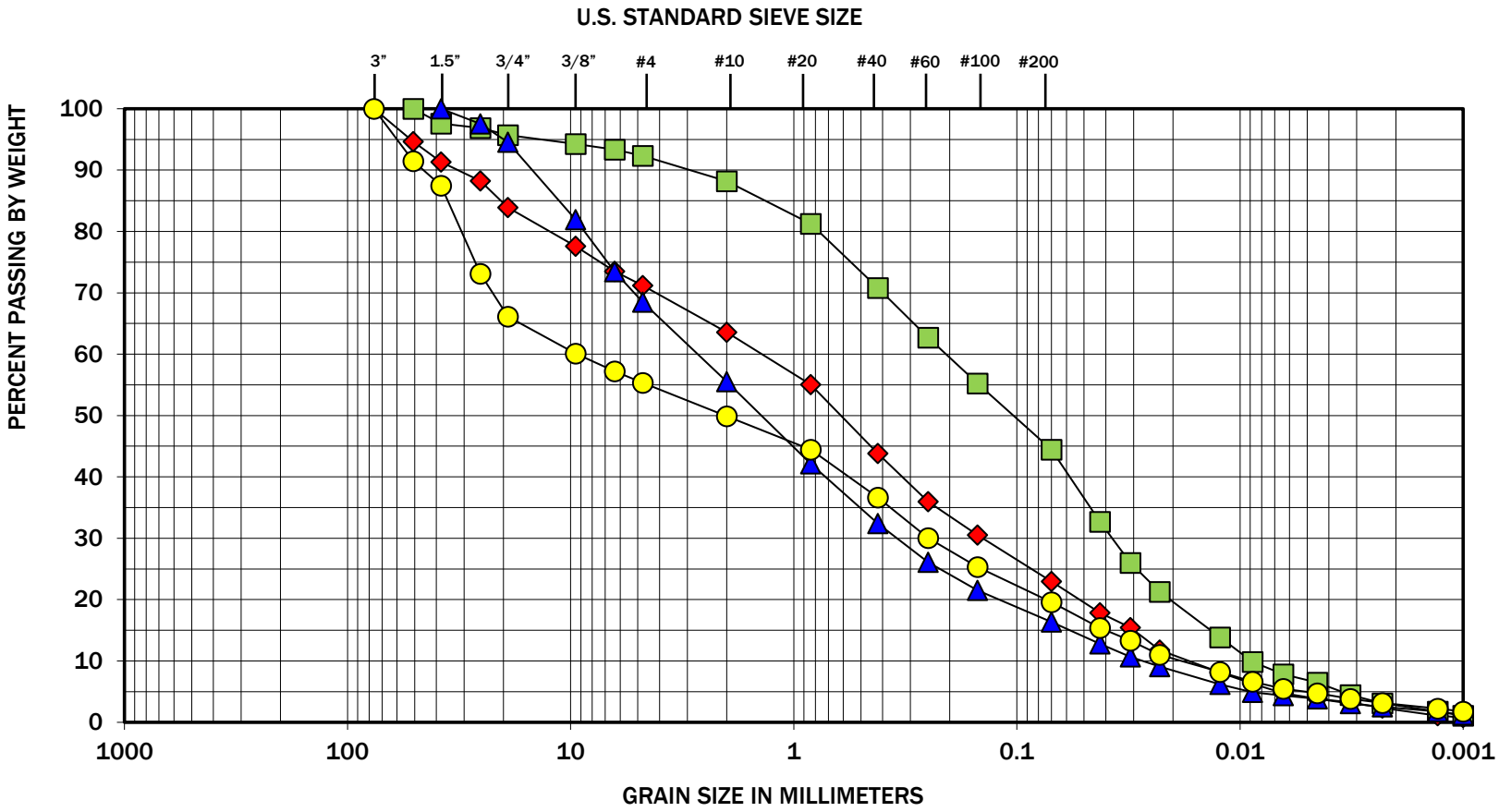
The grain size analysis results were obtained in general accordance with ASTM C 136.

Sieve Analysis Results

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-10



Symbol	Boring Number	Depth (feet)	Moisture (%)	Soil Description
◆	EX-2	0.25 - 1	17	Silty sand with gravel (SM)
■	EX-3	0.25 - 1	22	Silty sand with fine grass roots (SM)
▲	EX-3	2 - 2.5	5	Silty sand with gravel (SM)
●	EX-4	2.5	9	Silty gravel with sand (GM/SM)

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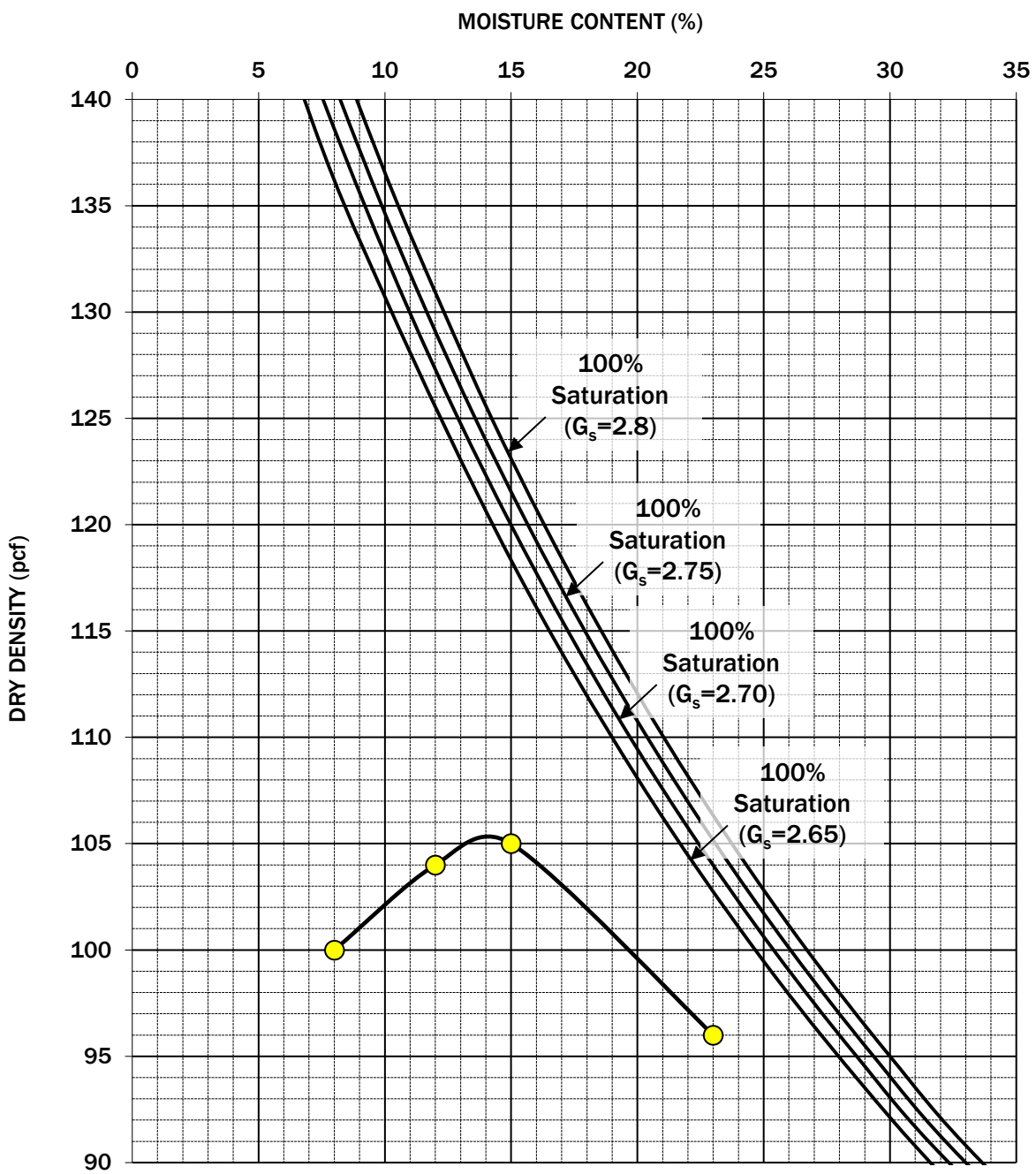
The grain size analysis results were obtained in general accordance with ASTM D 422.

Sieve and Hydrometer Analysis Results

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-11



Symbol	Boring Number	Depth (feet)	Soil Description	Optimum Moisture (%)	Maximum Dry Density (pcf)
Uncorrected	EX-3	0.25 – 1	Dark gray silty sand (SM)	15.0	105.0

Note: This report may not be reproduced, except in full, without written approval of GeoEngineers, Inc. Test results are applicable only to the specific sample on which they were performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes.

The Proctor results were obtained in general accordance with ASTM D 698 (AASHTO T-99).

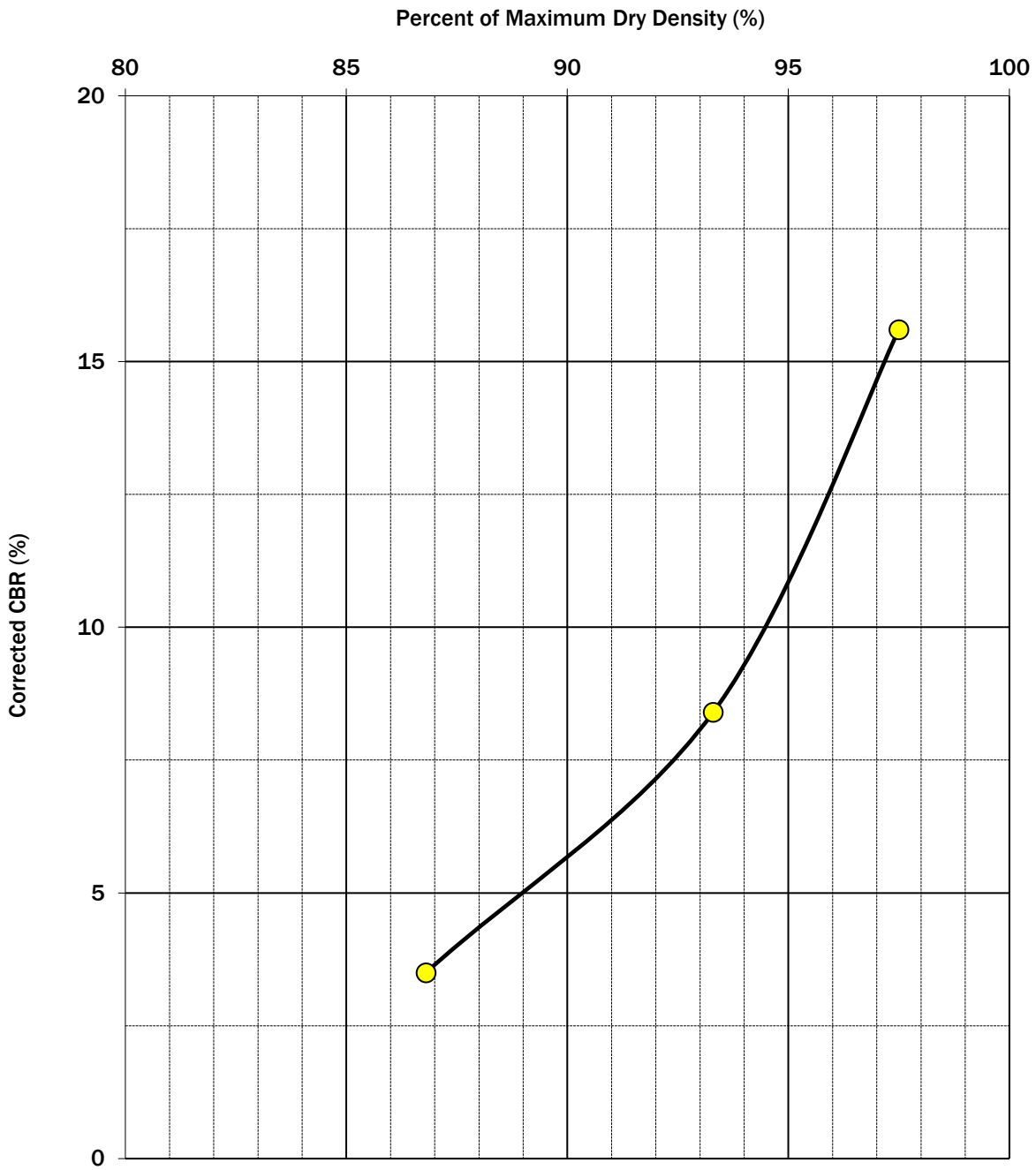
Compaction Test Results

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-12

28238-001-00 Date Exported: 12/16/2025



Symbol	Test Pit Number	Depth (feet)	Soil Description	Optimum Moisture (%)	Maximum Dry Density (pcf)
○	EX-3	0.25 - 1	Silty Sand (SM)	15	105.0

Note: This report may not be reproduced, except in full, without written approval of GeoEngineers, Inc. Test results are applicable only to the specific sample on which they were performed, and should not be interpreted as representative of any other samples obtained at other times, depths or locations, or generated by separate operations or processes.

The Proctor results were obtained in general accordance with ASTM D 1883.

California Bearing Ratio

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure A-13

28238-001-00 Date Exported: 12/15/25

Appendix B
Previous Exploration Logs

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE			GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE			SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- Modified California Sampler (6-inch sleeve) or Dames & Moore
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

- Measured groundwater level in exploration, well, or piezometer
- Measured free product in well or piezometer

Graphic Log Contact

- Distinct contact between soil strata
- Approximate contact between soil strata

Material Description Contact

- Contact between geologic units
- Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
EI	Expansion index
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

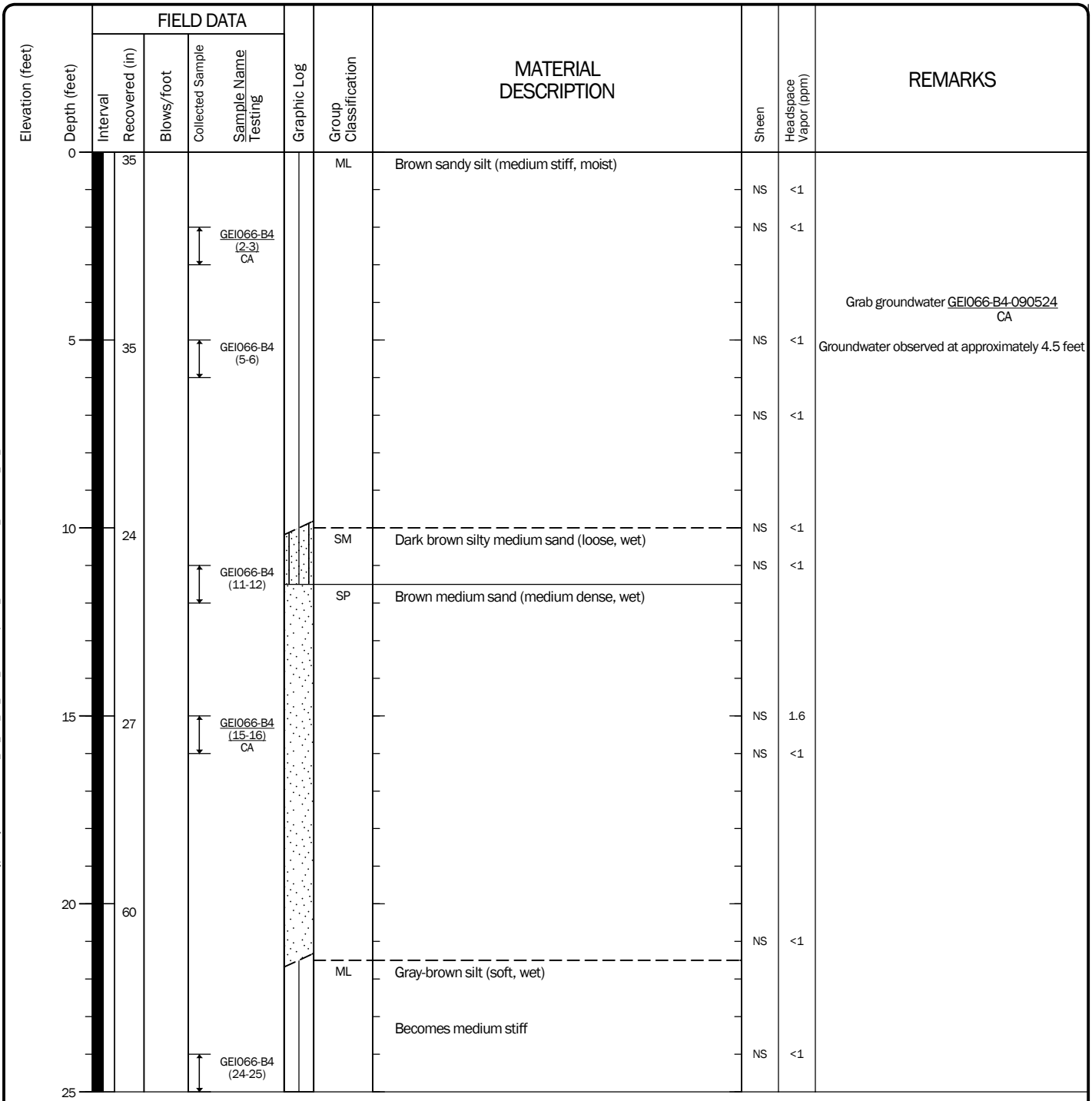
Key to Exploration Logs

GeoEngineers

Figure B-1

Drilled Start 9/4/2024 End 9/4/2024	Total Depth (ft) 25	Logged By SR Checked By JDO	Driller AEC Drilling	Drilling Method Direct-push	
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment GeoProbe 7022DT	
Easting (X) 1840225 Northing (Y) 307235		System Datum WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes:



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

Log of Boring GEI066-B4

GeoEngineers

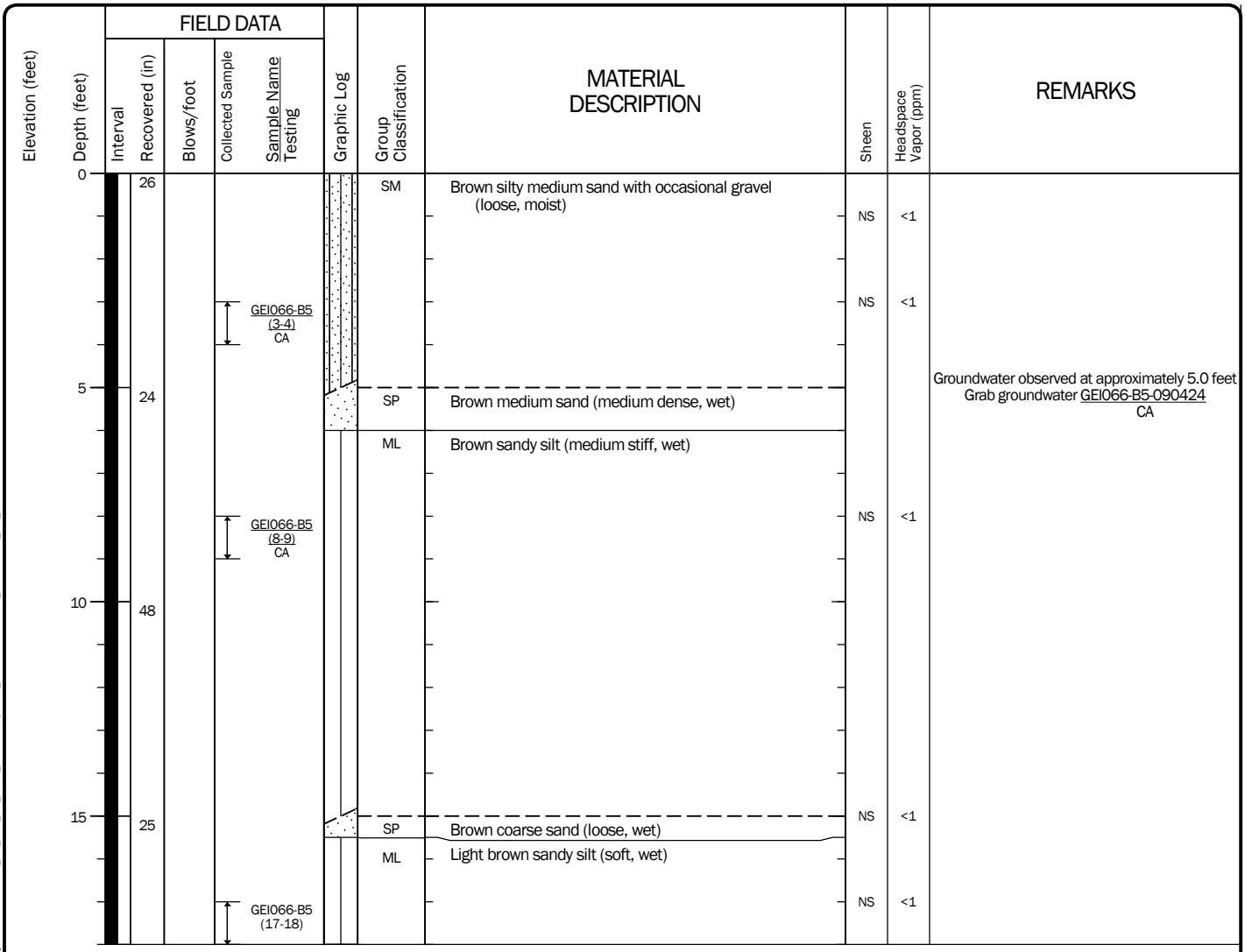
Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-2
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library/GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

023200 - GEOTECHNICAL ENGINEERING EVALUATION

Drilled Start 9/3/2024 End 9/3/2024	Total Depth (ft) 18	Logged By SR Checked By JDO	Driller AEC Drilling	Drilling Method Direct-push	
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment GeoProbe 7022DT	
Easting (X) 1840289 Northing (Y) 307232		System Datum WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	
Notes:					



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

Log of Boring GEI066-B5

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-3
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

023200 - GEOTECHNICAL ENGINEERING EVALUATION

Drilled Start 9/4/2024 End 9/4/2024	Total Depth (ft) 18	Logged By SR Checked By JDO	Driller AEC Drilling	Drilling Method Direct-push	
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment GeoProbe 7022DT	
Easting (X) 1840187 Northing (Y) 307253		System Datum WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		20					ML	Brown sandy silt with gravel (soft, moist)	NS	<1	
						GEI066-B7 (1-2)		SM	Gray silty sand with occasional gravel (medium dense, moist)	NS	<1	
	5		20			GEI066-B7 (5-6) CA				SS	20.1	Groundwater observed at approximately 4.6 feet Grab groundwater GEI066-B7-090524 CA
								SP	Brown medium sand with gravel (medium dense, wet)	SS	15.1	Petroleum odor
	10		31			GEI066-B7 (10-11) CA		ML	Light brown sandy silt (medium stiff, wet)	NS	1.2	
										NS	<1	
	15		0						No recovery			

Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

Log of Boring GEI066-B7

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-4
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

023200 - GEOTECHNICAL ENGINEERING EVALUATION

Drilled: Start 9/4/2024 End 9/4/2024	Total Depth (ft): 25	Logged By: SR Checked By: JDO	Driller: AEC Drilling	Drilling Method: Direct-push	
Surface Elevation (ft) Vertical Datum: Undetermined NAVD88	Hammer Data: N/A	Drilling Equipment: GeoProbe 7022DT			
Easting (X) Northing (Y): 1840286 307249	System Datum: WA State Plane North NAD83 (feet)	See "Remarks" section for groundwater observed			
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0							SP	Brown fine sand (medium dense, dry)			0 to 6 feet removed with an airknife and vacuum truck
						GEI066-B8 (2-3)				NS	<1	
	5									NS	<1	
			48					ML	Light brown sandy silt with occasional gravel (soft, moist)	NS	1.1	
						GEI066-B8 (7-8) CA			Becomes wet			Groundwater observed at approximately 7.9 feet. Grab groundwater GEI066-B8-090424 CA
	10		60						Becomes medium stiff	NS	<1	
						GEI066-B8 (13-14) CA				NS	<1	
	15		60							NS	<1	
										NS	<1	
	20		60							NS	<1	
										NS	<1	
	25					GEI066-B8 (24-25)						

Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary\Library\GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

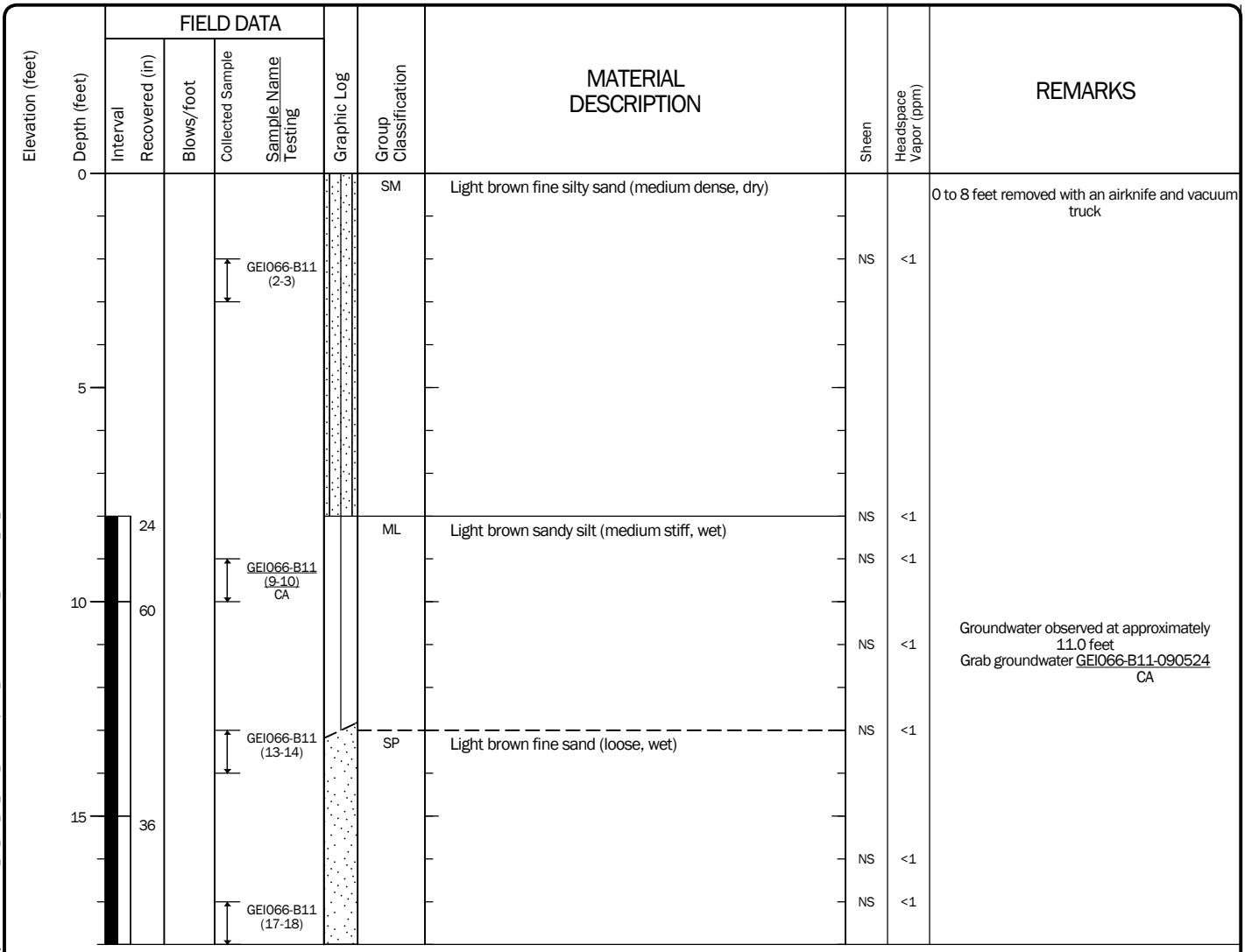
Log of Boring GEI066-B8

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-5
Sheet 1 of 1

Drilled: Start 9/5/2024 End 9/5/2024	Total Depth (ft): 18	Logged By: SR Checked By: JDO	Driller: AEC Drilling	Drilling Method: Direct-push	
Surface Elevation (ft) Vertical Datum: Undetermined NAVD88		Hammer Data: N/A		Drilling Equipment: GeoProbe 7022DT	
Easting (X) Northing (Y): 1840242 307315		System Datum: WA State Plane North NAD83 (feet)		See "Remarks" section for groundwater observed	
Notes:					



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

Log of Boring GEI066-B11

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-6
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	10/24/2024	10/24/2024	20	SR	JDO	AEC Drilling	Direct-push/ Hollow-stem Auger

Hammer Data	N/A	Drilling Equipment	GeoProbe 7022DT
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	1104.73
Easting (X) Northing (Y)	1840232.08 307231.11	Horizontal Datum	WA State Plane North NAD83 (feet)

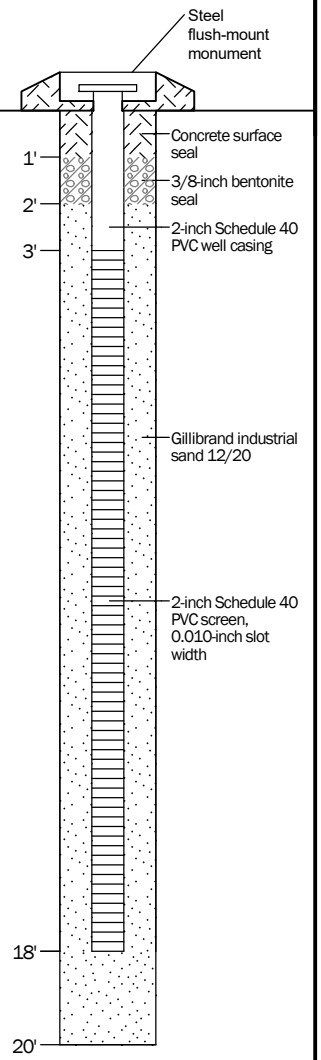
DOE Well I.D.: BQU 461
A 2-in well was installed on 10/24/2024 to a depth of 18 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/30/2024	8.42	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0		42						ML	Brown sandy silt (medium stiff, dry)	NS	<1
									SM	Gray silty sand, occasional gravel (medium dense, dry)		
						GEI066-MW-1 (2-3)						
	5		42									
						GEI066-MW-1 (6-7) CA					NS	<1
							▽			Becomes wet		
	10		30									
						GEI066-MW-1 (13-14)					NS	<1
	15		48						SP	Gray coarse sand (medium dense, wet)		
						GEI066-MW-1 (17-18)					NS	<1
	20											

WELL LOG



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Field Survey by Coffman Engineers dated 11/8/2024. Vertical approximated based on NA.

Log of Monitoring Well GEI066-MW-1

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-7
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Start Drilled	End	Total Depth (ft)	Logged By / Checked By	Driller	Drilling Method
10/24/2024	10/24/2024	20	SR / JDO	AEC Drilling	Direct-push/ Hollow-stem Auger

Hammer Data	N/A	Drilling Equipment	GeoProbe 7022DT
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	1105.14
Easting (X) Northing (Y)	1840197.09 307241.39	Horizontal Datum	WA State Plane North NAD83 (feet)

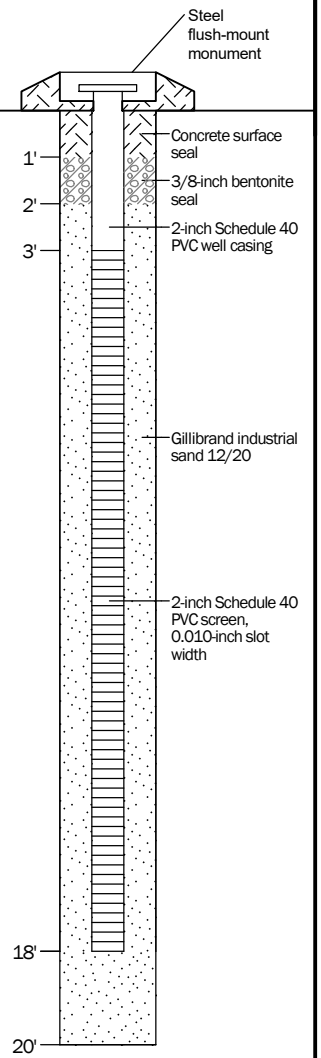
DOE Well I.D.: BQU 462
A 2-in well was installed on 10/24/2024 to a depth of 18 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/30/2024	8.89	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample / Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0		12					ML	Brown sandy silt (soft, moist)	NS	2.1
	5		18		GEI066-MW-2 (5-6) CA			GP	Coarse gravel with sand (medium dense, moist)	NS	2.3
	10		24		GEI066-MW-2 (10-11) CA			SM	Coarse silty sand with gravel, odor (medium dense, wet)	NS	54
								ML	Brown silt with sand (medium stiff, wet)		
	15		54		GEI066-MW-2 (16-17)			SP	Brown coarse sand, odor (medium dense, wet)	NS	19
									With gravel		
									Becomes fine sand	NS	1.2
	20										

WELL LOG



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Field Survey by Coffman Engineers dated 11/8/2024. Vertical approximated based on NA.

Log of Monitoring Well GEI066-MW-2

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-8
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

023200 - GEOTECHNICAL ENGINEERING EVALUATION

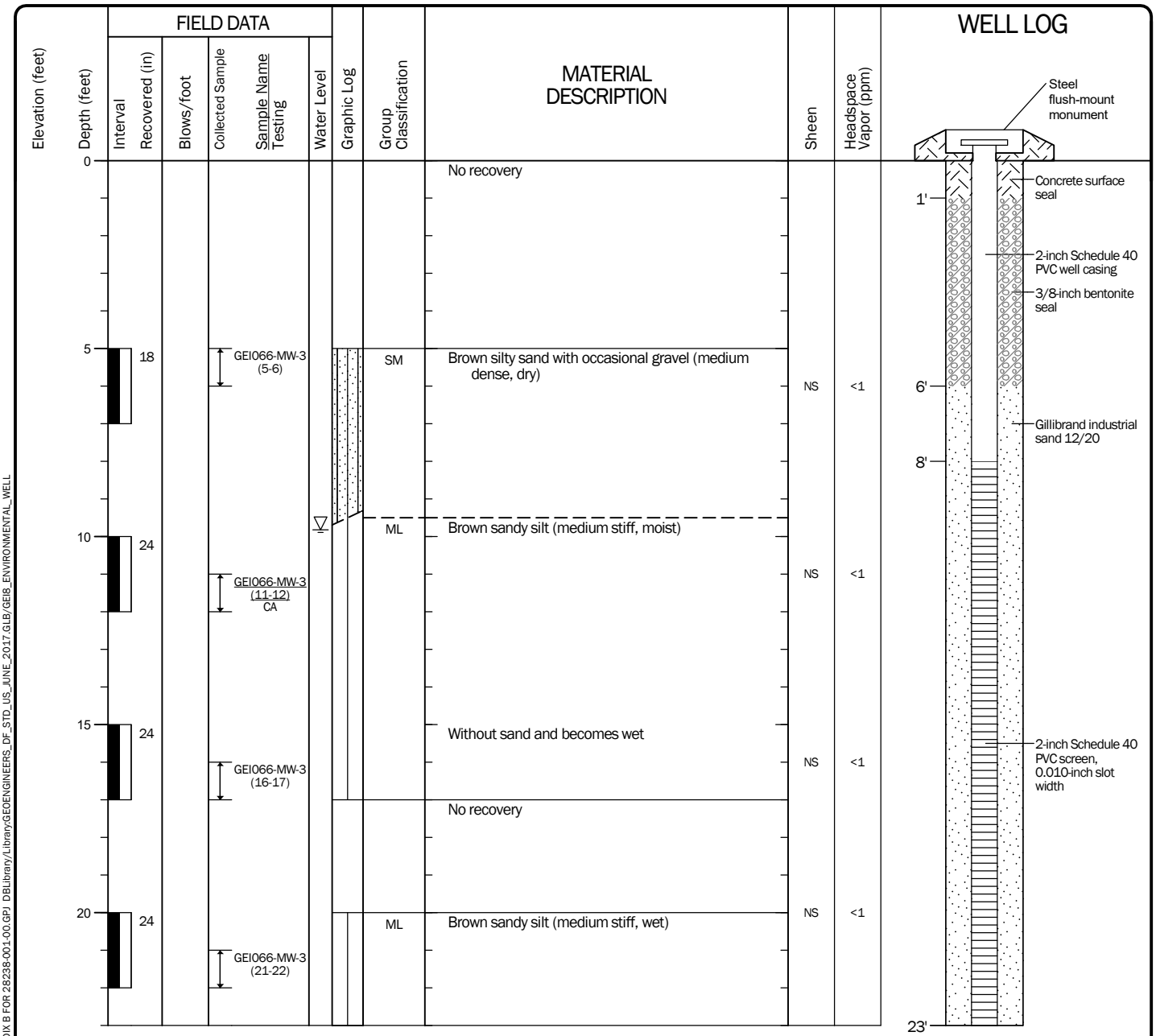
Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	10/23/2024	10/23/2024	23	SR	JDO	AEC Drilling	Direct-push/ Hollow-stem Auger

Hammer Data	N/A	Drilling Equipment	GeoProbe 7022DT
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	1109.03
Easting (X) Northing (Y)	1840296.98 307246.52	Horizontal Datum	WA State Plane North NAD83 (feet)

DOE Well I.D.: BQU 463
A 2-in well was installed on 10/23/2024 to a depth of 23 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/30/2024	9.82	

Notes:



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Field Survey by Coffman Engineers dated 11/8/2024. Vertical approximated based on NA.

Log of Monitoring Well GEI066-MW-3

GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-9
Sheet 1 of 1

Date:12/10/25 Path:P:\0\0504170\GINT\050417001 AS APPENDIX B FOR 28238-001-00.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

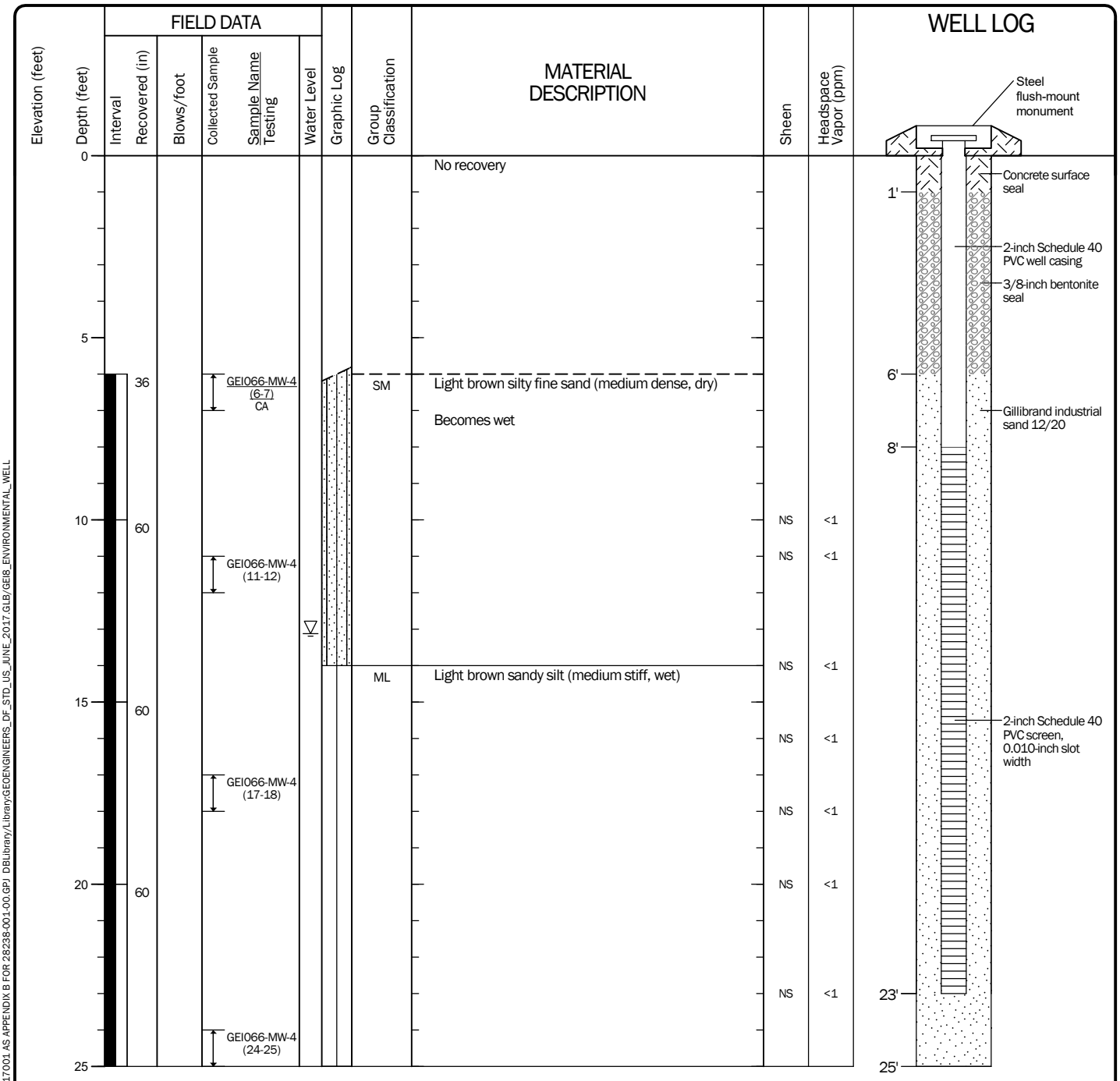
Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	10/24/2024	10/24/2024	25	SR	JDO	AEC Drilling	Direct-push/ Hollow-stem Auger

Hammer Data	N/A	Drilling Equipment	GeoProbe 7022DT
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	1110.30
Easting (X) Northing (Y)	1840248.86 307311.02	Horizontal Datum	WA State Plane North NAD83 (feet)

DOE Well I.D.: BQU 464
A 2-in well was installed on 10/24/2024 to a depth of 23 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
10/30/2024	13.12	

Notes:



Note: See Figure B-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Field Survey by Coffman Engineers dated 11/8/2024. Vertical approximated based on NA.

Log of Monitoring Well GEI066-MW-4

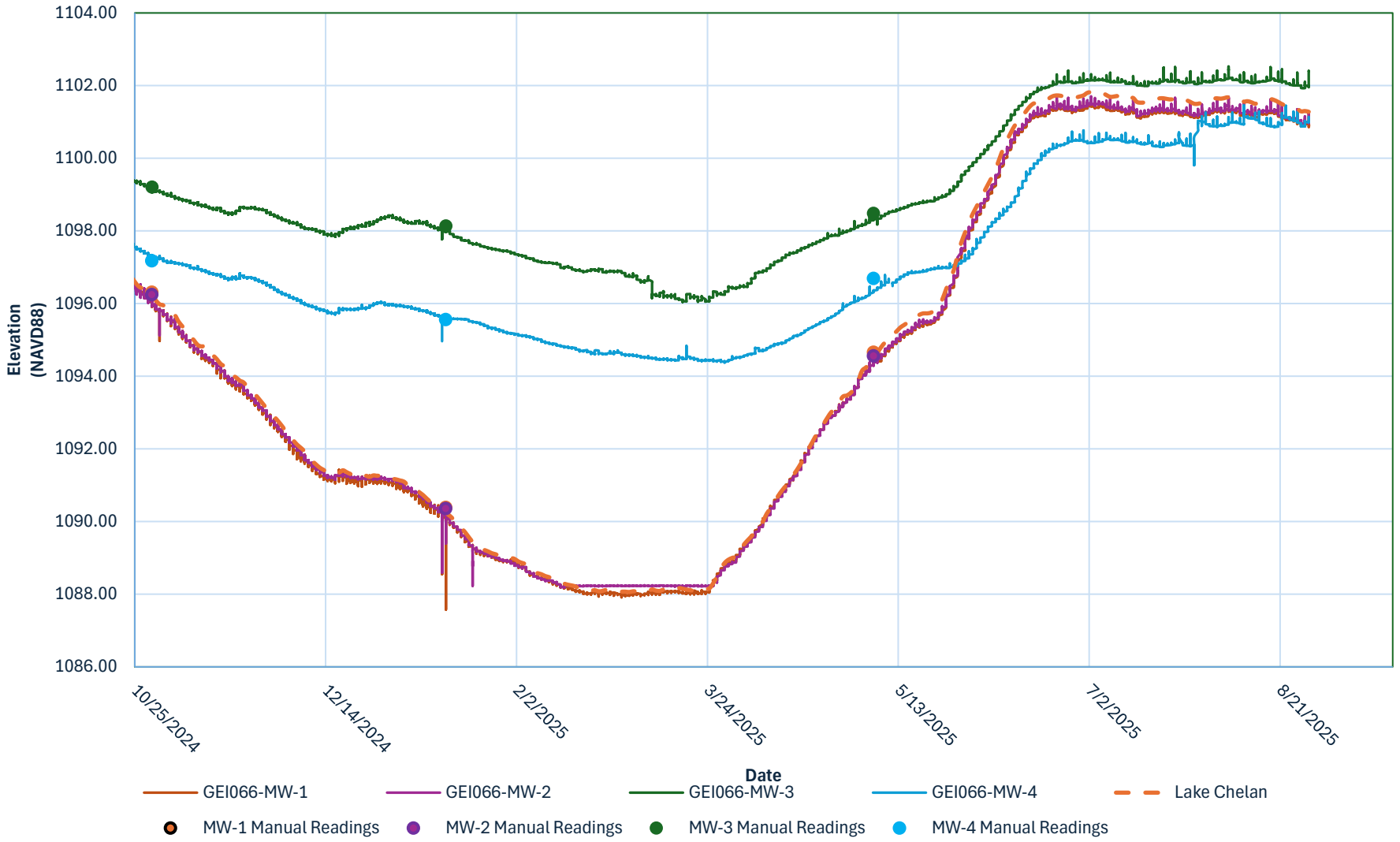
GeoEngineers

Project: Chelan Sewer Pump Station No. 1
Project Location: Chelan, Washington
Project Number: 0504-170-01

Figure B-10
Sheet 1 of 1

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Appendix C
Groundwater Level Measurements



Groundwater Elevation Trends

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure C-1

Notes:

1. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
2. Lake Chelan elevations converted from NGVD of 1912 to NAVD88 using: NGVD of 1912 + 2.18 feet = NAVD88.

Lake Chelan Elevation Data Source: https://www.chelanpud.org/parks-and-recreation/lake-chelan-lake-levels

Appendix D

Report Limitations and Guidelines for Use

Appendix D
Report Limitations and Guidelines for Use[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

READ THESE PROVISIONS CLOSELY

It is important to recognize that the geoscience practices (geotechnical engineering, geology and environmental science) rely on professional judgment and opinion to a greater extent than other engineering and natural science disciplines, where more precise and/or readily observable data may exist. To help clients better understand how this difference pertains to our services, GeoEngineers includes the following explanatory "limitations" provisions in its reports. Please confer with GeoEngineers if you need to know more how these "Report Limitations and Guidelines for Use" apply to your project or site.

GEOTECHNICAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared for Ardurra for the project specifically identified in the report. The information contained herein is not applicable to other sites or projects.

GeoEngineers structures its services to meet the specific needs of its clients. No party other than the party to whom this report is addressed may rely on the product of our services unless we agree to such reliance in advance and in writing. Within the limitations of the agreed scope of services for the Project, and its schedule and budget, our services have been executed in accordance with our proposal dated August 1, 2025 and generally accepted geotechnical practices in this area at the time this report was prepared. We do not authorize, and will not be responsible for, the use of this report for any purposes or projects other than those identified in the report.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report has been prepared for the CC1 Sewer Lift Station project in Chelan, Washington. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, it is important not to rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or
- Completed before important project changes were made.

[1] Developed based on material provided by GBA, GeoProfessional Business Association; www.geoprofessional.org.

For example, changes that can affect the applicability of this report include those that affect:

- The function of the proposed structure;
- Elevation, configuration, location, orientation or weight of the proposed structure;
- Composition of the design team; or
- Project ownership.

If changes occur after the date of this report, GeoEngineers cannot be responsible for any consequences of such changes in relation to this report unless we have been given the opportunity to review our interpretations and recommendations. Based on that review, we can provide written modifications or confirmation, as appropriate.

ENVIRONMENTAL CONCERNS ARE NOT COVERED

Unless environmental services were specifically included in our scope of services, this report does not provide any environmental findings, conclusions, or recommendations, including but not limited to, the likelihood of encountering underground storage tanks or regulated contaminants.

SUBSURFACE CONDITIONS CAN CHANGE

This geotechnical or geologic report is based on conditions that existed at the time the study was performed. The findings and conclusions of this report may be affected by the passage of time, by man-made events such as construction on or adjacent to the site, new information or technology that becomes available subsequent to the report date, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. If more than a few months have passed since issuance of our report or work product, or if any of the described events may have occurred, please contact GeoEngineers before applying this report for its intended purpose so that we may evaluate whether changed conditions affect the continued reliability or applicability of our conclusions and recommendations.

GEOTECHNICAL AND GEOLOGIC FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations from widely spaced sampling locations at the site. Site exploration identifies the specific subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied its professional judgment to render an informed opinion about subsurface conditions at other locations. Actual subsurface conditions may differ, sometimes significantly, from the opinions presented in this report. Our report, conclusions and interpretations are not a warranty of the actual subsurface conditions.

GEOTECHNICAL ENGINEERING REPORT RECOMMENDATIONS ARE NOT FINAL

We have developed the following recommendations based on data gathered from subsurface investigation(s). These investigations sample just a small percentage of a site to create a snapshot of the subsurface conditions elsewhere on the site. Such sampling on its own cannot provide a complete and accurate view of subsurface conditions for the entire site. Therefore, the recommendations included in this report are preliminary and should not be considered final. GeoEngineers' recommendations can be finalized only by observing actual subsurface conditions revealed during construction. GeoEngineers

cannot assume responsibility or liability for the recommendations in this report if we do not perform construction observation.

We recommend that you allow sufficient monitoring, testing and consultation during construction by GeoEngineers to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes if the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork activities are completed in accordance with our recommendations. Retaining GeoEngineers for construction observation for this project is the most effective means of managing the risks associated with unanticipated conditions. If another party performs field observation and confirms our expectations, the other party must take full responsibility for both the observations and recommendations. Please note, however, that another party would lack our project-specific knowledge and resources.

A GEOTECHNICAL ENGINEERING OR GEOLOGIC REPORT COULD BE SUBJECT TO MISINTERPRETATION

Misinterpretation of this report by members of the design team or by contractors can result in costly problems. GeoEngineers can help reduce the risks of misinterpretation by conferring with appropriate members of the design team after submitting the report, reviewing pertinent elements of the design team's plans and specifications, participating in pre-bid and preconstruction conferences, and providing construction observation.

DO NOT REDRAW THE EXPLORATION LOGS

Geotechnical engineers and geologists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. The logs included in a geotechnical engineering or geologic report should never be redrawn for inclusion in architectural or other design drawings. Photographic or electronic reproduction is acceptable, but separating logs from the report can create a risk of misinterpretation.

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

To help reduce the risk of problems associated with unanticipated subsurface conditions, GeoEngineers recommends giving contractors the complete geotechnical engineering or geologic report, including these "Report Limitations and Guidelines for Use." When providing the report, you should preface it with a clearly written letter of transmittal that:

- Advises contractors that the report was not prepared for purposes of bid development and that its accuracy is limited; and
- Encourages contractors to conduct additional study to obtain the specific types of information they need or prefer.

CONTRACTORS ARE RESPONSIBLE FOR SITE SAFETY ON THEIR OWN CONSTRUCTION PROJECTS

Our geotechnical recommendations are not intended to direct the contractor's procedures, methods, schedule or management of the work site. The contractor is solely responsible for job site safety and for managing construction operations to minimize risks to on-site personnel and adjacent properties.

BIOLOGICAL POLLUTANTS

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants, and no conclusions or inferences should be drawn regarding Biological Pollutants as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

A Client that desires these specialized services is advised to obtain them from a consultant who offers services in this specialized field.

INFORMATION PROVIDED BY OTHERS

GeoEngineers has relied upon certain data or information provided or compiled by others in the performance of our services. Although we use sources that we reasonably believe to be trustworthy, GeoEngineers cannot warrant or guarantee the accuracy or completeness of information provided or compiled by others.

SECTION 024100 - DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment, tools, and incidentals to perform demolition as shown on the Drawings and specified herein.

B. Section includes:

1. Removal of electrical, HVAC, plumbing, process, and other mechanical equipment and piping.
2. Shutting off, capping and abandoning above ground and below ground piping and utilities.
3. Demolition and removal of above ground and below ground piping and utilities.
4. Demolition and removal of selected structures, equipment and materials.
5. Remove and reinstallation of selected structures, equipment and materials.
6. Remove and salvage of selected structures, equipment and materials.
7. Repair procedures for demolition operations.
8. Backfilling and compaction of trenches, holes and pits left by removed utilities and structures.

1.2 DEFINITIONS

A. Demolish: Demolish existing structures and/or utilities to point below finish grade as shown on the Drawings and specified herein.

B. Remove: Completely remove structures and or utilities as shown on the Drawings and specified herein.

C. Salvage: Detach items from existing construction and deliver to the Owner. Items delivered to Owner are to be in acceptable condition ready for reuse for its intended purpose. The structure and/or utility to be removed and salvaged are noted on the Drawings.

D. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated on the Drawings.

E. Existing to Remain in Operation: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, removed and reinstalled or remain in operation. All items in operation, before, during and after construction.

F. Abandon: Existing items of construction that are to be taken out of service and abandoned in place.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, demolished materials are to become Contractor's property and be removed from Project site.

1.4 SUBMITTALS

A. See Section 013300 - Submittal Procedures: Requirements for submittals.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Proposed Control Measures: Submit statement or drawing that indicates the measures proposed for use, proposed locations, and proposed time frame for their operation. Identify alternative options if proposed measures are later determined to be inadequate. Include measures for the following:

1. Dust control.
2. Noise control.

D. Schedule of Demolition Activities: Indicate the following:

1. Detailed sequence of demolition and removal Work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services.
3. Coordination for shutoff, capping and continuation of utility services.
4. Use of stairs.
5. Locations of temporary partitions and means of egress.
6. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

E. Pre-demolition Photographs or Videotape: Show existing conditions of adjoining construction and site improvements that might be misconstrued as damage caused by demolition operations. Submit before Work begins.

F. Inventory: After demolition is complete, submit a list of items that have been removed and salvaged.

1. Contractor to submit a statement of credit for recycled materials including type of material and poundage.

G. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.5 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition Work similar in material and extent to that indicated for this Project.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI A10.6 and NFPA 241.

D. Pre-demolition Conference: Conduct conference at Project site. Review methods and procedures related to demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of Work performed by other trades that rely on substrates exposed by demolition operations.

E. The use of explosives will not be permitted.

F. Promptly repair damage caused to adjacent facilities by demolition operations at no cost to the Owner.

1.6 PROJECT CONDITIONS

A. Owner will occupy Project site and buildings immediately adjacent to demolition areas. Contractor is to conduct demolition so Owner's operations will not be disrupted. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

B. Access:

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
2. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from authorities having jurisdiction.

C. Maintain sewage flow through the existing system and protect those facilities from damage as a result of the Work. Continue until the major portion of the new facilities is complete and accepted by the Owner as being adequate to properly collect and convey the wastewater flow.

D. Do not commence with demolition of various operable components of the existing system until specifically authorized by the Engineer. The contractor is responsible for scheduling all demolition activities to minimize interruption of the existing sewage flow.

E. Construct and maintain any temporary facilities required to satisfactorily handle flows and to maintain operations throughout the period of the Project.

F. Owner assumes no responsibility for the actual condition of structures, areas or items to be demolished. Locations of existing structures are shown on the Drawings and are provided for general information purposes only. The Contractor is to field verify the conditions to be encountered in the Work to be performed.

G. Hazardous Materials:
   a. Existing structures carrying sewage (such as septic tank) may contain high concentrations of but not limited to: Hydrogen Sulfide, Ammonia & Methane gases.

b. If materials suspected of containing other hazardous materials are encountered, do not disturb; immediately notify Engineer and Owner. Hazardous materials will be removed by Owner under a separate contract.
c. Asbestos cement pipe shall be handled in accordance with Specification Section 028213.33.

H. Storage or sale of removed items or materials on-site will not be permitted.

I. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

J. Maintain fire-protection facilities in service during demolition operations.

PART 2 - PRODUCTS

2.1 REPAIR MATERIALS

A. Use repair materials identical to existing materials.

1. If identical materials are unavailable or cannot be used for exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible.
2. Use materials whose installed performance equal or surpasses that of existing materials.

B. Comply with material and installation requirements specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities to be removed, abandoned or relocated have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during demolition operations.

F. Perform surveys as the Work progresses to detect hazards resulting from demolition activities.

3.2 UTILITY SERVICES

A. Existing Utilities: Maintain services indicated and protect them against damage during demolition operations.

B. Do not interrupt existing utilities serving occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and to authorities having jurisdiction.

1. Provide at least 72 hours' notice to Owner if shutdown of service is required during changeover.

C. Utility Requirements: Locate, identify, disconnect, and seal or cap off indicated utilities serving areas to be demolished.

1. Owner will arrange to shut off indicated utilities when requested by Contractor.
2. If utility services are required to be removed, relocated, or abandoned, before proceeding with demolition, provide temporary utilities that bypass area of demolition and that maintain continuity of service to other parts of facility.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Dangerous Materials: Drain, purge, or otherwise remove, collect, and dispose of chemicals, gases, explosives, acids, flammables, or other dangerous materials before proceeding with demolition operations.

B. Site Access and Temporary Controls: Conduct demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
2. Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction.
3. Protect existing site improvements, appurtenances, and landscaping to remain.

C. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around demolition area and to and from occupied portions of facility.
2. Provide temporary weather protection, during interval between demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect exposed walls, ceilings, floors, and other existing finish Work that are to permanently remain or that are exposed during demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.

D. Temporary Enclosures: Provide temporary enclosures for protection of existing building and construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weather-tight enclosure for building exterior.

1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.

E. Temporary Partitions: Erect and maintain dustproof partitions and temporary enclosures to limit dust and dirt migration and to separate areas from fumes and noise.

F. Temporary Shoring: Provide and maintain interior and/or exterior shoring, bracing, or structural support as required to preserve stability and prevent movement, settlement, or collapse of construction to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of demolition.

3.4 POLLUTION CONTROLS

A. Dust Control: Use water mist, temporary enclosures, and other suitable methods to limit spread of dust and dirt. Comply with governing environmental protection regulations.

1. Do not use water when it may damage existing construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
2. Wet mop floors to eliminate trackable dirt and wipe down walls and doors of demolition enclosure.

B. Disposal: Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

1. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

C. Cleaning: Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations. Return adjacent areas to condition existing before demolition operations began.

3.5 DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with demolition systematically, from higher to lower level. Complete demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until Work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.
10. Return elements of construction and surfaces that are to remain to condition existing before demolition operations began.
11. Containerize all small particles that may contain lead paint and turn over to the Owner for disposal.

B. Existing Facilities: Comply with Owner’s requirements for using and protecting, stairs, walkways, loading docks, building entries and other building facilities during demolition operations.

C. Salvaged Items: Comply with the following:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner and indicated on Drawings.
5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items: Comply with the following:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain in Operation: Protect equipment indicated to remain in operation against damage and soiling during demolition. When permitted by Engineer, items may be removed to a suitable, protected storage location during demolition, and reinstalled in their original locations after demolition operations are complete.

F. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals, using power-driven saw, then remove concrete between saw cuts.

G. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

H. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

I. Concrete and bituminous pavements, sidewalks and curbs: Sawcut pavement in a straight line, with vertical faces and remove pavement. Ragged and irregular edges will not be accepted and are to be recut. Remove sidewalks and curbs to the nearest joint. Remove pavement, curb, etc. as shown on the Drawings. Damaged areas beyond removal limits are to be repaired at Contractor's expense. For utility trenches in asphalt and concrete areas, unless indicated otherwise, remove pavement 12 inches beyond top of trench on both sides.

J. Removed Utility Pipes and Related Structures: Completely remove and dispose of pipe and appurtenances and structures to full depth as shown on the Drawings. Backfill voids resulting from removed structures and piping in accordance with Section 312316.13 - Trenching.

K. Demolish or Abandon Utility Pipes and Related Structures:
1. Remove upper portion of abandoned structures to a depth of at least one (1) foot below road subgrade or three (3) feet below finish grade for non-paved areas.
2. Break or perforate the bottom of structures to prevent the entrapment of water.
3. Seal all conduits or piping connecting to structures or ends of conduit or piping to be abandoned with a wall of concrete not less than 6-inches thick or an 8- inch wall of brick and mortar.
4. Abandoned pipes shall be plugged with grout. The plug shall not be less than the diameter of the abandoned pipe plus one foot.
5. Fill all conduits or piping abandoned in place under roads with a flowable fill as outlined in Section 9-20.3(4) of the WSDOT – Standard Specifications.
6. Backfill voids resulting from demolished structures and piping in accordance with Section 312316.00 - Excavation.

L. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 PATCHING AND REPAIRS

A. General: Promptly repair damage to adjacent construction caused by demolition operations.

B. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.

1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.

C. Finishes: Restore exposed finishes of patched areas and extend restoration into adjoining construction in a manner that eliminates evidence of patching and refinishing.

D. Floors and Walls: Where walls or partitions that are demolished or removed extend from one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish color, texture and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

1. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
2. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
3. Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.

E. Ceilings: Patch, repair or re-hang existing ceilings as necessary to provide an even- plane surface of uniform appearance.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

B. Burning: Burning of demolished or removed materials will not be permitted.

C. Disposal: Legally transport demolished materials and dispose/recycle in a legal manner.

END OF SECTION 024100

026100 - SOIL AND GROUNDWATER MANAGEMENT PLAN

Soil and Groundwater Management Plan

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

for

Ardurra Group, Inc.

March 12, 2026

523 East Second Avenue
Spokane, Washington 99202
509.363.3125

GeoEngineers

Soil and Groundwater Management Plan

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington
File No. 28238-001-01
March 12, 2026

Prepared for:

Ardurra Group, Inc.
1717 South Rustle Street
Spokane, Washington 99224

Attention: Jake Bender, Senior Project Manager

Prepared by:

GeoEngineers, Inc.
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LTO:JDO:SHL:kjb:ijm

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Figure 2. Site Plan

1.0 Introduction

This document presents the Soil and Groundwater Management Plan (SGMP) for earthwork activities associated with the construction of an underground lift station to replace the existing Pump House and installation of surface improvements at the CC-1 Sewer Lift Station located at 109 East Wapato Avenue in Chelan, Washington (herein referred to as "Site") as shown in Vicinity Map, Figure 1.

This SGMP has been prepared to assist in identification, characterization, and handling of potentially contaminated soil and groundwater that might be encountered during earthwork activities associated with the construction of the underground lift station and surface improvements to be carried out at the Site.

2.0 Site Description and Background

The Site is located in the northwest portion of the Chelan Riverwalk Park, near the Lake Chelan and consists of the Chelan Public Utilities District (PUD) Pump Station Number (No.) 1 pump house (Pump House), the grassy landscaped area between the Pump House and Lake Chelan, and a paved access road and concrete walking path located on the west side of the Park. The Site is adjacent to a paved alleyway, East Woodin Avenue and the Campbell Resort to the north, parking areas associated with the Park to the east, and Lake Chelan to the south and West Site Features are shown in the Site Plan Figure 2.

2.1 PREVIOUS INVESTIGATIONS

In 1988, a 500-gallon UST was installed near the Pump House to supply diesel fuel to the backup generator for the Pump House. In 1997, petroleum contaminated soil (PCS) was identified at the Site during removal of the UST (White Shield Environmental [WSE] 1997). Approximately 30 cubic yards (CY) of PCS was removed from the UST excavation and confirmation samples were collected from the soil left in place at the limits of the excavation. The approximate location of the PCS excavation is shown on Figure 2. Based on chemical analytical results for soil samples collected from the excavation, WSE concluded that contaminated soil was left in place near the foundation of the Pump House and likely extended underneath the Pump House (WSE 1997).

Between 2021 and 2025, GeoEngineers performed multiple soil and groundwater assessments to evaluate the Site at the request of the Washington State Department of Ecology. Soil and groundwater samples were collected from soil borings, temporary well points, and permanent monitoring wells and analyzed for gasoline-, diesel-, and oil-range petroleum hydrocarbons (GRPH, DRPH, and ORPH, respectively); benzene, toluene, ethylbenzene and total xylenes (BTEX), lead, and other petroleum-related compounds. Chemical analytical results indicated that petroleum contamination was present at the Site in soil near the soil/groundwater interface and in groundwater near the Pump House at concentrations greater than the Site-specific Washington State Model Toxics Control Act (MTCA) Cleanup levels (CULs) presented in Table I below (GeoEngineers 2025a):

TABLE I. SITE-SPECIFIC CLEANUP LEVELS

COC	SOIL CUL (MG/KG)	GROUNDWATER CUL (µG/L)
Gasoline-range petroleum hydrocarbons (GRPH)	30	800
Diesel-range petroleum hydrocarbons (DRPH)	2,000[1]	500[1]
Oil-range petroleum hydrocarbons (ORPH)		
Benzene	0.03	0.44
Toluene	7	57
Ethylbenzene	6	29
Total xylenes	9	1,000
Lead	250	2.5[2]

Notes:

[1]MTCA method A cleanup level for the combined concentrations of DRPH and ORPH.

CUL = cleanup level; mg/kg = milligram per kilogram; µg/L = microgram per liter.

Clean Water Act (CWA) cleanup level for chronic exposure to lead protective of aquatic life.

2.2 KNOWN CONTAMINATION

Known contaminants at the Site include DRPH/ORPH from the UST release described in Section 2.1. The main exposure pathways anticipated during construction activities are contaminated dust inhalation and direct contact with contaminated soil and/or groundwater.

2.3 EXTENT OF CONTAMINATION

We understand that the plans for construction include reusing below-grade infrastructure to the extent practicable for the construction of an underground lift station and surface improvements (GeoEngineers 2025c). Construction activities involving below-grade earthwork might require dewatering. The estimated extent of contaminated soil and groundwater that might be encountered during construction activities are described below and shown on Figure 2.

- Soil contamination is likely to occur within the groundwater smear zone below approximately 9 feet below ground surface (bgs).
- Groundwater encountered near the Pump House and should be considered contaminated and will likely require planning, permitting, detention, testing, and either treatment or disposal at a regulated facility. GeoEngineers, Inc. (GeoEngineers) recommends using monitoring well GEI066-MW-1 and GEI066-MW-2 as reference for possible groundwater elevations near the Pump House during construction activities.

3.0 Site-Specific Health and Safety Plan

The Contractor should develop a Site-specific Health and Safety Plan (HASP) for use by Contractor personnel during earthwork and Site construction where contaminated media might be encountered. The Contractor's HASP should meet the requirements established under 29 CFR 1910.120 and WAC 296-843 (Hazardous Waste Operations), including the use of appropriately trained workers, monitoring and

identification of contaminated media, Contractor's health and safety officer's authority and responsibilities, and health and safety briefings for applicable Site personnel.

The Contractor is responsible for health and safety of their workers, subcontractors, and visitors to the Site. The Contractor should establish minimum personal protective equipment (PPE) requirements for the work and shall provide the necessary training and equipment needed to accomplish these requirements.

The Contractor's HASP should include dust control methods, PPE, and other appropriate methods to manage the risks associated with the exposure pathways highlighted in Section 2.2 to protect workers and site visitors. Workers and site visitors should be informed about the risks associated with exposure to contaminated media.

4.0 Soil Management, Characterization and Disposal

Overburden soil (about 0 - 9 feet bgs) and smear zone soil (below approximately 9 feet bgs) near the Pump House should be stockpiled, sampled, and characterized according to the Sections below. Unless sampling indicates that the soil is not contaminated, soil should be handled, characterized, and disposed as contaminated in accordance with the Design Plans and Specifications and applicable federal, state, and local regulations.

4.1 SOIL HANDLING

GeoEngineers recommends segregating soil encountered during construction activities into two separate stockpiles for sampling and characterization. The two stockpile categories include overburden soil (approximately 0 to 9 feet bgs) and soil from the smear zone (below approximately 9 feet bgs). The segregated soils will be placed on plastic sheets and covered with plastic sheeting anchored with sandbags to minimize potential contaminant-impacted runoff and wind-blown dust pending sampling, characterization, and disposal or reuse, as described in the Sections below.

4.2 SOIL SAMPLING

Stockpiles of overburden soil and stockpiles of smear zone soil should be sampled to characterize the soil for off-site disposal or other potential uses. If the soil sampling and chemical testing identify contaminants of concern, the soil will be classified according to the definitions presented in Section 4.3. Stockpile samples should be collected at the rates presented in Table II below to adequately profile the soil for disposal or other uses.

TABLE II. TYPICAL NUMBER OF SAMPLES NEEDED TO ADEQUATELY CHARACTERIZE STOCKPILED SOIL

BULK CUBIC YARDS (CY) OF SOIL	NUMBER OF REPRESENTATIVE SAMPLES FOR CHEMICAL ANALYSIS
0 – 100	3
101 – 500	5
501 – 1,000	7
1,000 – 2,000	10
>2,000	10 + 1 for each additional 500 CY of soil

Note:
1. Ecology (2016)

Soil samples should be analyzed for the chemicals required by the proposed disposal facility, which might include:

- GRPH using Northwest Method NWTPH-Gx;
- DRPH and ORPH using Northwest Method NWTPH-Dx;
- BTEX using Environmental Protection Agency (EPA) Method 8260D;
- Resource Conservation and Recovery Act (RCRA) metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) and Washington State Dangerous Waste metals (copper, nickel, and zinc) using United States Environmental Protection Agency (EPA) 6000/7000-series methods;
- Depending on the results of the initial analysis, additional analyses such as leachability analysis using the Toxicity Characteristic Leaching Procedure (TCLP) might be required by the permitted facility; and
- Other analytes, depending on the requirements of the selected permitted disposal facility or if other potential contaminants are encountered as described in Section 4.7.

Soil sampling and handing procedures should be in accordance with analytical sample preservation requirements, EPA chain-of-custody requirements, Ecology guidelines, and industry standards. An environmental professional should be retained to collect soil samples and interpret the laboratory results.

4.3 SOIL CHARACTERIZATION

Recommendations for on-site reuse or off-site disposal will be made based on the classification of the soil. Based on chemical analytical results of the samples collected from stockpiled soils, the soil might be characterized in one of the following categories:

- **Contaminated Soil.** Concentrations of one or more contaminants of concern are greater than the Site-specific CULs included in Table I. Smear zone soil is assumed to be contaminated unless chemical testing indicates otherwise. Contaminated soil should only be disposed of at a permitted facility. Based on the known contaminants, the Greater Wenatchee Regional Landfill located in Wenatchee, Washington, will likely accept contaminated soil from the Site. If soil is planned for off-site disposal, the potential disposal facility should be engaged early to determine the sampling and profiling requirements. Contaminated soil should not be transported to other properties for either permanent placement or temporary storage.

- **Impacted Soil.** Soil is considered impacted if one or more contaminants of concern are detected in the sample at concentrations less than the Site-specific CULs included in Table I. Impacted soil also should be disposed of at an appropriate facility. Because impacted soil does not designate as contaminated, other disposal facilities might accept the soil as construction waste. Disposal requirements for those facilities should also be met before transporting impacted soil.
- **Non-Regulated Soil.** Soil is considered non-regulated if analytes are not detected. Non-regulated soil does not have a restricted end use either on or off-site.
- **Dangerous/Hazardous Waste.** Contaminated soil might further be designated as a Washington State Dangerous Waste or a Resource Conservation and Recovery Act (RCRA) Hazardous Waste depending on the concentrations of the contaminants or the results of potential follow-up analyses, such as TCLP. An environmental professional should be retained to determine if follow-up analysis is required and if contaminated soil designates as a Dangerous/Hazardous Waste. Contaminated soil that is designated as a Dangerous/Hazardous Waste can only be disposed at a permitted facility such as Waste Managements (WM's) Chemical Waste Management of the Northwest facility located near Arlington, Oregon.

4.4 SOIL DISPOSAL

Contaminated or impacted soil should be disposed at a facility permitted to accept the waste. Soil that will be disposed off-site should be sampled to profile it for disposal as described in Sections 4.2 and 4.3. An environmental professional should be engaged to interpret the chemical analytical results and assist in profiling the soil for disposal at an appropriate facility. Soil designated for off-site disposal could take several weeks to obtain approval from a disposal facility.

Trucks used to transport contaminated soil should be covered with tarps to control contaminated soil deposition on to public roads. Extra care should be taken as part of the Site temporary erosion and sediment control (TESC) plan to control tracking site soil off site and control potentially contaminated runoff from leaving the Site. TESC best management practices (BMPs) should be frequently inspected and rigorously maintained to control potentially contaminated soil and runoff from leaving the Site.

Soil tracked off site should be cleaned up immediately and managed as contaminated soil. Contaminated soil should be removed from vehicles and equipment before exiting the Site or demobilization. If tire washes are used to remove soil from equipment and vehicles, the wash water should be captured and contained as potentially contaminated water. It should be sampled and disposed of at an appropriate facility based on the sample results.

4.4.1 On-Site Reuse of Contaminated Soil

We assume that contaminated or impacted soil will not be reused on-site. However, if reuse of contaminated or impacted soil is desired, the following should be considered:

- The soil must meet structural specifications for the project, as determined in the Geotechnical Engineering Evaluation report (GeoEngineers 2025).
- Contaminated or impacted soil should only be reused as fill beneath pavement or other low-permeability surfaces.

- If contaminated or impacted soil is reused, this could result in more regulatory involvement, strategic planning, and other related costs, including establishing an environmental covenant.

4.5 STORMWATER FEATURES

It is our understanding that stormwater features designed to infiltrate stormwater into the subsurface (such as drywells, swales, and infiltration basins) are not included in the underground lift station design. If underground lift station and surface improvement design changes to include stormwater infiltration, an environmental professional should be consulted to determine the implications related to contaminated soil and groundwater. Stormwater should not be infiltrated through contaminated media.

4.6 DUST CONTROL

The Contractor should minimize fugitive dust generated from on-site fill by actively suppressing dust to control the inhalation exposure pathway. Dust control can include, but is not limited to:

- Clearing only those areas where immediate activity will take place while maintaining original ground cover as long as practical.
- Spraying exposed surfaces with water or other suitable palliative and repeating as necessary throughout the course of construction. Water applied as dust control shall not leave the Site as surface runoff.

4.7 DISCOVERY OF UNEXPECTED POTENTIALLY CONTAMINATED SOIL

Soil from the smear zone (below approximately 9 feet bgs) is likely to be contaminated with DRPH and ORPH. If indications of contamination are observed in overburden soil are encountered, then GeoEngineers and City of Chelan (City) should be contacted and soil excavated from that area should be segregated and stockpiled for profiling. Characteristics of potentially contaminated soil might include:

- Soil staining;
- Petroleum hydrocarbon or other chemical odors;
- The presence of debris fill (brick, glass, metal, ash, clinkers, or slag);
- A moderate or heavy sheen when placed in contact with water; and/or
- Significant concentrations of organic vapors detected using headspace field screening methods.

Upon discovery of potentially contaminated soil, the Contractor should refer to this guide for contact information of people to notify, as well as information regarding the location, type, and actions taken to address the potentially contaminated soil.

TABLE III. PROJECT CONTACTS

NAME	TITLE	OFFICE PHONE	EMAIL
Scott Lathen	Associate Environmental Engineer	509.209.2843	slathen@geoengineers.com
Justin Orr	Project Geologist	509.570.0779	jorr@geoengineers.com
Jake Youngren	Public Works Director	509.682.8030	jyoungren@cityofchelan.us

If indications of potential contamination are observed, an environmental professional should be consulted to determine if additional analytical testing is required and to identify appropriate chemical analytical methods.

5.0 Groundwater Management, Characterization and Disposal

Previous investigations conducted at this Site indicate that groundwater depth in existing monitoring wells range between 9 feet bgs to about 18 feet bgs and is influenced by the elevation of Lake Chelan (GeoEngineers 2025b). If groundwater is encountered during earthwork activities, dewatering might be

required. The Contractor will prepare a groundwater management plan with appropriate containment, testing, treatment, and disposal methods if dewatering is required.

5.1 GROUNDWATER HANDLING

Based on the results of previous groundwater monitoring activities carried out on this Site, conducting below-grade earth work might require temporary dewatering. If dewatering is required, dewatering should be conducted in accordance with the Design Plans and Specifications and all applicable federal, state, and local regulations. Groundwater removed from the excavation should be stored on-site for sampling, characterization, and disposal as described in the Sections below.

5.2 SAMPLE COLLECTION AND LABORATORY ANALYTICAL METHODS

Water samples should be collected from stored groundwater as required by federal, state, and local regulations and permit requirements to profile the groundwater for disposal. Groundwater samples should be analyzed for the following:

- GRPH using Northwest Method NWTPH-Gx;
- DRPH and ORPH using Northwest Method NWTPH-Dx;
- BTEX using EPA Method 8260D;
- Total lead using EPA Method 6020B; and
- Other analytes might be required based on the preferred water disposal option.

Groundwater sampling and handing procedures should be in accordance with analytical sample preservation requirements, EPA chain-of-custody requirements, Ecology guidelines, and industry standards. An environmental professional should be retained to collect water samples and interpret the laboratory results.

5.3 GROUNDWATER CHARACTERIZATION

Based on the previous environmental reports for the Site, groundwater from the Site should be considered contaminated with DRPH and ORPH. Contaminated groundwater should be disposed in accordance with federal, state, and local regulations and the permit requirements.

Contaminated groundwater might be further designated as a Washington State Dangerous Waste or a RCRA Hazardous Waste depending on the concentration of the contaminants or the results of potential follow-up analyses, such as TCLP. An environmental professional should be retained to determine if follow-up analysis is required and if contaminated groundwater designates as a Dangerous/Hazardous Waste. Contaminated groundwater that is designated as Dangerous/Hazardous Waste can only be disposed at a permitted facility such as WM's Chemical Waste Management of the Northwest facility located near Arlington, Oregon.

5.4 GROUNDWATER DISPOSAL

Groundwater removed from the excavation should be disposed in accordance with federal, state, and local regulations and permit requirements. Potential disposal methods could include:

- Discharge to the City of Chelan (City) sewer system, which requires obtaining permits from the Chelan County Public Utility District (PUD);
- Reinjection into the subsurface, which requires obtaining permits through Ecology's Underground Injection Control (UIC) program;
- Other methods suitable for contaminated groundwater disposal and compliant with federal, state, and local regulations and permits; or
- Disposal at a permitted facility (if groundwater is designated as a Dangerous/Hazardous Waste).

Depending on the requirements of the selected disposal method(s), pretreatment of contaminated groundwater might be required before it is discharged; groundwater should be treated in accordance with federal, state, and local regulations and permit requirements.

6.0 Documentation

During construction and management of contaminated media, records including as-built plans, should be kept indicating:

- Locations of unexpected soil contamination;
- Waste profile results and waste characterization;
- Waste disposal documentation indicating the type and quantity of contaminated media transported off site;
- Influent/effluent sample results, as required by permit (if applicable); and
- Discharge/injection rates as required by permit (if applicable).

7.0 References

GeoEngineers, Inc. 2021. "Soil and Groundwater Assessment, Revision 1, Chelan Sewer Pump Station No 1, Chelan, Washington." September 17, 2021. GEI File Number 0504-170-00.

GeoEngineers, Inc. 2025a. "Remedial Investigation Report, Chelan Sewer Pump Station No. 1, 117 Wapato Avenue, Chelan, Washington." March 25, 2025. GEI File No. 0504-170-01.

GeoEngineers, Inc. 2025b. "2nd Quarter 2025 Groundwater Assessment, Chelan Sewer Pump Station No. 1, 117 Wapato Avenue, Chelan, Washington." Jume 17, 2025. GEI File No. 0504-170-01.

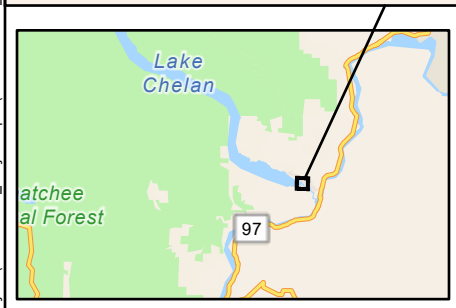
GeoEngineers, Inc. 2025c. "Geotechnical Engineering Evaluation, Chelan Sewer Pump Station No. 1, 117 Wapato Avenue, Chelan, Washington." December 31, 2025. GEI File No. 28238-001-00.

Washington State Department of Ecology. 2016. "Guidance for Remediation of Petroleum Contaminated Sites." June 2016. Publication No. 10-09-057.

White Shield Environmental (WSE). 1997. "UST Site Assessment Report. Chelan Sewer Pump Station #1, Chelan, Washington." June 26, 1997.

Figures





N

0 1,000

Feet

Source(s):
- ESRI

Coordinate System: NAD 1983 UTM Zone 10N

Disclaimer: This figure was created for a specific purpose and project. Any use of this figure for any other project or purpose shall be at the user's sole risk and without liability to GeoEngineers. The locations of features shown may be approximate. GeoEngineers makes no warranty or representation as to the accuracy, completeness, or suitability of the figure, or data contained therein. The file containing this figure is a copy of a master document, the original of which is retained by GeoEngineers and is the official document of record.

Vicinity Map

City of Chelan
CC1 Sewer Lift Station
Chelan, Washington

GeoEngineers

Figure 1

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Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. DRPH/ORPH MTCA Method A cleanup level in soil: 2,000 mg/kg. DRPH/ORPH MTCA Method A cleanup level in groundwater: 500 ug/L.

Data Source: Bing Imagery, 2024 Google Earth Imagery
Parcel from Chelan County GIS.

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

- 2024 Direct-Push Soil Boring
- DRPH/ORPH detected in soil at concentrations greater than 100 mg/kg but less than the MTCA Method A cleanup level.
- Monitoring Well Approximate Location
- DRPH/ORPH detected in groundwater at concentration greater than Site-specific cleanup levels.
- Approximate Former UST Excavation Location
- Estimated extent of DRPH/ORPH contamination with concentrations greater than the Site-specific cleanup levels.
- Site Boundary

N W E S

15 0 15
Feet

Site Plan

Chelan Sewer Pump Station No 1
Chelan County, Washington

GeoEngineers

Figure 2

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SECTION 028213.33 - ASBESTOS ABATEMENT FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Removal of ACM-contaminated pipeline coatings.
2. Cutting of pipelines containing or coated with ACM.
3. Monitoring of Work area during cutting and cleaning operations.

1.2 DEFINITIONS

A. ACM: Asbestos-containing material.

B. ACP: Asbestos-cement pipe.

1.3 REFERENCE STANDARDS

A. Occupational Safety and Health Administration (OSHA):

1. 29 CFR Part 1926 - Safety and Health Regulations for Construction.
2. 40 CFR Part 763, Subpart E, Appendix E, Section 1- Polarized Light Microscopy.
3. 42 CFR Part 84, Subpart K - Non-Powered Air-Purifying Particulate Respirators.

B. U.S. Environmental Protection Agency:

1. National Emission Standards for Hazardous Air Pollutants (NESHAPs).

1.4 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Asbestos Cement Pipe (ACP) Chain of Custody: Contractor submit all chain-of-custody documentation and landfill receipts to Owner and Engineer prior to payment when applicable.

C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.6 QUALITY ASSURANCE

A. Perform Work according to OSHA, and EPA standards.

1.7 QUALIFICATIONS

A. Contractor: Company specializing in repairing, modifying, cleaning, or removing AC pipe or ACM-coated pipe as specified in this Section with experience similar to the extent indicated for this Project.

B. The Contractor is required to meet OSHA requirements for working with Category II asbestos containing material.

C. Active Waste Disposal Site: Solid waste disposal site permitted to accept ACM waste.

D. Testing Laboratory: Company participating in National Voluntary Laboratory Accreditation Program for asbestos, administered by National Institutes of Standards and Technology.

1.8 ASBESTOS-CEMENT (TRANSITE) PIPE

Category II, Non-Friable Asbestos Cement Pipe (ACP) is expected to be encountered during this project. Should ACP be encountered, it shall be handled in accordance with the following guidance for quantities below the NESHAP threshold, 260-LF of ACP.

A. Contractor shall comply with the requirements of the Asbestos NESHAP found within 40 CFR Section 61.140 through 61.157. Nothing in this specification shall be construed to void any provision of a contract or other law, ordinance, regulation, or policy whose requirements are more stringent, including State law in the location of the project.

B. ACP is defined under NESHAP as a Category II, non-friable, non-regulated material in its intact state, but which may become friable upon removal, demolition, and/or disposal. EPA has generally defined “friable” as material, when dry, that may be crumbled, pulverized, or reduced to powder by hand pressures. Consequently, if the Contractor’s removal/disposal process renders the ACP friable, it is regulated under the disposal requirements of 40 CFR Section 61.150 and the Contractor becomes the “Generator” of the regulated material. Further, if more than 260 linear feet, 160 square feet, or 35 cubic feet (amount to be confirmed by Contractor since smaller amounts may apply in some areas) of ACP is removed, a NESHAP notification must be filed with the governing state regulatory agency and USEPA.

C. Work required in the Contract Documents includes activities which may affect existing ACP. Contractor is responsible as applicable for identifying, abandoning, drilling, cutting, removing, handling, transporting, and disposing of the AC waste material in accordance with all applicable Federal, State and Local regulatory requirements.

D. When ACP is to be removed, it shall be done in such careful and prudent manner that it remains intact and non-friable. The Contractor is responsible to employ those means, methods, techniques and sequences to ensure this result to the maximum extent possible. However, if the actions of the Contractor cause the material to become friable and therefore

subject to federal, state, local and other applicable regulations, that Contractor shall be defined as the Generator of the hazardous material.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Respirators Not in Use:

1. Store in sanitary location that protects respirators from dust, sunlight, heat, extreme cold, excessive moisture, and potentially damaging chemicals.
2. Place in plastic bags or closed containers.

PART 2 - PRODUCTS

2.1 RESPIRATORS

A. Manufacturers:

1. Enviro Safety Products.
2. Or approved equal.
   a. Substitutions: Specified in Section 016000 – Product Requirements

B. Description:

1. Comply with 42 CFR Part 84, Subpart K.
2. Type: Half-face mask; reusable after washing.
3. Maintenance: Replaceable filters and cartridges only.
4. Single-use respirators are not acceptable.

C. Filters: Top air inlet.

D. Performance and Design Criteria:

1. Application: Asbestos abatement for concentrations up to 10 times permissible exposure limit (PEL).
2. Design: Low profile.

PART 3 - EXECUTION

3.1 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for application preparation.

B. Perform ACM removal without damage to or contamination of adjacent Work or existing area.

C. Perform cleaning operations without taking pipeline out of service.

3.2 APPLICATION

A. Removal of ACM Pipe Coating:

1. Use cleaning machines or "line-traveling machines" that move along pipeline while removing exterior pipe coating.
2. Collect coating residue in bags and dispose in a permitted active waste disposal site.
3. Cutting and Disposal:

a. Transport removed piping to a central staging area to cut for transport or disposal.
b. Deposit pipeline pieces in leakproof metal collection box secured with tarpaulin covers.
c. Transport filled boxes to an approved landfill.
d. A licensed and certified asbestos supervisor will accompany transport vehicles to manage transport process.
e. Maintain supply of fresh water near cutting operation to keep freshly cut areas of ACM damp while cutting piping.
f. Individually wrap each joint of piping and pipe ends prior to loading.

3.3 ASBESTOS CEMENT (TRANSITE) PIPE HANDLING AND DISPOSAL

A. Compliance with all aspects of worker safety and health regulations, including, but not limited to, the OSHA Asbestos Standard 29 CFR 1926.1101 is the responsibility of the Contractor. The Owner and Engineer assume no responsibility for compliance programs, which are the responsibility of the Contractor.

B. Contractor to retain all chain-of-custody documentation and landfill receipts and provide copies to Owner and Engineer.

C. If sections of ACP are to be left in the ground and abandoned in place, the Contractor shall inspect the visible sections that remain to insure they are intact and non-friable. The ACP shall be abandoned per Federal, State and local regulations, which may include filling the abandoned line with grout. The ends of the ACP shall be encapsulated, and any friable ACP shall be lawfully recorded, removed, and disposed of. ACP shall NOT be crushed and left in place. If ACP is crushed or otherwise caused to become friable, it shall be removed in conformance with all federal and state regulations.

D. Record drawings (as-built) information for all AC pipelines abandoned-in-place shall be documented and identified on the Contractor's as-built record drawing information and submitted to the Engineer and Owner

3.4 The Contractor is responsible for the proper handling and disposal of ACP. If contamination occurs as a result of the Contractor's activities, all costs associated with fines, fees, legal proceedings and cleanup activities shall be the sole responsibility of the Contractor.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Sample Testing:

1. Test pipe or pipe coating for asbestos prior to repairing, modifying, or removing pipelines.
2. Remove samples of pipe or coating along entire length of piping to be removed and have testing laboratory determine quantity of asbestos that may be present.

END OF SECTION 028213.33

SECTION 032100 – CONCRETE REINFORCING BAR

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide concrete reinforcement as indicated and specified:
   a. Section includes:
      i. Reinforcement bars
      ii. Reinforcement accessories.

B. All sections referenced herein correspond to the Washington State Department of Transportation (WSDOT) Standard Specifications Standard Specification FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION M 41-10 -2026

1.2 REFERENCES

A. AASHTO M 31 Grade 60: Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

B. ASTM A706 Grade 60: Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement

C. ASTM A1064: Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

1.3 SUBMITTALS

A. The following items shall be submitted:
   1. Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use by these specifications.
   2. Reinforcement fabrication details shall be determined from the information provided in the Plans.
   3. Shop Drawings:
      a. Submit placing drawings for all reinforced concrete structures
      b. Indicate locations of reinforcement bar cut-offs, splices and development lengths.
      c. Clearly indicate bar sizes, spacings, locations and quantities of reinforcement steel, bending schedules, and supporting and spacing devices. Show joints, with applicable joint reinforcement.

PART 2 - PRODUCT

2.1 MATERIALS

A. Materials shall meet the requirements of the following sections:

Steel Reinforcing Bar	9-07.2
Epoxy-Coated Steel Reinforcing Bars	9-07.3
Tie Bars	9-07.6
Welded Wire Reinforcement	9-07.7

PART 3 - EXECUTION

3.1 INSTALLATION

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. Place reinforcement a minimum of 2 inches (51 mm) clear of any metal pipe or fittings.

B. Locate reinforcement to avoid interference with items drilled in later, such as concrete anchors.

C. Securely support and tie reinforcement steel to prevent movement during concrete placement.

D. Reinforcement shall `be clean and free from loose mill scale, dirt, grease, oil, form release agent, dried concrete or any material reducing bond with concrete.

E. Setting bars on layers of fresh concrete as the work progresses or adjusting reinforcement during the placement of concrete is prohibited.

3.2 CONCRETE COVER

A. Unless noted otherwise, the minimum concrete cover for main reinforcing bars shall be:

- 3 inches to a concrete surface deposited against earth without intervening forms.
- 2 inches to a concrete surface when not specified otherwise in this section or in the Contract documents.

3.3 REINFORCING STEEL SPLICES

A. LAP SPLICES

1. Overlap bars in accordance with Table below, Minimum Lap Lengths for Reinforcing Steel Splice.

Table 1 LAP SPLICE LENGTH

Bar Size (No.)	Uncoated Bars	Coated Bars
4 [13]	2 ft 5 in [710 mm]	2 ft 11 in [860 mm]
5 [16]	3 ft 0 in [880 mm]	3 ft 8 in [1070 mm]
6 [19]	3 ft 9 in [1070 mm]	4 ft 6 in [1300 mm]
7 [22]	5 ft 1 in [1460 mm]	6 ft 1 in [1770 mm]
8 [25]	6 ft 8 in [1930 mm]	8 ft 1 in [2340 mm]
9 [29]	8 ft 5 in [2430 mm]	10 ft 2 in [2950 mm]
10 [32]	10 ft 8 in [3090 mm]	12 ft 11 in [3750 mm]
11 [36]	13 ft 1 in [3790 mm]	15 ft 10 in [4610 mm]

2. Distribute splices evenly, grouping them together only at points of low tensile stress.
3. Place lap-spliced bars in contact for the length of the splice and tie them together near each end.

3.4 ACCESSORIES

A. Provide accessories such as chairs, chair bars and the like in sufficient quantities and strength to adequately support the reinforcement and prevent its displacement during the erection of the reinforcement and the placement of concrete.

B. Use precast concrete blocks where the reinforcement steel is to be supported over soil.

C. Provide stainless steel bar supports or steel chairs with plastic tips where the chairs are set on forms for a concrete surface that will be exposed to weather, high humidity or liquid (including bottom of slabs over liquid containing areas) unless otherwise noted on contract documents.

D. Do not use metal chairs, ferrous clips, nails, etc. that extend to the surfaces of the concrete. Do not use stones, brick or wood block supports.

END OF SECTION

SECTION 033100 – CONCRETE CAST IN PLACE

PART 1 - GENERAL

1.1 DESCRIPTION

This work consists of the construction of all Structures and sidewalk made of Portland Cement. All sections referenced herein correspond to the Washington State Department of Transportation (WSDOT) Standard Specifications Standard Specification FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION M 41-10 -2026

1.2 REFERENCES

A. AASHTO M85 or ASTM C150: Standard Specification for Portland Cement

B. AASHTO T 303: Standard Method of Test for Accelerated Detection of Potentially Deleterious Expansion of Mortar Bars Due to Alkali-Silica Reaction

C. AASHTO M 6: Standard Specification for Fine Aggregate for Hydraulic Cement Concrete

D. AASHTO T 21: Organic Impurities in Fine Aggregates for Concrete

E. AASHTO T 71: Effect of Organic Impurities in Fine Aggregate on Strength of Mortar

F. AASHTO M 80: Standard Specification for Coarse Aggregate for Hydraulic Cement Concrete

G. AASHTO M213: Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction

1.3 SUBMITTALS

A. Comply with requirements in WSDOT Standard Specification, Structural Drawings, and as specified.

B. Product Data:
   1. Manufacturer's specifications and instructions including Material safety Data Sheets (MSDS) for admixtures and curing materials. Manufacturer’s certification of compatibility of all admixtures.

C. Shop Drawing
   1. Provide certificate that cement used complies with AASHTO M85 or ASTM C150 and these specifications.
   2. Provide certificates that aggregates comply with ASTM C33 and contain less than 1 percent asbestos by weight or volume. Submit gradation analysis with concrete mix designs.
   3. Provide certificate of compliance with these specifications from the manufacturer of the concrete admixtures.
   4. For each formulation of concrete proposed, provide concrete mix designs and laboratory 7-day and 28-day compressive tests, or submit test results of 7- and 28-day compressive tests of the mix where the same mix has been used on two previous projects in the past twelve months.
   5. Proposed special procedures for protection of concrete under wet weather placement conditions.
   6. Proposed special procedures for protection and curing concrete under hot and cold weather conditions.

D. Manufacturers' Instructions:
   1. Provide epoxy bonding compound manufacturer's specific instructions for use. Provide manufacturer's data sheets as to suitability of product to meet job requirements with regard to surface, pot life, set time, vertical or horizontal application, and forming restrictions.

PART 2 - PRODUCT

2.1 MATERIALS

A. Materials shall meet the requirements of the following sections of Washington State Department of Transportation(WSDOT) Standard Specification FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION M 41-10 -2026

Cement	9-01
Aggregate for Concrete	9-03.1
Joint Filler	9-04.1
Premolded Joint Filler	9-04.1(2)
Joint Sealants	9-04.2
Sealing Band	9-04.12
Concrete Surface Treatments	9-08.3
Concrete Curing Materials and Admixtures	9-23
Fly Ash	9-23.9
Curing Materials and Admixtures	9-23
Water	9-25

PART 3 - CONSTRUCTION REQUIREMENTS

3.1 CONCRETE FOR RETAINING WALL

A. Cast-in-place concrete for reinforced concrete retaining walls shall be formed, reinforced, cast, cured, and finished in accordance with Section 6-02, and the details shown in the Plans. All cast-in-place concrete shall be Class 4000 unless otherwise shown in the Plans. Cast-in-place footings shall have a longitudinal slope no steeper than 1V: 6H, unless otherwise shown in the Plans.

B. Concrete shall conform to the requirements as section mentioned below
   1. Mix design and proportioning specified in Sections 6-02.3(2), 6-02.3(2)A and 6-02.3(2)A1
   2. Consistency requirements specified in Section 6-02.3(4) C.
   3. Temperature and time for placement requirements specified in Section 6-02.3(4)D
   4. Curing requirements specified in Section 6-02.3(11)

C. Premolded joint filler, ½ inch thick, shall be placed full height of all vertical wall stem expansion joints in accordance with Section 6-01.14.

3.2 CONCRETE FOR SIDEWALK

A. The concrete in the sidewalks and curb ramps shall be air entrained concrete Class 3000 in accordance with the requirements of Section 6-02 of WSDOT standard specification.

B. The concrete shall be placed in the forms and struck off with an approved straightedge. As soon as the surface can be worked, it shall be troweled smoothly with a steel trowel.

C. Expansion and contraction joints shall be constructed as shown in the Plans. When the sidewalk abuts a cement concrete curb or curb and gutter, the expansion joints in the sidewalk shall have the same spacing as the curb. The expansion joint shall be filled to full cross-section of the sidewalk with ⅜ inch premolded joint filler.

3.3 FORMS

A. Forms shall be of wood or metal and shall extend for the full depth of the concrete. All forms shall be straight, free from warp, and of sufficient strength to resist the pressure of the concrete without springing.

B. Bracing and staking of forms shall be such that the forms remain in both horizontal and vertical alignment until their removal.

C. After the forms have been set to line and grade, the foundation shall be brought to the grade required and thoroughly wetted approximately 12 hours before placing the concrete.

END OF SECTION

SECTION 099000 - PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and field application of paints and other coatings.

1.2 DEFINITIONS

A. ANSI/NSF 61/600: Drinking Water System Components Health Effects

B. Refer to ASTM D16 for definitions of terms used in this Section.

C. Dry Film Thickness (DFT): Thickness of a coat of cured paint measured in mils (1/1000 inch).

D. Interior: the inner portion of associated building, pipe, structure, or other.

E. Exterior: the outer portion of associated building, pipe, structure, or other.

F. Exposed: not sheltered or protected from the weather including but not limited to UV light, precipitation, and atmospheric temperature.

G. Immersion: portion of associated pipe, structure, or other which is commonly submerged in liquid.

1.3 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.

B. ASTM D 4263 - Indicating Moisture in Concrete by the Plastic Sheet Method.

C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.

D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

E. ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

F. AWWA D 102- Painting Steel Water Storage Tanks

G. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

H. GS-03 - Anti-Corrosive Paints.

I. GS-11 - Paints and Coatings.

J. International Concrete Repair Institute (ICRI) Guideline No. 310.2-1997 (formerly 03732) - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.

K. MPI - Approved Products List.

L. MPI - Architectural Painting Manual.

M. NACE SP0188 - Standard Recommended Practice, Discontinuity (Holiday) Testing of Protective Coatings.

N. NAPF 500-03-04 Abrasive Blast Cleaning.

O. SCAQMD Rule 1113 - Architectural Coatings.

P. SSPC-SP 1 - Solvent Cleaning.

Q. SPPC-SP 5/NACE 1 - White Metal Blast Cleaning.

R. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.

S. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.

T. SSPC-SP 16 Brush-Off Blast Cleaning of Non-Ferrous Metals

U. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.

V. SSPC-TU 11 - Inspection of Fluorescent Coating Systems

1.4 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.5 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Do not apply finish coats until paintable sealant is applied.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data:

1. Submit manufacturer data on coatings.
2. Include MPI - Approved Products Lists with proposed products highlighted.

C. Samples:

1. Submit color samples, illustrating range of colors available for each surface finishing product as scheduled.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit special surface preparation procedures, and substrate conditions requiring special attention.

F. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

G. Qualifications Statements:

1. Submit qualifications for manufacturer and applicator.
2. Submit manufacturer's approval of applicator.

1.7 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data: Submit information on cleaning, touchup, and repair of painted and coated surfaces.

1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Extra Stock Materials:

1. Furnish extra 1 gal. of each color and type as provided for Project.
2. Label each container with manufacturer's label, color, type, and room number/Site location.
3. Store where directed by Owner.

1.9 QUALITY ASSURANCE

A. Maintain and provide copies of daily records of Contractor activity while performing work on the project. Daily record information shall include but is not limited to:
1. Site foreman responsible for day’s activities.
2. QC representative for the Contractor.
3. Crew size and members.
4. Start and finish times for each operation.
5. All dry film thickness readings are in accordance with SSPC-PA2.
6. Verification all coatings were applied in accordance with SSPC-PA1.

7. Verification that all stripe coating was conducted in accordance with SSPC-PA Guide 11.
8. Verification of thinning and mixing of the coatings.
9. Atmospheric measurements during exterior work shall include evenly sequenced measurements of general weather conditions, wind speed, air temperature, and relative humidity.
10. Atmospheric measurements during high performance coating application particularly submerged or immersion items/ work shall include evenly sequenced measurements of general weather condition, wind speed, air temperature, and relative humidity during all surface preparation, application, and curing of applied systems.
11. Substrate temperatures at the time of application and completion of the application. Utilize electronic equipment to record and monitor temperatures of tank interior.
12. Measure wet film of applied coating using wet film thickness gauges.
13. Detailed record of start and finish times of work operations and all activities performed on a given space.
14. Holiday detection testing: Shall be accomplished over 100 percent of coated surfaces, and in strict accordance with NACE SP0188.

B. The Contractor shall provide all the necessary environmental control required to complete the work and maintain the required environmental conditions (including air temperature and humidity) including, but not limited to, shelters, enclosures, dehumidification equipment, fans, heating equipment, and fuels for all equipment at no additional cost to the Owner.

C. Surface Burning Characteristics:

1. Fire-Retardant Finishes: Maximum 25/450 flame-spread/smoke-developed index when tested according to ASTM E84.

D. Perform Work according to The State of Washington Criteria for Sewer Works Design – use ‘Force Main’ guidance for pressure pipes – and according to Washington State Department of Transportation (WSDOT) Standard Specifications.

E. Maintain one copy of each standard affecting Work of this Section on Site.

1.10 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Applicator: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

1.11 MOCKUPS

A. Section 014000 - Quality Requirements: Requirements for mockup.

B. Locate where directed by Engineer.

C. Incorporate accepted mockup as part of Work.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Container Labeling: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Inspection:

1. Accept materials on Site in manufacturer's sealed and labeled containers.
2. Inspect for damage and to verify acceptability.

D. Store materials in ventilated area and otherwise according to manufacturer instructions.

E. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.13 AMBIENT CONDITIONS

A. Section 015000 - Temporary Facilities and Controls: Requirements for ambient condition control facilities for product storage and installation.

B. Storage Conditions:

1. Minimum Ambient Temperature: 60 degrees F.
2. Maximum Ambient Temperature: 90 degrees F.

C. Application Conditions:

1. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint manufacturer.
2. Do not apply exterior coatings during rain or snow, when relative humidity is outside humidity ranges, or when moisture content of surfaces exceeds those required by paint manufacturer.
3. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors and 50 degrees F for exteriors, unless otherwise indicated by manufacturer instructions.
4. Minimum Application Temperatures for Epoxy Paints: 60 degrees F, unless otherwise indicated by manufacturer instructions.
5. Minimum Application Temperature for Polyurea Coatings: 0 degrees F .

1.14 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five-year manufacturer's warranty for paint and coatings.

PART 2 - PRODUCTS

2.1 PAINTS AND COATINGS

A. Manufacturers:
1. Sherwin-Williams Company (The).
2. Tnemec.
3. Or Engineer approved equal.
a. Substitutions: Specified in Section 016000 – Product Requirements

B. Materials:

1. COATING SYSTEMS FOR STEEL - STRUCTURAL, TANKS, PIPE, EQUIPMENT, AND MISCELLANEOUS

a. Exterior Exposed:
1) System Type: Ultra-high solids epoxy with NSF 61 Certification.
2) Surface Preparation: SSPC-SP 6; surface profile 2.0 mil sharp and angular profile.
3) Primer: None. Apply direct to steel substrate.
4) Finish Coat: Apply according to manufacturer recommendation. DFT 18.0-22.0 mils.
5) Total DFT: 18.0 to 22.0 mils.
6) Finish Color: black.

b. Alternate Exterior Exposed:
1) System Type: Epoxy*/Epoxy/Urethane.
2) Surface Preparation: SSPC-SP 6; surface profile of 2.0-3.0 mils.
3) Primer*: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
4) Intermediate Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
5) Finish Coat: A two-component, acrylic polyurethane finish. DFT 2.0-4.0 mil

* A two-component epoxy polyamide primer and A single-component, moisture-curing urethane zinc rich primer are also acceptable.

c. Interior Exposed:
1) System Type: Epoxy/Epoxy/Epoxy.
2) Surface Preparation: SSPC-SP 6; surface profile of 2.0-3.0 mils..
3) Primer*: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
4) Intermediate Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
5) Finish Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
6) Total DFT: 9.0-15.0 mils.

7) Finish Color: To match existing or as indicated on the drawings.
* A two-component epoxy polyamide primer is also acceptable.

d. Immersion (Potable Water)
1) System Type: Ultra-high solids epoxy with NSF 61 Certification.
2) Surface Preparation: SSPC-SP 10; surface profile 2.0-3.0 mil sharp and angular profile.
3) Primer: None. Apply direct to steel substrate.
4) Two Coat: Apply according to manufacturer recommendation. DFT 10.0-12.0 mils each.
5) Total DFT: 20.0 to 24.0 mils.
6) Finish Color: White or light gray.

e. Immersion (Wastewater)
1) System Type: Epoxy Flake Filled/Epoxy Flake Filled
2) Surface Preparation: SSPC-SP 10; surface profile 2.0-3.0 mils
3) OPTIONAL Shop Primer: A two-component, high-solids polyamidoamine epoxy lining. DFT 3.0-5.0 mils.
4) Primer: A two-component, glass flake-reinforced amine epoxy coating: DFT 8.0-12.0 mils.
5) Finish Coat: A two-component, glass flake-reinforced amine epoxy coating: DFT 8.0-12.0 mils.
6) Total DFT: 16.0 to 24.0 mils excluding optional shop primer.*
7) Finish Color: To match existing or as indicated on the drawings.
* Spray apply A two-component, ultra high-solids epoxy amine for one or two coat application. Optically active pigment technology strongly recommended.

2. COATING SYSTEMS FOR GALVANIZED STEEL AND NONFERROUS METAL - PIPE AND MISCELLANEOUS FABRICATIONS

a. Exterior Exposed:
1) System Type: Epoxy/Urethane.
2) Surface Preparation: SSPC SP-16.
3) Primer: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
4) Finish Coat*: A two-component, acrylic polyurethane finish. DFT 2.0-4.0 mils
5) Finish Color: To match existing, as indicated on the drawings, or according to pipe identification schedule.
* A two-component, polysiloxane finish at 4.0-6.0 mils acceptable as a non-isocyanate finish coat

b. B. Interior Exposed:
1) System Type: Epoxy/Epoxy
2) Surface Preparation: SSPC SP-16.
3) Primer: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
4) Finish Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
5) Total DFT: 6.0 to 10.0 mils.

6) Finish Color: To match existing, as indicated on the drawings, or according to pipe identification schedule.

c. Immersion (Wastewater)*:
1) System Type: Epoxy/epoxy.
2) Surface Preparation: SSPC-SP-16.
3) Primer Coat: A two-component, glass flake-reinforced amine epoxy coating: DFT 8.0-12.0 mils
4) Finish Coat: A two-component, glass flake-reinforced amine epoxy coating: DFT 8.0-12.0 mils
5) Total DFT: 16.0 to 24.0 mils.

* Zinc-rich coatings including galvanizing are ready consumed in acidic conditions, so complete coverage is essential. Spray apply a two-component, ultra high-solids epoxy amine for one or two coat application. Optically active pigment technology strongly recommended.

3. COATING SYSTEMS FOR DUCTILE OR CAST IRON - PIPE, PUMPS, AND VALVES

a. Exterior Exposed:
1) System Type*: Epoxy/Epoxy/Urethane.
2) Surface Preparation: NAPF 500-03-04 with the exception that ALL rust and mold coating be removed. Only tightly adherent annealing oxide may remain..
3) Primer**: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
4) Intermediate Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
5) Finish Coat***: A two-component, acrylic polyurethane finish. DFT 2.0-4.0 mils
6) Finish Color: To match existing, as indicated on the drawings, or according to pipe identification schedule.

* For potable water applications, system shall include NSF 61 Certification.

** A two-component epoxy polyamide primer and a single-component, moisture-curing urethane zinc rich primer are also acceptable.

*** A two-component, polysiloxane finish at 4.0-6.0 mils acceptable as a non-isocyanate finish coat

b. Below Ground (Buried):
1) System Type*: Coal Tar Epoxy.
2) Surface Preparation: NAPF 500-03-04 with the exception that ALL rust and mold coating be removed. Only tightly adherent annealing oxide may remain.
3) Primer: None.
4) Finish Coat: (Option 1) A two-component, high-build, polyamide-cured epoxy coal tar coating. DFT 16.0-24.0 mils
5) Finish Coat: (Option 2) A two-component, high-build polyamide epoxy coal tar coating. 2 coats @ 8.0-16.0 per coat.
6) Finish Color: Black.

* For potable water applications, system shall include NSF 61 Certification.

c. Interior Exposed:
   1) System Type: Epoxy/Epoxy.
   2) Surface Preparation: Surface Preparation: NAPF 500-03-04 with the exception that ALL rust and mold coating be removed. Only tightly adherent annealing oxide may remain.
   3) Primer*: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
   4) Intermediate Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
   5) Finish Coat: Two-component, high-solids, fast-drying polyamide epoxy mastic. DFT 3.0-5.0 mils.
   6) Total DFT: 9.0 to 15.0 mils.
   7) Finish Color: To match existing, as indicated on the drawings, or according to pipe identification schedule.

   * A two-component epoxy polyamide primer and a single-component, moisture-curing urethane zinc rich primer are also acceptable.

d. Immersion (Wastewater)*:
   1) System Type: Epoxy/Epoxy/Epoxy.
   2) Surface Preparation: NAPF 500-03-04 with the exception that ALL rust and mold coating be removed. Only tightly adherent annealing oxide may remain.
   3) Primer: A two-component, glass flake-reinforced amine epoxy coating: DFT 8.0-12.0 mils.
   4) Finish Coat: A two-component, glass flake-reinforced amine epoxy coating: DFT 8.0-12.0 mils
   5) Total DFT: 16.0 to 24.0 mils.

   * Spray apply A two-component, ultra high-solids epoxy amine for one or two coat application. Optically active pigment technology strongly recommended

e. Immersion (Potable Water):
   1) System Type: Ultra-high solids epoxy with NSF 61 Certification.
   2) Surface Preparation: NAPF 500-03-04 with the exception that ALL rust and mold coating be removed. Only tightly adherent annealing oxide may remain.
   3) Primer: None. Apply direct to substrate.
   4) Two Coat: Apply according to manufacturer recommendation. DFT 10.0-12.0 mils each.
   5) Total DFT: 20.0 to 24.0 mils.
   6) Finish Color: White or light gray.

4. COATING SYSTEMS FOR PVC

a. Interior or Exterior Exposed:
   1) System Type: Acrylic.
   2) Surface Preparation: Scarify.
   3) Primer: A single-component, self-cross-linking acrylic primer. DFT 2.0-4.0 mils.
   4) Finish Coat: A single-component, acrylic coating. DFT 2.5-4.0 mils.
   5) Total DFT: 4.5 to 8.0 mils.

6) Finish Color: To match existing, as indicated on the drawings, or according to pipe identification schedule.

5. COATING SYSTEMS FOR INSULATED PIPE

a. Interior or Exterior Exposed:
1) System Type: Acrylic.
2) Surface Preparation: Clean and dry.
3) Primer: A single-component, self cross-linking acrylic primer. DFT 2.0-4.0 mils.
4) Finish Coat: A single-component, acrylic coating. DFT 2.5-4.0 mils.
5) Total DFT: 4.5 to 8.0 mils.
6) Finish Color: To match existing, as indicated on the drawings, or according to pipe identification schedule.

6. COATING SYSTEMS FOR PRECAST CONCRETE, CAST-IN-PLACE CONCRETE, AND DENSE CONCRETE MASONRY UNITS

a. Exterior Exposed:
1) System Type: Elastomeric Acrylic
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 2-3.
3) Primer: A single-component, masonry high-build coating. Spreading Rate 90 to 115 sf/gal.
4) Finish Coat: A single-component, masonry high-build coating. Spreading Rate 90 to 115 sf/gal.
5) Finish Color: To match existing or as indicated on the drawings.

b. Below Grade (Soil Side):
1) System Type: Coal Tar Epoxy.
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 2-3. Clean and dry.
3) Primer: None.
4) Finish Coat: (Option 1) A two-component, high-build, polyamide-cured epoxy coal tar coating. DFT 16.0-22.0 mils
5) Finish Coat: (Options 2) A two-component, high-build polyamide epoxy coal tar coating - 2 coats @ 8.0-16.0 mils per coat.
6) Finish Color: Black.

c. Immersion (Potable Water)
1) System Type: Ultra-high solids epoxy with NSF 61 Certification.
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 2-3. Clean and dry.
3) Filler: Fill bug holes, air pockets & voids with ultra-high solids epoxy using squeegee to ensure penetration.
4) Primer: None. Apply direct to concrete substrate.
5) Two Coat: Apply according to manufacturer recommendation. DFT 10.0-12.0 mils each.
6) Total DFT: 20.0 to 24.0 mils.
7) Finish Color: White or light gray.

d. Immersion (Wastewater):

1) System Type: Epoxy.
2) Surface Preparation: SSPC-SP-13/NACE 6; ICRI 310.2 CSP 3-5.
3) Filler: Fill bug holes, air pockets & voids with a two-component, 100% solids, epoxy surfacing compound or a three-component, epoxy modified cementitious resurfacer.
4) Primer: A two-component, 100% solids, high-build, high-strength reinforced epoxy lining. DFT 40.0-50.0 mils.
5) Finish*: A two-component, 100% solids, high-build, high-strength reinforced epoxy lining. DFT 40.0-50.0 mils.
6) Total DFT: 80.0-100.0 mils. Finish Color: White or Gray

* Where flexibility is required, use a two-component, 100% solids, elastomeric, aromatic polyurethane at 60.0 to 100.0 mils total DFT over an epoxy primer.

e. Interior Exposed:
1) System Type: Epoxy/ Epoxy
2) Surface Preparation: SSPC-SP 13/NACE 6 to achieve a surface profile of ICRI CSP 2 or 3.3.
3) Primer: Two component water based polyamine epoxy. DFT 2.0-4.0 mils.
4) Finish Coat: Two component water based polyamine epoxy. DFT 3.0-4.0 mils
5) Total DFT: 5.0 to 8.0 mils.
6) Finish Color: To match existing or as indicated on the drawings.

7. COATING SYSTEMS FOR CONCRETE FLOORS

a. Mild Exposure:
1) System Type: Silicate Blend.
2) Surface Preparation: Clean & Dry. No curing compounds.
3) Primer: Concrete curing agent and densifier. 300-350 SFG
4) Finish Coat: Concrete curing agent and densifier. 350-400 SFG
5) Total DFT: N/A.
6) Finish Color: N/A.

b. Heavy Traffic and Chemical Exposure:
1) System Type: Self Leveling Epoxy Slurry/CR Epoxy
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 4-6.
3) Primer: A two-component, high-solids, epoxy primer and binder resin at 200-225 SFG.
4) Base Coat: A two-component, high-solids epoxy resin, 19lbs aggregate applied at 50-60 square feet per 1.25 gallons.
5) Broadcast Coat: (Non-Skid Applications) 30-60 mesh silica to excess.
6) Grout Coat: A two-component, recoatable epoxy and binder resin @ 100-150 SFG
7) Finish Coat: A two-component, recoatable epoxy and binder resin at 150-200 SFG.
8) Total DFT: Greater than 1/8 inch.
9) Finish Color: As indicated on the drawings. [Limited Color Selection]
10) Finish Texture: As required by the Engineer.

c. Decorative:

1) System Type: Ceramic Quartz Broadcast Epoxy Floor System
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 4-6
3) Primer: A two-component, high-solids, clear or pigmented epoxy primer and binder resin at 200-225 SFG.
4) First Coat: A two-component, high-solids epoxy resin at 125-150 SFG, broadcast to refusal GP5900F.
5) Second Coat: A two-component, high-solids epoxy resin at 100-125 SFG, broadcast to refusal GP5900F
6) Grout Coat: A two-component, recoatable epoxy and binder resin at 100-150 SFG
7) Finish Coat: A two-component, tough, durable, high-gloss polyurethane enamel finish.. DFT 2.0 to 3.0 Mils
8) Total DFT: Greater than 1/8 inch.
9) Finish Color: As indicated on the drawings.
10) Finish Texture: As required by the Engineer.

d. High-Build Epoxy/Urethane Floor Coating. Mosaic Decorative Flake.
1) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 4-5.
2) Primer: A two-component, high-solids, clear or pigmented epoxy primer and binder resin at 200-225 SFG.
3) Base Coat: A two-component, high-solids, clear or pigmented epoxy coating @ 150-200 SFG broadcast to refusal with decorative paint chip flake
4) Grout Coat: A two-component, recoatable epoxy and binder resin at 200-225 SFG
5) Finish Coat: A two-component, tough, durable, high-gloss polyurethane enamel finish at 250-300 SFG
6) Total DFT: 24.0 to 31.0 Mils.
7) Finish Color & Pattern: As selected by Engineer from manufacturer's standard colors.

8. COATING SYSTEMS FOR SECONDARY CONTAINMENT

a. Chemical Storage Containment Area:*
1) System Type: High-Solids Novolac Epoxy.
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 4-5.
3) Primer: A two-component, low-viscosity, penetrating epoxy primer/sealer. DFT 4.0 to 6.0 mils.
4) Intermediate Coat: A two-component, 100% solids, novolac epoxy coating. DFT 15.0 to 20.0 mils.
5) Finish Coat: A two-component, 100% solids, novolac epoxy coating. DFT 15.0 to 20.0 mils.
6) Total DFT: 34.0 to 46 mils.
7) Finish Color: To match existing or as indicated on the drawings. [Limited Color Selection]

* Verify resistance to stored commodities and anticipated traffic load PRIOR to installation.

b. Floors, Severe Chemical, Abrasion, and Traffic Exposure:*
1) System Type: Aggregate-filled Epoxy Novalac.
2) Surface Preparation: SSPC-SP 13/NACE 6; ICRI 310.2 CSP 5-6.

3) Primer: A two-component, low-viscosity, penetrating epoxy primer/sealer. DFT 4.0 to 6.0 mils.
4) First Coats: A two-component, 100% solids, self-leveling novolac epoxy coating, double broadcast. DFT 1/8 inch.
5) Finish Coat: A two-component, 100% solids, novolac epoxy coating. DFT 15.0 to 20.0 mils.
6) Total DFT: Greater than 1/8 inch (125 mils).
7) Finish Color: To match existing or as indicated on the drawings. [Limited Color Selection]

* Verify resistance to stored commodities and anticipated traffic load PRIOR to installation.

9. COATING SYSTEMS FOR POROUS CONCRETE MASONRY UNITS

a. Exterior Exposed:
1) System Type: Elastomeric Acrylic.
2) Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
3) Primer: A single-component, masonry high-build coating. Spreading Rate 90 to 115 SFG
4) Finish Coat: A single-component, masonry high-build coating. Spreading Rate 90 to 115 SFG
5) Finish Color: To match existing or as selected by Engineer from manufacturer's standard colors.

b. Interior Exposed:
1) System Type: Cementitious Acrylic/Epoxy
2) Surface Preparation: SSPC-SP 13/NACE 6. Clean and dry.
3) Primer: Cement Plex 875. Spreading rate 80 to 100 SFG
4) Intermediate Coat: Two component water based polyamine epoxy. DFT 2.0-4.0 mils.
5) Finish Coat: Two component water based polyamine epoxy. DFT 3.0-4.0 mils.
6) Total DFT: 5.0 to 8.0 mils plus filler.
7) Finish Color: To match existing or as selected by Engineer from manufacturer's standard colors.

10. COATING SYSTEMS FOR PLASTER, GYPSUM BOARD, AND WOOD

a. Interior or Exterior Exposed:
1) System Type: Acrylic.
2) Surface Preparation: Clean and dry.
3) Primer: Interior/Exterior Latex Primer/Sealer. DFT 1.0-1.5 mils.
4) Intermediate Coat: Single-component, water based acrylic coating. DFT 2.0-4.0 mils.
5) Finish Coat: Single-component, water based acrylic coating. DFT 2.5-4.0 mils.
6) Total DFT: 6.0 to 9.5 mils.
7) Finish Color: To match existing or as selected by Engineer from manufacturer's standard colors.

11. ACCESSORIES

a. Coating Application Accessories:
1) Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.
2) Products of coating manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for application examination.

B. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.

C. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

D. Verify that substrate conditions are ready to receive Work as recommended by product manufacturer.

E. Examine surfaces scheduled to be finished prior to commencement of Work, and report conditions capable of affecting proper application to Engineer.

F. Test shop-applied primer for compatibility with subsequent cover materials.

G. Moisture Content:

1. Measure moisture content of surfaces using electronic moisture meter.
2. Do not apply finishes unless moisture content of surfaces are below following maximums:

a. Plaster and Gypsum Wallboard: 12 percent.
b. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
c. Interior Wood: 15 percent, measured according to ASTM D4442.
d. Exterior Wood: 15 percent, measured according to ASTM D4442.
e. Concrete Floors: 8 percent.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for application preparation.

B. PROTECTION OF SURFACES NOT SCHEDULED TO BE COATED
1. Protect surrounding areas and surfaces not scheduled to be coated from damage during surface preparation and application of coatings.

2. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

C. SURFACE PREPARATION OF STEEL
1. Prepare steel surfaces in accordance with manufacturer's instructions.
2. Fabrication Defects:
   a. Correct steel and fabrication defects revealed by surface preparation.
   b. Remove weld spatter and slag.
   c. Round sharp edges and corners of welds to a smooth contour.
   d. Smooth weld undercuts and recesses.
   e. Grind down porous welds to pinhole-free metal.
   f. Remove weld flux from surface.
3. Ensure surfaces are dry.
4. Immersion or Below Grade Surfaces: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 10/NACE 2. Create a surface profile as specified in Part 2 or as required by the coating manufacturer..
5. Exterior Exposed or Interior Exposed Surfaces: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP 6/NACE 3. Create a surface profile as specified in Part 2 or as required by the coating manufacturer..
6. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface. Do not leave blast-cleaned surfaces uncoated for more than 8 hours.
7. Shop Primer: Shop primed steel shall receive a field sweep blast prior to the application of subsequent coats. Prepare shop primer to receive field coat in accordance with manufacturer's instructions. Removal all unknown shop primers and re-prime in accordance with this specification.

D. SURFACE PREPARATION OF GALVANIZED STEEL AND NONFERROUS METAL
1. Prepare galvanized steel and nonferrous metal surfaces in accordance with SSPC-SP16 and the coating manufacturer's instructions.
2. Test galvanized surfaces for chromate treatments and remove as required by SSPC-SP 16, or other Engineer approved method.
3. Ensure surfaces are dry.

E. SURFACE PREPARATION OF DUCTILE OR CAST IRON
1. Prepare ductile or cast iron surfaces in accordance with NAPF 500-03-04 Abrasive Blast Cleaning with the exception that ALL rust and mold coating be removed. Only tightly adherent annealing oxide may remain. Bituminous coated pipe shall NOT be allow if field painting is required..
2. Bituminous coated pipe shall NOT be allow if field painting is required.
3. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

F. SURFACE PREPARATION OF PVC
1. Prepare PVC surfaces in accordance with manufacturer's instructions.
2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. Scarify PVC surfaces.

G. SURFACE PREPARATION OF INSULATED PIPE
1. Prepare insulated pipe surfaces in accordance with manufacturer's instructions.

2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.

H. SURFACE PREPARATION OF CONCRETE
1. Interior, Wet Substrate:
   a. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.
   b. Allow concrete to cure for a minimum of 28 days.
   c. Test concrete for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.
   d. Abrasive blast surface to remove laitance and solid contaminants and to provide clean, sound substrate with uniform anchor profile.
   e. Verify that the pH of the cleaned concrete surfaces to be coated is within the range of to 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the Engineer.
   f. Fill holes, pits, voids, and cracks with manufacturer approved surfacer.
   g. Ensure surfaces are clean, dry, and free of oil, grease, chalk, form release agents, and other contaminants.
2. Exterior and Interior Dry:
   a. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.
   b. Allow concrete to cure for a minimum of 28 days.
   c. Test concrete for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.
   d. Level concrete protrusions and mortar spatter.
   e. Verify that the pH of the cleaned concrete surfaces to be coated is within the range of to 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the Engineer.
   f. Fill hairline cracks less than 1/64 inch (0.4 mm) in accordance with manufacturer's instructions.
   g. Prepare cracks wider than 1/64 inch (0.4 mm), moving cracks, gaps, and expansion joints in accordance with manufacturer's instructions.
   h. Ensure surfaces are clean, dry, and free of oil, grease, chalk, form release agents, and other contaminants.

I. SURFACE PREPARATION OF CONCRETE FLOORS
1. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.
2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. Allow concrete to cure for a minimum of 28 days before coating.
4. Test concrete for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.
5. Verify that the pH of the cleaned concrete surfaces to be coated is within the range of to 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the Engineer.

J. SURFACE PREPARATION OF SECONDARY CONTAINMENT
1. Prepare secondary containment surfaces in accordance with manufacturer's instructions.
2. Prepare concrete surfaces in accordance with manufacturer's instructions, SSPC-SP 13/NACE 6, and ICRI 310.2.
3. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
4. Allow concrete to cure for a minimum of 28 days before coating.
5. Test concrete for moisture in accordance with ASTM D 4263 and, if necessary, F 1869.

6. Verify that the pH of the cleaned concrete surfaces to be coated is within the range of to 8 to 11. Application of coating materials outside this range will not be permitted without written approval from the Engineer.

K. SURFACE PREPARATION OF POROUS CONCRETE MASONRY UNITS
1. Prepare porous concrete masonry unit surfaces in accordance with manufacturer's instructions and SSPC-SP 13/NACE 6.
2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. Allow mortar to cure for a minimum of 28 days before coating.
4. Level protrusions and mortar spatter.

L. SURFACE PREPARATION OF PLASTER
1. Prepare plaster surfaces in accordance with manufacturer's instructions.
2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. Allow plaster to cure and dry out for a minimum of 28 days before coating.
4. Do not coat over plaster containing free water, lime, or other soluble alkaline salts.
5. Remove plaster nibs and other protrusions.
6. Patch voids and cracks with approved materials and after dry, sand flush with surface.

M. SURFACE PREPARATION OF GYPSUM BOARD
1. Prepare gypsum board surfaces in accordance with manufacturer's instructions.
2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, and other contaminants.
3. Sand joint compound smooth and feather edge.
4. Avoid heavy sanding of adjacent gypsum board surfaces, which will raise nap of paper covering.
5. Do not apply putty, patching pencils, caulking, or masking tape to drywall surfaces to be painted.
6. Lightly scuff-sand tape joints after priming to remove raised paper nap. Do not sand through primer.

N. SURFACE PREPARATION OF WOOD
1. Prepare wood surfaces in accordance with manufacturer's instructions.
2. Ensure surfaces are clean, dry, and free of oil, grease, dirt, dust, surface deposits of sap or pitch, and other contaminants.
3. Seal knots and pitch pockets.
4. Sand rough spots with the grain.
5. Fill cracks and holes with approved materials after primer is dry. Sand flush with surface when filler is hard.
6. Lightly sand between coats.

3.3 APPLICATION

A. Comply with MPI - Architectural Painting Manual.

B. Do not apply finishes to surfaces that are not dry.

C. Apply coatings in accordance with manufacturer's instructions.

D. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.

E. Keep containers closed when not in use to avoid contamination.

F. Do not use mixed coatings beyond pot life limits.

G. Use application equipment, tools, pressure settings, and techniques in accordance with manufacturer's instructions.

H. Apply each coat to uniform appearance.

I. Uniformly apply coatings at spreading rate required to achieve specified DFT.

J. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.

K. Stripe paint with brush critical locations on steel such as welds, corners, and edges using specified primer. Apply and additional strip coat of the intermediate coating material in immersion areas.

L. Roll or backroll the first coat of epoxy or block filler applied to concrete or interior block substrates to work the material into the substrate.

M. Fillers:

1. If clear finishes are required, tint fillers to match wood.
2. Work fillers into grain before set, and wipe excess from surface.

N. Concealed Surfaces:

1. Prime concealed surfaces of interior and exterior woodwork with primer paint.
2. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.

O. SCHEDULES
1. Coating System Schedule: Refer to the drawings for coating system schedules.
2. Color Schedule: To facilitate identification of piping in plants and pumping stations follow the Ten States Identification Colors system

P. Installation Standards: Install Work according to Manufacturer recommendations.

Q. ONE-YEAR INSPECTION
1. Owner will set date for one-year inspection of coating systems.
2. Inspection shall be attended by Owner, Contractor, Engineer, and manufacturer's representative.
3. Repair deficiencies in coating systems as determined by Engineer in accordance with manufacturers instructions.

3.4 FIELD QUALITY CONTROL

A. Section 017000 - Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Inspecting and Testing: Comply with MPI - Architectural Painting Manual.

C. Required Inspections and Documentation:
1. Verify coatings and other materials are as specified.
2. Verify environmental conditions are as specified.
3. Verify surface preparation and application are as specified.
4. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges. DFT's shall be measured in accordance with SSPC-PA2.
5. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.
   a. Check for holidays on interior steel immersion surfaces using holiday detector in accordance with NACE SP0188 or SSPC TU-11 using a safe blue light inspection lamps if optically active pigment technology is used.
6. Report:
   a. Prepare inspection reports daily.
   b. Submit written reports describing inspections made and actions taken to correct nonconforming work.
   c. Report nonconforming work not corrected.
   d. Submit copies of report to Engineer and Contractor.

D. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems.

3.5 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. Remove temporary coverings and protection of surrounding areas and surfaces.

C. Collect waste material that may constitute fire hazards, place in closed metal containers, and remove daily from Site.

3.6 PROTECTION OF COATING SYSTEMS

A. Protect surfaces of coating systems from damage during construction.

3.7 REPAIR

A. Materials and Surfaces Not Scheduled To Be Coated: Repair or replace damaged materials and surfaces not scheduled to be coated.

B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.

C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

END OF SECTION 099000

SECTION 099500 - CONCRETE REHABILITATION

PART 1 - GENERAL

1.1 DESCRIPTION

Work included: This specification covers work, materials and equipment required for protecting and/or rehabilitating; concrete and masonry structures, large diameter pipes and other underground vaults by monolithic spray-application of a high-build, rigid and solvent-free polyurethane coating to eliminate infiltration, provide corrosion protection, repair voids and enhance structural integrity as required. Procedures for surface preparation, cleaning, application and testing are described herein.

The omission of minor items in the schedule of work shall not relieve the Contractor of his obligation to include such items where they come within the general intent of these Specifications.

1.2 REFERENCES

A. ASTM D638 - Tensile Properties of Plastics.
B. ASTM D790 - Flexural Properties of Unreinforced and Reinforced Plastics.
C. ASTM D695 - Compressive Properties of Rigid Plastics.
D. ASTM D 7234 (Concrete) - ASTM D 4541 (Steel)
E. Pull-off Strength of Coatings Using a Portable AdhesionTester.
F. ASTM D2584 - Volatile Matter Content.
G. ASTM D2240 - Durometer Hardness, Type D.
H. ASTM D543 - Resistance of Plastics to Chemical Reagents.
I. ASTM C109 - Compressive Strength Hydraulic Cement Mortars.
J. ACI 506.2-77 - Specifications for Materials, Proportioning, and Application of Shotcrete.
K. ASTM C579 - Compressive Strength of Chemically Setting Silicate and Silica Chemical Resistant Mortars.
L. ASTM - The published standards of the American Society for Testing
M. and Materials, West Conshohocken, PA.
N. SSPC - The published standards of the Society of Protective Coatings,
O. Pittsburgh, PA.
P. Los Angeles County Sanitation District – Evaluation of Protective Coatings for Concrete.
Q. ASTM F1216 (Including Appendix XI): Design Parameters for Buried Structures (structural rehabilitation) utilizing the External Buckling Equation for thickness determination.
R. ASTM D2990: Test Methods for Tensile, Compressive and Flexural Creep and Creep Rupture in Plastics
S. SSPWC 210-2.3.3 - Chemical resistance testing published in the Standard Specifications for Public Works Construction, 1997 edition (otherwise known as “The Greenbook”).
T. NACE - The published standards of National Association of Corrosion Engineers (NACE International), Houston, TX.

1.3 QUALITY ASSURANCE

A. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE and SSPC standards and the protective coating manufacturer's recommendations.
B. A NACE Certified Coating Inspector shall be provided. The Inspector will observe surface preparation, application and material handling procedures to ensure adherence to the specifications.

1.4 SUBMITTALS

A. The following items shall be submitted:

1. Technical data sheet on each product used, including ASTM test results indicating the product conforms to and is suitable for its intended use per these specifications.

2. Material Safety Data Sheets (MSDS) for each product used.

3. Project specific guidelines and recommendations.

4. Applicator Qualifications:

a. Manufacturer certification that Applicator has been trained and approved in the handling, mixing and application of the products to be used. Certification letter shall be dated within six months of bid date.

b. The Applicator shall provide four (4) references which demonstrate previous successful projects completed for the specified structural protective coating system or comparable, during the last two (2) years.

c. Certification that the equipment to be used for applying the products has been manufactured or approved by the protective coating manufacturer and Applicator personnel have been trained and certified for proper use of the equipment. Certification letter shall be dated within six months of bid date.

d. Proof of any necessary federal, state or local permits or licenses necessary for the project.

5. Structural Design:

a. Third party testing verifying the short term Modulus of Elasticity used on this project, minimum of 735,000 psi.

b. Third party testing verifying Flexural Strength used on this project, minimum 14,000 psi.

c. Third party testing verifying long term Flexural Modulus of Elasticity, minimum of 529,000 psi. This third party testing will verify the long term reduction factor (Creep Analysis) of a minimum of 50%. This long term reduction factor verification shall be conducted utilizing ASTM D2990-01 via a third party, independently certified laboratory.

1.5 DESIGN CONDITIONS

A. The following design conditions shall be assumed for all structures being rehabilitated with the approved resin system:

Parameter	Design Requirement
Structure Condition	Partially/Fully Deteriorated, based on condition of the existing structure.
Soil Type	Saturated/Unsaturated
Design Thickness	ASTM 1216-Appdx. XI
Ovality	Not greater than 5%
Soil Load	120 lbs/cu. ft.
Traffic Load	AASHTO-HS-20-44 Highway
Soil Modulus	>500 psi.<1000 psi.
Safety Factor	2.0
Soil Cover	Distance from grade to crown of conduit
Water Table	Same as Soil Cover unless changed by Owner or Owner's Agent (Saturated).

Wall thickness design calculations for each structure to be rehabilitated utilizing the specified resin technology systems must be submitted with all qualified bids, along with supporting formulas that document that version of formula used. Additionally, product specific strength values, including the short term flexural modulus and the long term flexural modulus strength, must be substantiated by third party testing which will be submitted with all qualified bids. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long term test with respect to the initial flexural modulus and the long term reduction factor used in design.

1.6 PRODUCT DELIVERY, HANDLING AND STORAGE

A. Materials are to be kept dry, protected from weather and stored under cover.

B. Protective coating materials are to be stored between 50 deg F and 90 deg F. Do not store near flame, heat or strong oxidants.

C. Protective coating materials are to be handled according to their material safety data sheets.

1.7 SITE CONDITIONS

A. Applicator shall conform with all local, state and federal regulations including those set forth by OSHA, RCRA and the EPA and any other applicable authorities.

B. Method statements and design procedures are to be provided by Owner when confined space entry, flow diversion or bypass is necessary in order for Applicator to perform the specified work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Structural rehabilitation coating shall be manufactured by Sprayroq, Inc. or approved equal.
B. Or approved equal.
   a. Substitutions: Specified in Section 016000 – Product Requirements

2.2 REPAIR MATERIALS

A. Repair materials shall be used to; fill voids, bugholes, structurally reinforce and/or rebuild surfaces, etc. as determined necessary by the engineer and protective coating applicator. Repair materials must be compatible with the specified coating and shall be applied in accordance with the manufacturer's recommendations.

B. The following products may be accepted and approved as compatible repair basecoat materials for approved topcoating for use within the specifications:

1. 100% solids, solvent-free grout specifically formulated for approved topcoating compatibility. The grout manufacturer shall provide instructions for trowel or spray application and for approved topcoating procedures.

2. Factory blended, rapid setting, high early strength, non-shrink cementitious or epoxy repair mortar that can be trowelled or pneumatically spray applied may be approved if specifically formulated to be suitable for approved topcoating. Such repair mortars should not be used unless their manufacturer provides information as to its suitability for topcoating with the approved topcoating. Project specific submittals should be provided including application, cure time and surface prepration procedures which permit optimum bond strength with the approved coating.

3. In the case of excessive infiltration, a hydraulic cement or plug may be used to stop the flow of the infiltration. The hydraulic cement shall be compatable with the spray applied resin coating.

2.3 STRUCTURAL AND OR PROTECTIVE COATING MATERIALS

A. The resin based material shall be used to form the sprayed structurally enhanced monolithic liner covering all interior surfaces of the structure, including benches and inverts of manholes. The finished liner shall be SprayWall® as manufactured by Sprayroq, Inc. or approved equal and conform to the minimum physical requirements listed below. The physical requirements must be verified by an independent, certified, third party testing laboratory within the last five years and must be submitted with the bid package. Any bid package not including the verifiable, independent third party testing shall be ruled non-responsive and will be rejected.

Description	Standard	Specification
Compressive Strength	ASTM D 695	> 18,000 psi
Tensile Strength	ASTM D 638	> 7,450 psi
Bond (Concrete)	ASTM D 7234 Or Substrate Failure	> 200 psi
Bond (Steel)	ASTM D 4541	> 1,600 psi
Flexural modulus (initial)	ASTM D 790	> 735,000 psi
Flexural modulus (long term)	DMA 983 Or ASTM D 2990	> 529,000 psi
Chemical Resistance	ASTM D 543	
Density		87 ± pcf
Severe Municipal Sewer		All types of service
Successful Pass	Evaluation Study or SSPWC 211-2	Sanitation District of L.A. County Coating

B. When the wall of the resin based liner is to be structurally designed to withstand the hydraulic load generated by the groundwater table the long term (50yr) value of the flexural modulus of elasticity will be utilized to calculate the thickness of the structural liner. The initial flexural modulus of elasticity (short term) of the submitted resin material will be utilized with the long term deformation percentage as determined by ASTM D2990 (see below) in the design equation outlined in ASTM 1216-09, Appendix X1. The value of the long term flexural modulus of the proposed product will be certified by an independent, certified, third party testing lab, independent of the Manufacturer and submitted with the bid package. [The definition of long term value will be identified as initial flexural modulus of elasticity less the reduction in value caused by Creep over a fifty (50) year minimum period and verified by third party DMA testing(ASTM D2990).] All design submittals will include this certified third party DMA testing (ASTM D2990) value in their respective design calculations for each structure being rehabilitated.

C. When groundwater loading is not an issue and only a corrosion barrier is required, the rehabilitation lining shall be installed to the thickness necessary to qualify as a monolithic (void free) liner. The roughness of the substrate will dictate the thickness needed to create the monolithic liner and eliminate any opportunity for voids in the lining. The minimum value for coating thickness for corrosion protection for non-structural rehabilitation shall be 125 mils and structural shall be a minimum 250 mils.

D. Flat Wall surfaces to receive protective coating shall be prepared with a series of grooves cut into the substrate at a spacing and depth determined by the "Flat Wall" design formula, developed by the manufacturer, to key or lock the protective coating to the substrate. The grooves shall be a minimum ¼"w x ¼"d x 45º (60º maximum), cut into the substrate at opposing angles. The grooves shall be cut: horizontally and vertically (walls), longitudinal and latitudinal (floors and ceilings) where applicable.
Note: The design approach for flat wall applications of SprayWall® is based on one-way and two-way slab designs, addressing stress-based and deflection-based design criteria selection. In most cases, calculations are used to determine the thickness of the SprayWall application required to withstand hydrostatic pressure from ground water. A factor of safety is provided for in the calculations. An additional safety factor is applied to the measured ultimate strength of the SprayWall material, as determined by independent third party laboratory tests.

Flat Wall Design:

Deflection-based criteria for slab design:

$t = 1.84\ L\ \{\ [\ H\ (0.109)\ N\ ]\ /\ E\ \}\ ^{\wedge\ (1/3)}$

t = design thickness, inches

L = max.length to center point between end points, horizontal or vertical, inches

H = max. external water height, feet

N = safety factor

E = modulum of elasticity, reduce to allow for creep, psi

Stress-based criteria for slab design:

$t = L\{\ [\ H(0.184)N\ ]\ /\ \sigma\ \}\ ^{\wedge\ (1/2)}$

t = design thickness, inches

L = max.length to center between end points, horizontal or vertical, inches

H = max. external water height, feet

N = safety factor

σ = minimum of allowable "flexural" strength, psi
(Reduced for creep)

2.3 PROTECTIVE COATING APPLICATION EQUIPMENT

A. Manufacturer approved heated plural component spray equipment shall be used in the application of the specified protective coating.

2.4 REPAIR MORTAR SPRAY APPLICATION EQUIPMENT (if spray applied)

B. Spray applied repair mortars shall be applied with manufacturer approved equipment.

PART 3 - EXECUTION

3.1 PREPARATION

ACCEPTABLE APPLICATORS

A. Repair mortar applicators shall be trained to properly apply the cementitious mortar according to manufacturer's recommendations.

B. Protective coating must be applied by a Certified Applicator of the protective coating manufacturer and according to manufacturer specifications.

3.2 EXAMINATION

A. All structures to be coated shall be readily accessible to Applicator.

B. Appropriate actions shall be taken to comply with local, state and federal regulatory and other applicable agencies with regard to environment, health and safety.

C. Any active flows shall be dammed, plugged or diverted as required to ensure that the liquid flow is maintained below the surfaces to be coated. Flows should be totally plugged and/or diverted when coating the invert. All extraneous flows into the manhole or vaults at or above the area coated shall be plugged and/or diverted until the coating has set hard to the touch. As an option, hot air may be added to the manhole to accelerate set time of the coating.

D. (Optional) Pipe joint seals shall be installed by others. No leaks may be present prior to commencing and during work.

E. Installation of the protective coating shall not commence until the concrete or metal substrate has properly cured in accordance with these specifications.

F. Temperature of the surface to be coated should be maintained between 70ºF and 110ºF during application. Prior to and during application, care should be taken to avoid exposure of direct sunlight or other intense heat source to the structure being coated.

3.3 SURFACE PREPARATION

A. Applicator shall inspect all surfaces specified to receive a protective coating prior to surface preparation. Applicator shall notify Owner of any noticeable disparity in the surfaces which may interfere with the proper preparation or application of the repair mortar and protective coating.

B. All contaminants including: oils, grease, incompatible existing coatings, waxes, form release, curing compounds, efflorescence, sealers, salts, or other contaminants shall be removed.

C. All concrete or metal that is not sound or has been damaged by chemical exposure shall be removed to a sound surface or replaced.

D. Surface preparation method(s) should be based upon the conditions of the substrate, service environment and the requirements of the resin protective coating to be applied.

E. Surfaces to receive protective coating shall be cleaned and abraded to produce a sound surface with profile to meet as a minimum ICRI CSP4 –CSP6 profile and porosity to provide a strong bond between the protective coating and the substrate. Generally, this can be achieved with a high pressure water cleaning using equipment capable of a minimum 4,000 psi at 3.5 gpm with a turbo head jet nozzle. Other methods such as high pressure water jetting (refer to SSPC-SP 13/NACE No.6), abrasive blasting, shotblasting, grinding, scarifying or acid etching may also be used. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the concrete. Whichever method(s) are used, they shall be performed in a manner that provides a uniform, sound clean neutralized surface that is not excessively damaged.

F. Infiltration shall be stopped by using a material which is compatible with the specified repair mortar and is suitable for topcoating with the specified protective coating.

G. The area between the manhole and the manhole ring and any other area that might exhibit movement or cracking due to expansion and contraction, shall be grouted with a flexible grout or gel. A termination groove “key” cut into the substrate between the bottom of the manhole frame and concrete is recommended for placement of the flexible grout or gel. The “key” shall be a minimum ¼”w x ¼”d, cut at a minimum 45º angle (60º maximum).

H. (OPTIONAL) Castings can be abrasive blasted and coated to prevent corrosion if desired.

I. Surfaces to receive protective coating shall be dry to the touch and or with no visible dampness. This is to insure maximum adhesion to the substrate. If required, drying may be accomplished by a minimum of 20 minutes of a heated, forced air blower. The drying shall

be to the specification dictated by the resin manufacturer and its trained applicator.

J. All surfaces should be inspected by the Inspector during and after preparation and before the repair material is applied.

3.4 APPLICATION OF REPAIR MATERIALS

A. Areas where structural steel has been exposed or removed shall be repaired in accordance with the Project Engineer's recommendations.

B. Repair materials shall meet the specifications herein. The materials shall be trowel or spray applied utilizing proper equipment on to specified surfaces. The material thickness shall be specified by the Project Engineer according to Owner's requirements and manufacturer's recommendations.

C. If using approved cementitious repair materials, such shall be trowelled to provide a smooth surface with an average profile equivalent to coarse 60 grit sandpaper to optimally receive the protective coating. No bugholes or honeycomb surfaces should remain after the final trowel procedure of the repair mortar.

D. The repair materials shall be permitted to cure according to manufacturer recommendations. Curing compounds should not be used unless approved for compatibility with the specified protective coating.

E. Application of the repair materials, if not performed by the coating certified applicator, should be inspected by the protective coating certified applicator to ensure proper finishing for suitability to receive the specified coating.

F. After abrasive blast and leak repair is performed, all surfaces shall be inspected for remaining laitance prior to protective coating application. Any evidence of remaining contamination or laitance shall be removed by additional abrasive blast, shotblast or other approved method. If repair materials are used, refer to these specifications for surface preparation. Areas to be coated must also be prepared in accordance with these specifications after receiving a cementitious repair mortar and prior to application of the approved coating.

G. All surfaces should be inspected during and after preparation and before the protective coating is applied.

3.5 APPLICATION OF PROTECTIVE LINING

A. Application procedures shall conform to the recommendations of the protective coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment.

B. The spray equipment shall be specifically designed to accurately ratio and apply the specified protective coating materials and shall be regularly maintained and in proper working order.

C. The protective coating material must be spray applied by a Certified Applicator of the protective coating manufacturer.

D. Specified surfaces shall be coated by spray application of a solvent-free, 100% solids, rigid polyurethane structural lining as further described herein.

E. Airless spray application equipment approved by the coating manufacturer shall be used to apply each coat of the protective coating. The air source is to be filtered to completely remove all oil and water.

F. If necessary, subsequent topcoating or additional coats of the protective coating should occur as soon as the basecoat becomes tack free, no later than the recoat window for the specified products. Additional surface preparation procedures will be required if this recoat window is exceeded.

G. When groundwater loading is not an issue and only a corrosion barrier is required, the rehabilitation lining shall be installed to the thickness necessary to qualify as a monolithic (void free) liner. The roughness of the substrate will dictate the thickness needed to create the monolithic liner and eliminate any opportunity for voids in the lining. The minimum value for coating thickness for corrosion protection for non-structural rehabilitation shall be 125 mils and structural shall be a minimum 250 mils.

3.06 TESTING AND INSPECTION

A. High Voltage Spark Test. After the protective coating has set hard to the touch it shall be inspected with high-voltage holiday detection equipment. This test is critical when applied to corrosion protection applications (i.e. mil coatings less than 250 mils). Surface shall first be dried, an induced holiday shall then be made on to the coated concrete or metal surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of film thickness applied but may be adjusted as necessary to detect the induced holiday (refer to NACE RPO188-99 or ASTM D4787 Continuity Testing of Liquid or Sheet Liners On Concrete -Holidays). All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional protective coating material can be hand applied to the repair area. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.

B. Adhesion Testing. The adhesion tests shall be performed on a minimum of one or 10% of all rehabilitated manholes (which ever is greater), every 200 square feet of large structures or as shown on the Plans and/or specified in the Special Provisions. Adhesion testing shall be conducted after the lining or coating system has cured per manufacturer instruction and in accordance with ASTM D4541(Steel) or ASTM 7234(Concrete). Adhesion is critical for proper performance of a corrosion barrier (i.e. < 250 mils). A minimum of one 20 mm dolly shall be affixed to the lined surface of the structure at the upper section or cone area, mid section and at the bottom, unless otherwise specified in the Special Provisions. Each testing location shall be identified by the Engineer. The adhesive used to attach the dollies to the liner shall be a two part 100% solids epoxy adhesive with a tensile strength greater than the tensile strength of the lining system. Affix the 20 mm dollies to the lining surfaces, and allow it to cure in accordance with the manufacturer’s instructions.The lining material and dollies shall be adequately prepared to receive the adhesive. Prior to pull test, the Contractor shall utilize a scoring device to cut through the coating until the substrate is reached. Extreme care shall be required while scoring to prevent micro cracking in the coating, since cracks may cause failures at diminished

strengths. Failure due to improper dolly adhesive or scoring shall require retesting. The pull tests in each area shall meet or exceed 200 psi. and shall include subbase adhered to the back of the dolly or no visual signs of coating material in the test hole. Pull tests with results between a minimum 150 psi and 200 psi shall be acceptable if more than 50% of the subsurface is adhered to the back of the dolly. A test result can be discarded, as determined by the Engineer, if there is a valid nonstatistical reason for discarding the test results as directed by Sections 8.4 and 8.5 of ASTM D4541 and ASTM D7234. If any test fails, a minimum of three additional locations in the section of the failure shall be tested, as directed by the Engineer. If any of the retests fail, all loosely adhered or unadhered liner in the failed area, as determined by the Engineer, shall be removed and replaced at the Contractor's expense. If a structure fails the adhesion test, one additional structure or 10% of the initial number of structures selected for testing shall be tested at the discretion of the Engineer and/or as specified in the Special Provisions. All touch-up/repair procedures shall follow the protective coating manufacturer's recommendations.

NOTE: The mil thickness will be measured and confirmed with the scored and pulled test samples. In structural repairs (partially or fully deteriorated design assumptions), it is critical to confirm the design thickness with the pulled sample as adhesion is not assumed in the ASTM 1216 design. The primary purpose of the pull test in structural rehabilitation is to confirm applied thickness, not adhesion. Any derived adhesion is further enhancement to the final installation strength of the rehabilitated structure.

C. A final visual inspection shall be made by the Inspector and manufacturer's representative. Any deficiencies in the finished coating shall be marked and repaired according to the procedures set forth herein by Applicator.

D. The municipal sewer system may be put back into non-severe operational service as soon as the final inspection has taken place. However, for severe corrosion duty such as high concentrations of acids, bases or solvents, 4 to 8 hours may be necessary prior to returning to service. Consult coating manufacturer for further details.

END OF SECTION 099500

SECTION 26 00 00 - GENERAL ELECTRICAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The work includes, but is not limited to, the following principal systems and equipment:

1. 120/240-Volt system.
2. 480-Volt-system.
3. Low voltage Motors.
4. Panelboards.
5. Automatic Transfer Switch.
6. Conduits and Raceways.
7. Transformers.
8. Lighting fixtures and lamps.
9. Grounding and Lightning Protection.
10. Conductors.
11. Generators.
12. Miscellaneous controls and Equipment.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section 1 Specification apply to this Section.

B. Section 01 33 00 - Submittal Procedures.

1.03 SUBMITTALS

A. Data Required:

1. Submit shop drawings, product data and all other required information as specified in Section 1. Submittals are required on all products and items to be installed on this project.
2. Submittal data must show manufacturer's name, published ratings or capacity data, detailed equipment drawing for fabricated items, panel diagrams, wiring diagrams, installation instructions and other pertinent data.
3. Where literature is submitted covering a group or series of similar items, the applicable items must be clearly indicated. Mark through items not being provided and clearly identify all options being provided.
4. Do not combine submittals for multiple Specifications Sections.

B. Submit a letter showing all the exceptions to the specification. If no exception are taken the letter shall indicate no exception. Submittal will be rejected without preliminary review if the letter is not submitted. Submittal will be rejected without preliminary review if the letter is

not submitted.

C. Submittal Items: Submittals are required for all equipment and materials to be used on this project. Submittals shall be complete with all pertinent information and installation details. Assume all costs and liabilities which may result from the ordering of any material or equipment prior to the review of the shop drawings or submittals, and no work shall be done until the shop drawings or submittals have been reviewed. In case of correction or rejection, resubmit until such time as they are accepted by the Owner's Representative, and such procedures will not be cause for delay.

D. Terminal Connection Diagrams:

1. Submit terminal connection diagrams for approval prior to any wire installation.
2. Submit finalized terminal connection diagrams at the end of the Contract.
3. All manufacturers named are a basis as a standard of quality and substitutions of any equal product will be considered for acceptance. The judgment of equality of product substitution shall be made by the Engineer.

1.04 REFERENCE STANDARDS

A. Perform work, furnish and install materials and equipment in full accordance with the latest issue of the applicable rules, regulations, requirements, and specifications of the following:

1. Local laws and ordinances.
2. State and Federal Laws.
3. National Electrical Code (NEC).
4. State Fire Marshal.
5. Underwriters' Laboratories (UL).
6. National Electrical Safety Code (NESC).
7. American National Standards Institute (ANSI).
8. National Electrical Manufacturer's Association (NEMA).
9. National Electrical Contractor's Association (NECA) Standard of Installation.
10. Institute of Electrical and Electronics Engineers (IEEE).
11. Insulated Cable Engineers Association (ICEA).
12. Occupational Safety and Health Act (OSHA).
13. International Electrical Testing Association (NETA).
14. American Society for Testing and Materials (ASTM).
15. National Fire Protection Association (NFPA).
16. American Concrete Institute (ACI).
17. International Building Code (IBC).
18. Insulated Power Cable Engineers Association (IPCEA).
19. Association Edison Illuminating Company (AEIC).

20. Standard for Electrical Safety in the Workplace (NFPA 70E).

B. Wherever the requirements of the Specifications or Drawings exceed those of the above items, the requirements of the Specifications or Drawings govern. Code compliance is mandatory.

C. Product Quality: All electrical items shall be new and unused. Items such as cables, transformers, motors, control centers, etc., shall be newly manufactured for this project. Proof of purchase documents shall be provided upon request. Utilize products of a single manufacturer for each item.

1.05 QUALITY ASSURANCE

A. Regulations and permits:

1. Regulations: Work, materials and equipment must comply with the latest rules and regulations of the following:
   a. National Electrical Code (NEC).
   b. National Electrical Safety Code (NESC).
   c. Standard for Electrical Safety in the Workplace (NFPA70E).
   d. National Fire Protection Association (NFPA70E).
   e. Occupational Safety and Health Act (OSHA).
   f. State and federal codes, ordinances and regulations.
   g. Local Electrical Code.
2. Permits: Obtain certificates of inspection and other permits required as a part of the work.

B. Contractor qualifications:

1. An acceptable Contractor for the work under this Section must have personnel with experience, training, and skill to provide a practical working system. The Contractor shall have previous water and wastewater experience with at least 5 years in business.
   a. The Contractor shall be required to furnish acceptable evidence of having installed not less than three systems of size and type comparable to this project.
   b. The systems must have served satisfactorily for not less than 3 years.
   c. The superintendent must have had experience in installing not less than three systems.
   d. The Contractor shall submit qualifications of his firm and resumes of his personnel who will work on this project.

C. General requirements for workmanship, equipment, and materials:

1. All electrical work shall be performed by workmen skilled in the electrical trade and licensed for the work by the local authority.
2. A licensed Master Electrician will be required for the issuance of a building permit for constructing, installing, altering, maintaining, repairing, or replacing any electrical wiring, apparatus, or equipment on any voltage level. A licensed Master Electrician or a

licensed Journeyman Electrician holding a current license in the state the project is being erected is required to be on the job site during the performance of any electrical work. Master Electrician shall spend minimum of 2 hrs. per week at the job site reviewing work completed.

3. All cable splicing and termination methods and materials shall be of the type recommended by the splicing materials manufacturer for the cable to be spliced and shall be approved by the Engineer prior to installation.
4. All materials and equipment shall be installed in accordance with the approved recommendations of the manufacturer, the best practices of the trade, and in conformance with the Contract Documents. The Contractor shall promptly notify the Owner in writing of any conflict between any requirements of the Contract Documents and manufacturer's directions and shall obtain written instructions from the Owner before proceeding with the work. Should the Contractor perform any work that does not comply with the manufacturer's directions or such written instructions from the Owner, he shall bear all costs arising in correcting deficiencies.
5. All equipment and materials shall be new, unless specifically noted otherwise, and shall bear the manufacturer's name, trademark and ASME, UL, and/or other labels in every case where a standard has been established for the particular item. Equipment shall be the latest approved design of a standard product of a manufacturer regularly engaged in the production of the required type of equipment and shall be supported by a service organization that is, in the opinion of the Owner, reasonably convenient to the site.
6. The Electrical design is based on preliminary equipment selections. If the contractor provides equipment that is larger than the selections, the contractor is responsible for upsizing all cables, starters, overloads, transformers, etc. to meet the National Electrical Code and provide an overall voltage drop of less than 5%. It is the responsibility of the Contractor to ensure that items furnished fit the space available with adequate room for proper operation and maintenance. He shall make measurements to certain space requirements, including those for connections, and shall furnish and install such sizes and shapes of equipment that, in the final inspection, will suit the true intent and meaning of the Plans, Specifications and Contract Documents.
7. The Contractor shall furnish and install all equipment, accessories, connections and incidental items necessary to complete the work, ready for use and operation by the Engineer/Owner.
8. When the Engineer/Owner has reviewed equipment submittals and given instructions to proceed with the installation of items of equipment that require arrangements or connections different from those shown on the drawings, it shall be the responsibility of the Contractor to install the equipment to operate properly and in accordance with the intent of the Plans and Specifications, and he shall provide any additional equipment and materials that may be required. The Contractor shall be responsible for the proper location of roughing-in and connections by other trades. All changes shall be made at no increase in the Contract Amount or additional costs to other trades.
9. The Contractor shall support the installation of all equipment, plumb, rigid and true to line. The Contractor shall determine how equipment, fixtures, conduit, etc., are to be installed, and shall provide foundations, bolts, inserts, stands, hangers, brackets and accessories for proper support whether or not shown on the drawings.

D. System responsibility

1. The Contractor shall be responsible for:
   a. Complete systems in accordance with the intent of these Contract Documents.
   b. Coordinating the details of facility equipment and construction for all Specification Sections which affect the work covered under Section 26 Electrical.
   c. Furnishing and installing incidental items not actually shown or specified, but which are required by good practice to provide complete functional systems.
   d. Coordinate the work with the instrumentation Contractor.
      1) The conduit and wiring to and from the instruments shall be furnished and installed by the Electrical Contractor. Termination in the instrument shall be by the Instrument Contractor.
      2) All terminations in the control panel shall be by the Instrument Contractor.
      3) The Electrical Contractor shall provide termination drawings for the instrumentation Contractor.
      4) The equipment pad for the control panels, consoles and instrument panels shall be furnished by the Electrical Contractor.
      5) The Electrical Contractor shall coordinate the testing of the electrical system being furnished. He shall be responsible for the equipment he is supplying.
      6) The Electrical Contractor shall be present at time of the instrument system testing and start-up. He shall be responsible for coordinating the testing of the facility with the Instrument Contractor.
      7) The Electrical Contractor shall coordinate the interface requirement between each starter and control panel furnished under this Contract with the Instrument Contractor.
      8) Written proof shall be furnished and submitted to the Engineer prior to installation to verify that a clear understanding has been reached between the Electrical Contractor and the Instrument Contractor for each control loop requirements, (e.g. type of contacts (momentary, maintained), interface relay requirement number of wires, terminal marking, control schematic information, and wiring diagrams).
2. Electrical plan drawings show only general locations of equipment, devices, and raceway, unless specifically dimensioned. The Contractor shall be responsible for the proper routing of raceway, subject to the approval of the Engineer.
3. Submit to the Engineer in writing details of any necessary, proposed departures from these Contract Documents, and the reasons therefore. Submit such request as soon as practicable, and within ten (10) days after award of the Contract. Make no such departures without written approval of the Engineer.
4. Dimensions on electrical drawings shall be verified with structural, architectural, and mechanical drawings.
5. Where the Contractor is submitting a packaged system, Contractor shall meet the requirements of electrical specifications. This includes field cables, conduits, junction boxes, circuit breakers, combination starters, pushbuttons, pilot lights, and motors. Deviations shall not be accepted, unless approved in writing in advance. Control centers and special control cabinets wired to terminal blocks shall include the manufacturer's

standard quality, unless specifically mentioned to the contrary on the drawings or in the specifications.

6. Maintain continuity of electric service to functioning portions of the process or buildings during hours they are normally in use. Temporary outages will be permitted during cutover work at such times and places can be prearranged with the Owner's designated Representative. Such outages shall be kept to a minimum number and minimum length of time. Make no outages without prior written authorization of the Engineer. Include costs for temporary wiring and overtime work required in the Contract price. Remove temporary wiring at the completion of the work. The Contractor shall be responsible to provide and pay for temporary power to any facility during construction to facilitate the new construction. If a generator is needed the contractor shall be responsible for all the costs associated with, including fuel.
7. Unless shown in detail, the drawings are diagrammatic and do not necessarily give exact details as to elevations and routing of raceways, nor do they show all offsets and fittings; nevertheless, install the raceway system to conform to the structural and mechanical conditions of the construction.
8. Cabling inside equipment shall be carefully routed, trained, and laced. Placing cables so that they obstruct equipment devices is not acceptable.
9. Review the equipment dimensions prior to pouring foundation and equipment slabs. It is the responsibility of the contractor to include cost for slabs large enough to fit the equipment they are proposing. No additional payment will be provided for equipment that has a larger footprint than shown in the drawings and requires an oversized slab.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

A. Intent of contract documents:

1) The intent of the contract drawings or Plans is to establish the types of systems and functions, but not to set forth each item essential to the functioning of the system.
2) Electrical drawings are generally diagrammatic and show approximate location and extent of work.
3) Install the work complete, including minor details necessary to perform the function indicated.
4) In case of doubt as to work intended, or if amplification or clarification is needed, request instructions from the Engineer.
5) It is also the intent of these Contract Documents for the electrical and process system Contractor to coordinate with each other in order to provide a complete and workable system with all wiring, conduit and accessories required which may not be shown on the Plans.
6) The Plans and Specifications are intended to comply with listed codes, ordinances, regulations and standards.

B. Discrepancies:

1. Review pertinent drawings and adjust the work to conditions shown.
2. Where discrepancies occur between Plans, Specifications, and actual field conditions,

immediately notify the Engineer in writing and ask for an interpretation.

3. Dimensions on electrical drawings shall be verified with structural, architectural and mechanical drawings.
4. Should installed materials or workmanship fail to comply, the Contractor is responsible for correcting the improper installation.
5. Additionally, where sizes, capacities, or other such features are required in excess of minimum code or standards requirement, provide those specified or shown.

C. Outlet and Equipment Locations:

1. Coordinate the actual locations of electrical outlets and equipment with building features and mechanical equipment as indicated on architectural, structural and mechanical drawings.
2. Review with the Engineer any proposed changes in outlet or equipment location.
3. Relocation of outlets before installation, up to 3 feet from the position indicated, may be directed by Owner without additional cost.
4. Remove and relocate outlets placed in an unsuitable location, when so requested by the Engineer.

1.07 DELIVERY, HANDLING AND STORAGE

A. Refer to individual sections for delivery, handling and storage instructions associated with each piece of equipment.

1.08 MAINTENANCE AND SPARE PARTS

A. Refer to individual sections for maintenance and spare parts associated with each piece of equipment.

1.09 EXTENDED WARRANTY

A. Refer to individual sections for maintenance and spare parts associated with each piece of equipment.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Condition: Materials and equipment provided under these Specifications must be new products of manufacturers regularly engaged in production of such equipment. Provide the manufacturer’s latest standard design for the type of equipment specified.

B. NEC and UL: Products must conform to requirements of the National Electrical Code. Where Underwriters' Laboratories have set standards, listed products, and issued labels, products used must be listed and labeled by UL.

C. NEMA and IEC: Only NEMA rated equipment is acceptable. IEC or dual rated NEMA/IEC equipment are not acceptable.

D. Space Limitations: Equipment selected must conform to the buildings features and must be coordinated with them. Do not provide equipment that will not suit arrangement and space limitations.

E. Factory Finish: Equipment must be delivered with a hard surface, factory-applied finish so that no additional field painting is required.

F. Field Installation: All field installed equipment, conduit, etc., shall require Type 316 stainless steel nuts, bolts, washers, metal framing and supports, and other items as indicated on the Plans.

G. Seismic Design: All electrical equipment to be designed in accordance with the latest IBC & ASCE 7 code for Seismic Design.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. PROTECTION OF EQUIPMENT

1. Moisture:
    a. During construction, provide heaters to protect switchgear, transformers, motors, control equipment, and other items from moisture absorption and corrosion.
    b. Apply protection immediately on receiving the products and provide continuous protection.
    c. Store all equipment indoors in dry, well-ventilated and heated space.
2. Clean:
    a. Keep products clean by elevating above ground or floor and by using suitable coverings.
3. Damage:
    a. Take such precautions as are necessary to protect apparatus and materials from damage. Failure to protect materials is sufficient cause for rejection of the apparatus or material in question.
    b. Provide rodent damage protection to switchgear, transformer, etc and any other electrical equipment during any storage and/or construction times.
4. Finish:
    a. Protect Equipment per the manufacturer’s requirements.

3.02 INSTALLATION

A. Cooperation with Other Trades:

1. Cooperation with trades of adjacent, related or affected materials or operations, and of trades performing continuations of this work under subsequent contracts, is considered a part of this work in order to effect timely and accurate placing of work and to bring together, in proper and correct sequence, the work of such trades.
2. Coordinated equipment layout in sufficient time to be coordinated with work of others, provide drawings and layout work showing exact size and location of sleeves, openings or inserts for electrical equipment in slabs, walls, partitions and chases.

B. Workmanship:

1. Work must be performed by workmen skilled in their trade. The installation must be complete whether the work is concealed or exposed.

C. Setting of Equipment:

1. Equipment must be leveled and set plumb.
2. Stainless Steel 316 enclosures mounted against a wall must be separated from the wall no less than 1/2-inch by means of corrosion resistant spacers or by 3 inches of air for freestanding units.
3. Stainless Steel 316 bolts, nuts, and washers to anchor the equipment.

D. Sealing of Equipment:

1. Permanently seal outdoor equipment at the base using concrete grout.
2. Seal or screen openings into equipment to prevent entrance of animals, birds and insects.
3. Use stainless steel mesh with openings not larger than 1/16-inch squares for screened openings.
4. Seal small cracks and openings from the inside with silicone sealing compound.

E. Concealed Work: Conceal electrical work in walls, floors, chases, under floors, underground and above ceilings except:

1. Where shown or specified to be exposed. Exposed is understood to mean open to view.
2. Where exposure is necessary to the proper function.
3. Where size of materials and equipment precludes concealment.

F. Equipment to be installed in Hazardous areas shall be in accordance with NEC article 500.

G. Installation and supply of electrical equipment shall be conformed to NEC 500, for classified area.

H. Project record documents

1. Preparation:
   a. At the job site, maintain a set of white prints of the contract drawings.
   b. At the job site, maintain a set of equipment terminal connection diagrams, revisions to be included in the as built drawings.

c. On the prints, record field changes and diagrams of those portions of work in which actual construction is at variance with the contract drawings.

d. Mark the drawings with a colored pencil. Record installed feeder conduits, dimensioning the exact location and elevation of the conduit.

2. Delivery: Deliver record drawings to the Engineer in the number and manner specified in Section 1 - General Requirements

I. Cutting and Patching

1. Lay out work carefully in advance. Do not cut or notch any structural member or building surface without specific approval of the Engineer. Carefully carry out any cutting, channeling, chasing, or drilling of floors, walls, partitions, ceilings, paving, or other surfaces required for the installation, support, or anchorage of conduit, raceways, or other electrical materials and equipment. Do not cut beams for any reason. Following such work, restore surfaces neatly to original condition.

J. Load Balance

1. The Drawings and Specifications indicate circuiting to electrical loads and distribution equipment. Balance electrical load between phases as nearly as possible on switchboards, panelboards, motor control centers, etc.

K. Motor rotation

1. Before and after final service connections are made, check and correct as necessary the rotation of motors.

2. Coordinate rotation checks with the Engineer and the Contractor responsible for the driven equipment. Submit a written report to the Engineer for each motor verifying that rotation has been checked and corrected.

3.03 INSPECTION

A. Refer to individual sections for inspections to be performed for each piece of equipment.

3.04 FIELD TESTING

A. Test Conditions:

1. Place circuits and equipment into service under normal conditions, collectively and separately, as may be necessary to determine satisfactory operation.

2. Perform specified tests in the presence of the Engineer, as specified in Section 1- General Requirements and Section 26– Electrical.

3. Furnish all instruments, wiring, equipment, and personnel required for conducting tests.

4. Demonstrate that the equipment operates in accordance with requirements of the plans and specifications.

5. No process equipment is to be operated until any associated HVAC equipment and auxiliary equipment is operational.

B. Test Dates: Schedule final acceptance tests sufficiently in advance of the Contract completion date to permit completion of any necessary adjustment or alterations within the number of

days allotted for completion of the Contract.

C. Retests: Conduct retests as directed by the Engineer of such time duration as may be necessary to assure proper functioning of adjusted or altered parts or items of equipment. Any resultant delay as a result of such necessary retests does not relieve the Contractor of his responsibility under this contract. Provide notice to Engineer and Owner of testing 30-days prior to testing.

3.05 FIELD PAINTING

A. Touch up scratches, scrapes, or chips in interior and exterior surfaces of devices and equipment with finishes matching as nearly as possible the type, color, consistency, and type of surface of the original finish. If extensive damage is done to equipment paint surfaces, refinish the entire equipment in a manner that provides finish equal to or better than the factory finish, and that meets the requirements of the Specifications and is acceptable to the Engineer.

3.06 CLEANING

A. Remove all temporary labels, dirt, paint, grease and stains from all exposed equipment. Upon completion of work, clean equipment and the entire installation so as to present a first-class job suitable for occupancy. No loose parts or scraps of equipment shall be left on the premises.

B. All temporary wiring, wiring devices and associated equipment shall be removed upon completion of the project.

END SECTION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install, complete and ready for operation, electrical conductor systems as shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 00 00 – General requirements.
2. 01 33 00 - Submittal Procedures.
3. 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00: Submittal Procedures.

B. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

C. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

D. Submit a letter certifying full and complete compliance with the specifications, drawings and other project requirements. The letter shall list any exceptions or deviations from the specified requirements, if any and reasons for same. Exceptions or deviations shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ICEA - Insulated Cable Engineers Association.
2. AEIC - Association of Edison Illuminating Companies.
3. NFPA 70 – National Electrical Code.
4. UL 510 - Standard for Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.
5. UL 44 - Thermoset-Insulated Wires and Cables.
6. ANSI/NEMA WC 70/ICEA S-95-658 – Power Cables Rated 2000 Volts or Less for the Distribution of Electric Energy.
7. IEEE 1202 - Flame Testing of Cables for Use in Cable Tray.
8. ASTM B8 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

1.05 QUALITY ASSURANCE

A. The general construction of the cable and the insulation material used shall be similar to that used for cable of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.

B. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the completed cable. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Check for reels not completely restrained, reels with interlocking flanges or broken flanges, damaged reel covering or any other indication of damage. Do not drop reels from any height.

B. Unload reels using a sling and spreader bar. Roll reels in the direction of the arrows shown on the reel and on surfaces free of obstructions that could damage the cable.

C. Store cable on a solid, well drained location. Unjacketed armored cable shall be stored indoors. Cover cable reels with plastic sheeting or tarpaulin. Do not lay reels flat.

D. Seal cable ends with heat shrinkable end caps. Do not remove end caps until cables are ready to be terminated.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. Use the manufacturer's name, model or catalog number, for the purpose of establishing the standard of quality and general configuration desired only.

2. Splices are not acceptable on this project, except at light fixtures and receptacles and unless approved in writing by owner representative

B. Conductors - 600 Volts

1. Single Conductors 600 Volts and Below:

a. Unless otherwise indicated, all conductors shall be copper and shall be stranded. Solid conductors shall not be used. All conductors with the exception of grounding conductors shall be stranded copper.

b. Utilize only conductors meeting applicable requirements of UL 44, UL 1685, IECA S-95-658 (NEMA WC70).

c. Provide conductors with type XHHW-2 insulation. Wire shall be TC rated where used in cable trays.

d. Unless noted otherwise, conductor sizes indicated are based on copper conductors. Do not provide conductors smaller than those indicated.

e. Where flexible cords and cables are specified, provide Type STJO, 600 volt, with the number and size of copper conductors indicated.

2. Single Pair (600 Volt No.16 AWG Twisted, shielded Pair Instrumentation Cable, Type TC):

a. General: Single pair instrumentation cable designed for noise rejection for process control, computer, and data log applications. Suitable for installation in cable trays, conduit, or other approved raceways. Minimum cable temperature rating shall be 90° C dry locations, 75° C wet locations.

b. Individual Conductors: Soft annealed copper, Class B, 7- strand concentric per ASTM B 8, 22 AWG, 7-strand copper drain wire.

c. Insulation and Jacket: Pair conductors pigmented black and white. Jacket flame-retardant and sunlight and oil resistant PVC with 45 mils nominal thickness. Shield aluminum/Mylar overlapped to provide 100 percent coverage

d. Dimension: 0.30 inch nominal OD

e. Manufacturers: Alpha Wire Corporation, Belden, General Cable, the Okonite Company.

3. Single Triad (600 Volt No. 16 Twisted, Shielded Triad Instrumentation Cable, Type TC):

a. General: Single triad instrumentation cable designed for noise rejection for process control, computer, or data log applications. Suitable for installation in cable tray, conduit, or other approved raceways. Minimum cable temperature rating shall be 90 C dry locations, 75 C wet locations.

b. Conductors: Soft annealed copper, Class B, 7-strand concentric per ASTM B8, 22 AWG, 7-strand copper drain wire.

c. Insulation and Jacket: Triad conductors pigmented black, red, and white. Jacket flame-retardant and sunlight and oil retardant PVC with 45 mils nominal thickness. Shield aluminum/Mylar, overlapped to provide 100 percent coverage.

d. Dimensions: 0.32-inch nominal OD.

e. Manufacturers: Alpha Wire Corporation, Belden, General Cable, the Okonite Company.

4. VFD cable: Conductors provided on the load side of variable frequency drives shall be specifically rated for VFD application, shielded with 3 symmetrical grounds with minimum voltage rating of 1,000V.

5. Equipment Grounding Conductors:

a. Refer to specification section 26 05 26: Grounding and Bonding for Electrical Systems for grounding conductor information.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. General

1. Do not exceed cable manufacturer's recommendations for maximum pulling tensions and minimum bending radii. Pulling compound shall be used. Use only UL listed compound compatible with the cable outer jacket and with the raceway involved.
2. CONTRACTOR is to provide and install all low voltage (120V, 208V, 480V, etc.) distribution equipment and hardware associated with this project as shown on the plan drawings.
3. Tighten screws and terminal bolts using torque type wrenches, and/or drives, to tighten to the inch-pound requirements of the NEC and UL.
4. Where single conductors and cables in manholes, handholes, vaults, cable trays, and other indicated locations are not wrapped together by some other means such as arc and fireproofing tapes, bundle throughout their exposed length conductors entering from each conduit with nylon, self-locking, releasable, cable ties placed at intervals not exceeding 12 inches on centers.
5. Provide conductor sizes as indicated on the drawings with 600V rated insulation.
6. Use silicone filled pressure connectors. Place no more than one conductor in any single-barrel pressure connection.
7. Motors connector shall be crimp connectors or kernys varnish carbonic C130.
8. Soldered mechanical joints insulated with tape will not be acceptable.
9. Vinyl plastic insulating tape for wire and cable splices and terminations shall be flame retardant, 8.5-mil thick minimum, rated for 105 ºC minimum meeting the requirements of UL 510. Acceptable product 3M-Scotch 88.
10. Provide terminals and connectors acceptable for the type of material used.
11. Arrange wiring in cabinets, panels, and motor control centers neatly cut to proper length. Remove surplus wire, bundle and secure in an acceptable manner. Identify circuits entering motor control centers or other control cabinets in accordance with the conductor identification system specified herein.
12. For terminals designed to accept only bare wire compression terminations, use only stranded wire, and terminate only one wire per terminal. Tighten terminal screws with torque screwdriver to recommended torque values.
13. Attach compression lugs with a tool specifically designed for that purpose which provides a complete, controlled, crimp where the tool will not release until the crimp is complete. Use of plier type crimpers is not acceptable.
14. Cap spare conductors and conductors not terminated with UL listed end caps.
15. Where conductors pass through holes or over edges in sheet metal, remove all burrs, chamfer edges, and install bushings and protective strips of insulating material to protect

the conductors.

16. For conductors that will be connected by others, provide at least 6 feet spare conductor in freestanding panels, and at least 2 feet spare in other assemblies. Provide more spare conductors in any particular assembly where it is obvious that more conductor length will be needed to reach the termination point.

B. Conductor Color Coding

1. For power conductors, provide all single conductors power cables with integral insulation pigmentation of the designated colors, except conductors larger than No. 6 may be provided with color-coding by wrapping the conductor at each end and at all accessible locations with vinyl tape. Where this method of color-coding is used, wrap at least six full overlapping turns of tape around the conductor covering an area 1-1/2 to 2 inches wide at a visible location.
2. Phase A, B, and C implies the direction of positive phase rotation.
3. Use owner's current color scheme. If owner does not have a consistent color scheme use the following:

Use the following colors:

System	Conductor	Color
All Systems	Equipment Grounding	Green
240/120 Volts	Grounded Neutral	White
1-Phase, 3-Wire	One Hot Leg	Black
	Other Hot Leg	Red
208Y/120 Volts	Grounded Neutral	White
3-Phase, 4-Wire	Phase A	Black
	Phase B	Red
	Phase C	Blue
480Y/277 Volts	Grounded Neutral	Gray
3-Phase, 4-Wire	Phase A	Brown
	Phase B	Orange
	Phase C	Yellow

C. Installation

1. Do not splice without written permission of the owner's representative. Locate splices, when permitted, only in readily accessible cabinets or junction boxes using terminal strips.
2. Cable Placement:

a. Immediately prior to the placement of each cable or cable group, inspect the raceway to determine that installation is complete and that the interior is clean and free of all materials detrimental to the cable or its placement. Group all cable assigned to a particular conduit and pulled simultaneously, using cable grips and acceptable lubricants.

b. Provide adequately sized raceways to accommodate the number and size of cable as specified, and in compliance with Article 300 of the National Electric Code. If at any time during the progress of the work raceways appear inadequate to accommodate the assigned cable, notify the Owner's Representative/Owner at once and discontinue further work on the questionable raceway until advised by the Owner as to how to proceed.

c. Carefully check all cable as to size and length before pulling into conduits. Remove and replace cable pulled into the wrong conduit or cut too short at no additional cost to the Owner's Representative. Do not pull cable removed from one conduit or duct into another conduit or duct without permission of the Owner's Representative.

d. Fishing and pulling shall be performed with flexible round non-metallic tape, carbon dioxide, or forced air propelled polyethylene cord, nylon rope, or manifold rope. No metallic cable or material that may damage or scratch the inside surface shall be pulled into any conduits.

3. Use woven wire cable grips to pull all low voltage single conductor cable, No. 2/0 and larger and all low voltage multi-conductor cable. Use pulling loops to pull single conductor cable smaller than No. 2/0. When a cable grip is used for pulling, the arc of the cable covered by the grip plus 6-inches shall be cut off and discarded.

4. Insert a reliable non-freezing type of swivel or swivel connection between the pulling ropes and the cable eye, or grip to prevent twisting under strain.

5. Do not exceed the maximum pulling tension recommended by the cable manufacturer. Pulling mechanisms of both the manual and power types shall have the rated capacity in tons clearly marked on the mechanism. Whenever the capacity of the pulling mechanism exceeds the recommended pulling tension of the cable as given by the cable manufacturer, a dynamometer shall be used to show the tension on the cable, and the indicator shall be constantly watched. If any excessive strain develops, stop the pulling operation at once and determine and correct the difficulty.

D. Conductor Arc and Fireproofing Tape

1. Use arc and fireproofing tapes on 600-volt single conductors and cables, except those rated Type TC, throughout their entire exposed length at splices in manholes, handholes, vaults, cable trays, and other indicated locations.

2. Wrap together as a single cable conductor entering from each conduit.

3. Follow tape manufacturer's installation instructions. Secure the arc and fireproofing tape at frequent intervals with bands of the specified glass cloth electrical tape. Make each band of at least two wraps of tape directly over each other.

4. Arc and Fireproofing tape shall be 3M Scotch #77 or equal.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Pulling tensions shall be recorded for all cable runs longer than 200 feet.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install grounding and bonding equipment for the electrical system. It is the intention of this specification that all electrical equipment be grounded. Furnish labor, materials, equipment and incidentals necessary to install a complete grounding system in strict accordance with Article 250 of the National Electrical Code (NEC) as shown on the drawings or as specified herein. Electrical work shall be in accordance with Section 26 00 00 Electrical General Provisions.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Submittal shall be in accordance with Section 1 and shall include:

1. Grounding materials, equipment and processes.
2. Product Data: For each type of product supplied.
3. Field quality-control test reports.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings, and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ANSI/IEEE Standard 142 - Recommended Practice for Grounding of Industrial and Commercial Power Systems.
2. ANSI/UL 467 - Grounding and Bonding Equipment.

3. NFPA 70 - National Electrical Code.

1.05 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Measure the ground grid resistance with the earth test megger and install additional ground rods and conductors as required until the resistance to the ground conforms to National Electrical Code requirements. Ground resistance measurement shall not exceed 5 ohms.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPART PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Ground Rods

1. Material: GROUND RODS: Copper-clad steel having a diameter of 3/4" and a minimum length of 10'.

2. Listing: UL 467.

B. Ground Cables

1. Stranded, bare copper of 98% conductivity and as specified in Section 26 05 19 CONDUCTORS - 600V AND BELOW.

C. Conduit Ground Fittings

1. Fittings for bonding ground cable to the conduit shall be FCI Burndy Corp., type NE or Thomas & Betts No. 3951 series.

D. Ground Rod Boxes

1. Precast Box with cast iron lid. Lid shall read “ground rod” on lid. Brooks Precast Model. “3-RT” or approved equal. Ground rod boxes shall have an AASHO H-20 rating.

E. Ground Plate Electrodes

1. 20 gauge copper with terminated two (2) foot welded pigtail connection.

F. CONNECTIONS

1. Type:

a. Unless otherwise noted, provide exothermic weld typed for all non-accessible and below-grade connections.

b. For above grade connections provide bonds and clamps of a nonferrous material which will not cause electrolytic action between the conductor and the connector.

2. Listing: UL 467.

3. Acceptable Manufacturers:

a. Below grade:

1) Cadweld.

2) Thermoweld.

b. Above grade:

1) Burndy.

2) Ilsco.

3) Erico.

4) OZ/Gedney.

5) T & B.

G. Certification

1. Contractor shall receive from the manufacturer proper training prior to execute the exothermic weld connection.

H. Wiring

1. Provide copper insulated conductors for bonding jumpers. All insulated grounding conductors shall be copper, stranded.

a. Provide 600-volt insulated conductors having a green-colored XHHW insulation for equipment grounding conductors, or green heat shrink over XHHW insulation in accordance with NFPA 70E.

b. Ground conductors shall be protected in conduit where subject to physical damage.

c. All exposed ground conductors shall be installed in conduits. Ground conductor attached to cable trays shall not be considered exposed.

d. Ground wire shall be un-insulated copper where ground wire is directly buried in earth or concrete.

I. Ground Bus

1. Round-edge tin plated copper bar with 98 percent International Annealed Copper Standard (IACS) conductivity.

2. Size the bus for not less than 25 percent of the cross-sectional area of the related feeder.

3. A minimum ground bus size of 3-inch by 2 inches is required.

J. Grounding for Instrumentation System

1. Ground Loop for instrumentation system shall be grounded at only one point to the

building ground system.

K. Ground Loop

1. All ground loop conductor shall be bare copper minimum wire size shall be #4/0 unless otherwise noted.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION (NOT USED)

3.02 INSTALLATION

A. System Ground

1. System Neutral:
   a. Where a system neutral is used, ground the system neutral conductor as required by NEC Article 250.
   b. Ground the system neutral only at the point of service and isolate it from ground at all other points in the system.
2. Separately Derived Systems: Ground neutrals of separately derived systems such as generators, transformers, etc., in accordance with NEC 250-30.
3. Size: Size the system grounding conductors to comply with NEC Table 250-66, unless shown larger.

B. Equipment Ground

1. Raceway Systems and Equipment Enclosures:
   a. Ground cabinets, junction boxes, outlet boxes, motors, controllers, raceways, fittings, switchgear, transformer enclosures, handrail, stair, steel pipe and other equipment and metallic enclosures.
   b. Ground equipment and enclosures to the continuous-grounded, metallic raceway system in addition to any other specific grounding shown.
   c. Provide bonding jumpers and ground wire throughout to ensure electrical continuity of the grounding system.
   d. Provide grounding-type insulated bushings for metal conduits terminating in equipment enclosures containing a ground bus and connect the bushing to the ground bus.
   e. Provide green insulated equipment grounding conductor for each feeder, power branch circuit, receptacle branch circuit and lighting branch circuit.

f. Raceways shall not be used for equipment ground. Provide individual equipment ground wires for all equipment even if not shown on plans.

g. Provide bonding jumper and bonding bushing on each metallic conduit entering or leaving the enclosure of the service equipment.

h. Where grounding conductors are shown, bond the wires to metallic enclosures at each end and to intermediate metallic enclosures. Connect grounding conductors to grounding bushings on raceway. Where any equipment contains a ground bus, extend and connect grounding conductors to that bus. Run ground conductor inside conduits enclosing the power conductors.

i. Make connections of any grounding conductors to motors ½ HP and above, or circuits 20 amps or above, by solderless terminal and a 5/16-inch minimum bolt tapped to the motor frame or equipment housing. Grounding clips mounted directly on the box, or with 3/8-inch machine screws. Completely remove all paint, dirt, or other surface coverings at grounding conductor at connection points so that good metal-to-metal contact is made.

j. Ground metal sheathing and any exposed metal vertical structural elements of buildings. Ground metal fences enclosing electrical equipment. Bond any metal equipment platforms which support electrical equipment to that equipment. Provide good electrical contact between metal frames and railings supporting pushbutton stations, receptacles, instrument cabinets, etc., and raceways carrying circuits to these devices.

k. Bond neutrals of transformers to the system ground network, and to any additional indicated grounding electrodes.

2. Size:

a. When grounding and bonding conductors are not sized on drawings, size the grounding conductors in accordance with NEC Table 250-122.

b. Size bonding jumper so that minimum cross-sectional area is greater than or equal to that of the equivalent grounding conductor as determined from NEC Table 250-122.

3. Install sufficient ground rods in addition to those shown, or code required grounding so that resistance to ground as tested by standard methods does not exceed 5 ohms. Where more than one rod is required, install rods at least 6 feet apart.

C. Ground Connections

1. Unless shown otherwise, make connections of grounding conductors to ground rods at the upper end of the rod with the end of the rod and the connection point below finished grade.

2. Make connections of sections of outdoor ground mats (counterpoise) for substations or other equipment underground. Make connections of other grounding conductors generally accessible.

3. When making thermite welds, wire blush or file the point of contact to a bare metal surface. Use thermite welding cartridges and molds in accordance with the manufacturer’s recommendations. After welds have been made and cooled, brush slag from the weld area and thoroughly clean the joint. For compression connectors, use homogeneous copper, anti-corrosion, surface treatment compound at connectors in

accordance with connector manufacturer's recommendations. Use connectors of proper size for conductors and ground rods specified. Use connector manufacturer's compression tool. Notify Owner's Representative prior to backfilling any ground connections.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. The testing shall be performed in accordance with Section 26 08 00.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 05 29 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Hangers and supports for electrical equipment and systems.

B. Construction requirements for concrete bases.

1.02 RELATED WORK

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 3.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

C. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Product Data:

1. Outdoor installation: 316 stainless steel slotted support systems.
2. Indoor installation: Galvanized steel slotted support systems.

B. Record data: Show fabrication and installation details for the following:

1. Trapeze hangers. Include Product Data for components.
2. Type 316 stainless steel slotted channel system for outdoors/galvanized steel slotted channel system for indoors and all bolts to be type 316SS.
3. Equipment supports and connections detail.

C. Welding certificates.

D. Field Test Report.

E. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

F. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. NFPA 70 – National Electric Code

B. NECA – National Electrical Contractor Association

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. Comply with NFPA 70.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Rated Strength: Adequate in tension and shear force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of 3 times the applied force.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Two (2) years from date of Substantial Completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Support, Anchorage, and Attachment Components

1. Outdoor use: Use stainless steel 316 components for support, anchorage and attachment components for any supports unless otherwise noted.
2. Indoor use: Use galvanized steel components for support, anchorage and attachment components for any supports unless otherwise noted.
3. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Allied Tube & Conduit.

b. Cooper B-Line, Inc.; a division of Cooper Industries.

c. ERICO International Corporation.

d. GS Metals Corp.

e. Thomas & Betts Corporation.

f. Unistrut; Tyco International, Ltd.

g. Wesanco, Inc.

4. Channel Dimensions: Selected for applicable load criteria.

5. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

6. Conduit and Cable Support Devices: hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

7. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported.

8. Structural Steel for Fabricated Supports and Restraints:

   a. 316 Stainless Steel only for outdoor installations.

   b. Galvanized Steel for indoor installations.

9. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

   a. Adhesive Anchor Systems: Epoxy adhesive 316 Stainless Steel, for use in hardened portland cement concrete, with tension and shear capacities appropriate for supported loads and building materials where used.

      1) Manufacturers: Hilti Inc. only.

   b. Mechanical-Expansion Anchors: Wedge-type 316 Stainless Steel, for use in hardened portland cement concrete, with tension and shear capacities appropriate for supported loads and building materials where used.

      1) Manufacturers: Hilti Inc. only.

   c. Powder-Actuated Fasteners: 316 Stainless Steel stud, for use in hardened portland cement concrete, steel, or wood, with tension and shear capacities appropriate for supported loads and building materials where used.

      1) Manufacturers: Hilti Inc. only

   d. Concrete Inserts: 316 Stainless Steel, Slotted support system units.

   e. Clamps for Attachment to Steel Structural Elements: 316 Stainless Steel, type suitable for attached structural element.

   f. Through Bolts: Structural type, hex head, and high strength. 316 Stainless Steel Toggle Bolts: 316 Stainless Steel.

   g. Hanger Rods: 316 Stainless Steel.

10. Cast aluminum one-hole clam conduit supports are not acceptable.

2.02 FABRICATION

A. Fabricated Metal Equipment Support Assemblies

1. Description: Welded or bolted, structural steel shapes, shop or field fabricated to fit dimensions of supported equipment.
2. Materials: Comply with requirements in Section 5 Section "Metals" for 316 Stainless Steel/galvanized steel shapes and plates.
3. All outdoor equipment rack shall be provided with canopy to protect the equipment for being overheated by the sun. Canopy shall extend at a minimum 1 foot in front of the equipment enclosure.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for conduit as required by NECA 1 Table 1 when the maximum spacing is less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with 316 Stainless Steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

D. Secure raceways and cables to these supports with two-bolt conduit clamps.

E. 316 Stainless Steel clamps designed for supporting single conduits may be used for 1- 1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.02 INSTALLATION

A. General Installation

1. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
2. All supports and fastening devices shall be stainless steel 316 unless when equipment is located in chlorine and ammonia environments in which case galvanized steel shall be utilized.
3. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 300 lb.

4. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
    a. To New Concrete: Bolt to concrete inserts or Adhesive Anchor Bolt.
    b. To Masonry: Wedge type expansion anchors on hollow masonry units and expansion anchor fasteners on solid masonry units.
    c. To Existing Concrete: Adhesive Anchor System provided with lock washers and nuts shall be used in existing normal weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete slabs or wall less than 4 inches thick.
    d. Expansion Anchor Bolt can be used for concrete thickness is less than 4 inches to meet minimum.
    e. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
    f. To Light Steel: Sheet metal screws.
    g. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panel boards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint wind strength and anchorage requirements.
5. Drill holes for expansion anchors in concrete at locations to avoid reinforcing bars.

B. Installation of Fabricated Metal Supports
1. Comply with installation requirements in Section 5 Section "Metals" for site- fabricated metal supports.
2. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
3. Field Welding: Comply with AWS D1.1/D1.1M.

C. Concrete Bases
1. Construct concrete bases of dimensions indicated but not less than 6 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
2. Use 3000-psi, 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Section 3 Section "Cast-in-Place Concrete."
3. Anchor equipment to concrete base.
    a. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
    b. Install anchor bolts to elevations required for proper attachment to supported equipment.
    c. Install anchor bolts according to anchor-bolt manufacturers written instructions.

D. Mounting Stands: Field mounted disconnects, pushbutton control stations, etc., shall be mounted on steel stands as shown on the Drawings. Where clearance requirements for stands

may not be maintained, the Owner's Representative may direct equipment to be wall-mounted adjacent to the drive, but in no case shall the distance from the drive motor to the control station exceed 3-ft.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touchup: Comply with requirements in Section 09 00 00 - Finishes for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair coating to comply with ASTM A780.

3.06 CLEANING

A. Remove dirt, dust, or concrete spatter from hangers and supports using brushes, vacuum cleaner, or clean, lint-free rags. Do not use compressed air.

END SECTION

SECTION 26 05 33.13 - CONDUIT FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete raceway systems as shown on the Drawings and as specified herein. A raceway system shall consist of materials designed expressly for containing wires and cables, including but not limited to, conduit, device bodies, conduit bodies, raceway boxes, and related materials.

B. Raceways and conductors that are listed on the raceway and conductor schedules are generally not shown on the Drawings, except where they are required to pass through a restricted or designated space. Raceways indicated to be run "exposed" on the schedules shall be run near the ceilings or along the walls of the areas through which they pass and shall be routed to avoid conflicts with HVAC ducts, cranes and hoists, lighting fixtures, doors and hatches, etc. Raceways indicated to be run concealed shall be run in the center of concrete floor slabs, in partitions, or above hung ceilings, as required.

C. This section specifies the furnishing and installation of electrical raceway systems.

1. Conduit:
    a. Rigid aluminum conduit.
    b. PVC-coated rigid aluminum conduit.
    c. Liquid-tight flexible metal conduit.
    d. PVC Schedule 40 conduit.
2. Wireways.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Submit to the Owner’s Representative, in accordance with Section 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. The ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC).
2. UL 1 - Safety Standard for Flexible Metal Conduit.
3. UL 5 - Safety Standard for Surface Metal Raceways and Fittings.
4. UL 651 - Standard for Schedule 40 and Schedule 80 Rigid PVC Conduit and Fittings.
5. UL 870 - Safety Standard for Wireways, Auxiliary Gutters, and Associated Fittings.
6. NEMA RN 1 - PVC Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
7. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
8. UL 6 and 614 - Electrical Rigid Metal Conduit.
9. UL 360 - Liquid-tight Flexible Steel Conduit.
10. UL 467 - Electrical Grounding and Bonding Equipment.
11. NFPA 70 - National Electric Code.
12. NFPA 70E - Standard for Electrical Safety in the Workplace.

B. All equipment components and completed assemblies specified in this Section of the Specifications shall bear the appropriate label of Underwriters Laboratories

1.05 QUALITY ASSURANCE

A. Installer shall be specialized in installing PVC coated conduit with minimum 5 years documented experience. Experience shall include training. Training to be submitted for approval prior to beginning work on this project.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer’s Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of shipment. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Rigid Aluminum Conduit:

1. Conduit: Rigid copper free aluminum (alloy 6063-T1) conduit (RAC).
2. Fittings: For RAC use threaded aluminum.
3. Listing: UL 6A.
4. Acceptable RAC Manufacturers: Wheatland Tube Company, Allied Tube and Conduit, Indalex, SAPA or approved equal.
5. Acceptable Fittings Manufacturers: Appleton, Crouse-Hinds, Midwest, OZ/Gedney, Raco and listed conduit manufacturers.

B. [PVC-Coated Rigid Aluminum Conduit:

1. Conduit: Rigid aluminum conduit plus a factory-applied, 40-mil-thick covering of polyvinyl chloride (PVC) bonded to the metal, and 2 mil polyurethane coating on the inside.
2. Fittings: Same as aluminum conduit fittings plus a factory-applied, 40-mil-thick covering of polyvinyl chloride (PVC) bonded to the metal.
3. Listing: UL 6.
4. Acceptable Conduit and Fittings Manufacturers: Killark, KorKap, OCAL, Triangle PWC Inc., Perma- cote, Plasti-bond, Robroy Industries, Calbrite.

C. Liquid-tight Flexible Metal Conduit:

1. Conduit: Spiral-wound, square-locked, aluminum plus a bonded outer jacket of PVC.
2. Fittings: Compression sealed type aluminum.
3. Listing: UL 467 for fittings.
4. Acceptable Conduit Manufacturers: Allied tube and Conduits, Anaconda, Anamet, Liquatite, American Brass Co., Ultratite AEF by Southwire, American Flexible Conduit Co., Universal Metal Hose Co., ALFLEX, or equal.
5. Fittings used with liquidtight flexible aluminum conduit shall be copper-free aluminum and shall conform to FEDSPEC AA50552, and UL-514B.Acceptable Fittings

Manufacturers: Appleton, Crouse-Hinds, Midwest, OZ/Gedney, Raco, and listed conduit manufacturers.

D. PVC Schedule 40 Conduit:

1. Non-metallic rigid conduit made of polyvinyl chloride (PVC) manufactured in accordance with the National Electrical Code UL 651 and NEMA TC-2.
2. Fittings shall also be non-metallic.
3. Acceptable conduit and fittings manufacturers: Allied Tube and Conduit, Prime Conduit, CertainTeed Products, Electri-Flex, Heritage Plastics Central. Or approved equal.

E. Explosion Proof Seal and Fitting

1. Conduit seal: Explosion proof, aluminum conduit filling with fiber and compound as define by NEC Article 500 and as manufactured by Crouse -Hinds or Appleton.
2. Explosion proof fittings: aluminum fittings; flexible coupling to match the hazard as defined by NEC Article 500 and as manufactured by Appleton, Crouse-Hinds, O.Z./Gedney Co., or equal.
3. Explosion proof conduits and fittings shall be rated for 40% fill.

F. Bushing: High impact, thermosetting, phenolic insulation; 150 degrees C; as manufactured by Appleton “BBUH”, Blackburn, or OZ Gedney type A.

G. Ground bushings: Conduit grounding bushings shall consist of an insulated throat conduit bushing with an attached aluminum set screw lug. Each bushing shall be furnished with a plastic insert cap. The size of the lug shall be sufficient to accommodate the maximum ground wire size required by the NEC for the application. Grounding bushing shall comply with Fed. Spec. W-F-408, UL Standards 514B and 467, and shall be Crouse Hinds Lazy Lug, O-Z Gedney or approved equal.

H. Locknuts: Stainless Steel as manufactured by Appleton.

I. Hubs:

1. Cast aluminum with broad flat surfaces with gripping teeth on both sides of conduit entry. Hub portion on exterior side of entry shall contain "O" ring for watertight seal of conduit entry. Hubs shall be Myers Hub, Appleton, Efcor.

J. Conduit through-wall and floor seal: PVC coated malleable aluminum body with oversized sleeves, sealing ring, pressure clamp and rings and sealing grommet; hex head cap screw, as manufactured by OZ Gedney, type FSK.

K. Smoke and fire seals: Material shall be intumescent, one (1) part (requiring no mixing) and capable of expanding up to a minimum of eight (8) times. Material shall be U.L. classified with a fire rating equal to or greater than the penetrated number. Products to be in caulk, putty, wrap strip, sheet, or access kit foam and shall be 3M "Fire Barrier".

L. Conduit drains: Conduit drains shall be Crouse Hinds ECD Universal or approved equal.

M. Expansion Joints: Aluminum with internal grounding. Shall be provided with an external bonding jumper for conduits 4" and above. Expansion joint shall be SAXJG by Cooper

Crouse-Hinds or equivalent by OZ Gedney.

N. Threaded nipples: As manufactured by Allied or Steel Duct. Conduit nipples shall have two (2) independent sets of threads. Running threads shall not be used. Utilize the conduit union when joining two (2) fixed conduits in a continuous run.

O. Escutcheons: Chrome-plated, sectional floor and ceiling plates, as manufactured by Crane No. 10.

P. Accessories: Reducers, washer, etc., shall be stainless steel.

Q. Weatherheads: Weatherheads shall be threaded aluminum for threaded rigid conduit application and shall not be a clamp type. Weatherheads shall be Crouse Hinds series F, O-Z type 17 or Appleton Series F.

R. End bells: PVC as manufactured by Prime Conduit, Cantex or equal by Heritage Plastics.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION

A. Place conduit or sleeves in the forms of walls and floor slabs for the free passage of wire or conduits.

B. Set conduit or sleeves in place a sufficient time ahead of concrete placement so as not to delay the work.

C. Apply sealing methods for sleeves through floors and through exterior walls, per details shown on plans.

D. Plugs or caps shall be installed before concrete placement begins.

3.02 INSTALLATION

A. Minimum Trade Size: 3/4 inch, except that 1/2-inch flexible metal conduit may be used in lengths not exceeding 72 inches for tap conductors supplying lighting fixtures and for switch legs. The minimum size for underground conduit shall be 1½" inch.

B. Conduit sizes, where not indicated, shall be N.E.C. code-sized to accommodate the number and diameter of wires to be pulled into the conduit.

C. Plastic coated metallic conduit lengths shall be joined with threaded metallic coupling that shall be each equipped with a 40 mil thickness sleeve that shall extend over the threads of the joined conduit. Each joint shall be watertight.

D. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint, and at every 100 feet.

E. All conduit runs shall be watertight over their lengths of run. Slope conduits such that they drain, and install drain fitting as required to remove condensation from the conduit.

F. Install a drain fitting for all conduits subject to condensation. Condensation water shall never enter electrical or instrumentation enclosure.

G. Plastic jacketed flexible metal conduit shall be used to connect wiring to motors, limit switches, bearing thermostats, and other devices that may have to be removed for servicing. Unless otherwise indicated, maximum lengths of flex shall be thirty (30") inches.

H. Application of Conduit Types:

1. All underground conduits including conduits under a concrete slab shall be PVC and shall be concrete encased. Shall be as specified under Section 26 05 43 Underground Ducts and Raceways for Electrical Systems. Exception taken for lighting circuits not located under roadways where direct buried conduit installation is permitted.
2. Provide PVC coated rigid galvanized steel conduit bends for all underground PVC conduits bends. Only factory bended long sweep elbow are acceptable.
3. Exposed conduits inside dry ventilated areas, outdoors in non-corrosive atmosphere shall be rigid aluminum. Aluminum shall not come in contact with concrete at any point.
4. Exposed conduits in areas where chemicals are stored, handled, or utilized the conduit shall be PVC schedule 80.
5. Exposed conduits in high humidity, non-ventilated areas, constant or frequency wet areas, corrosive atmosphere areas the conduit shall be PVC coated aluminum.
6. At the transition from PVC to rigid aluminum conduit, provide a 12" section of PVC coated galvanized steel conduit with a minimum of 6-inches into the concrete. The PVC coated galvanized steel conduit shall be per the specification, field wrapping or applying by spray shall not be acceptable.

I. Holes for raceway penetration into sheet metal cabinets and boxes shall be accurately made with an approved tool. Cutting openings with a torch or other device that produces a jagged, rough cut will not be acceptable.

J. Installation Requirements:

1. Metallic Conduits:
   a. Continuous between enclosures such as outlet, junction and pull boxes, panels, cabinets, motor control centers, etc.
   b. The conduit must enter and be secured to enclosures so that each system is electrically continuous throughout.
   c. Where knockouts are used, provide double locknuts, one on each side.
   d. At conduit terminations, provide insulated bushings for conductor protection.

e. Where conduits terminate in equipment having a ground bus, such as in switchgear, motor control centers and panelboards, terminate conduit with an insulated grounding bushing and extend a suitable grounding wire to the ground bus.

f. Hubs of the same material shall be used at conduit termination.

2. Run concealed conduit as directly and with the largest radius bends as possible.

3. Run exposed conduit parallel or at right angles to building or other construction lines in a neat and orderly manner. Conceal conduit in finished areas. Unless otherwise shown, remaining conduit may be exposed.

4. Provide chrome-plated floor and ceiling plates around conduits exposed to view and passing through walls, floors, partitions, or ceilings in finished areas.

5. Select properly sized plates to fit the conduit when securely locked in place.

6. PVC Coated conduit and fittings shall be installed per manufacturer's specifications. Contractor shall be trained by the manufacturer and evidence of training shall be available at all times. Field bending of conduit is not acceptable. All fittings shall be sealed by manufacturer recommended PVC compound.

K. Installation Methods:

1. Install each entire conduit system complete before pulling in any conductors.

2. Clean the interior of every run of conduit before pulling in conductors to guard against obstructions and omissions.

3. Cut all joints square, then thread and ream smooth.

4. Bends:

a. Make bends with standard elbows or conduit benders in accordance with the NEC.

b. Make field bends using equipment designed for the particular conduit material and size involved.

c. Bends must be free from dents or flattening.

d. Use no more than the equivalent of three 90-degree bends in any run between terminals and cabinets, or between outlets and junction boxes or pull boxes.

5. Conduit bodies may be used in lieu of conduit elbows where ease of installation and appearance warrants their use. Conduit bodies larger than 1-inch may be used only where approved.

6. Fastenings: Securely fasten and support exposed conduit to framing using stainless steel unistrut and straps of same material as unistrut with 316 stainless steel fastening hardware.

7. Provide a No. 30 nylon pulling line in conduits in which wiring is not installed under this work, such as telephone, signal, and similar systems. Identify both ends of the line by means of labels or tags reading "Pulling Line." Also, state the panel the conduit originated from. Apply write-on identification to empty conduits to identify each conduit as to terminus of other end and also to identify trade size of conduit.

8. Suitably cap conduit during construction to avoid water, dirt and trash entrance.

9. Use expansion-deflection fittings on conduit crossing structural expansion joints and on

exposed conduit runs of more than 100 feet or where necessary. Provide bonding jumpers across fittings in metal raceway systems. Conduit runs made in concrete pours or surface-mounted runs that are attached to the structure, shall be equipped with an expansion/deflection fitting where they cross an expansion joint, and at every 100 feet.

10. Use expansion-deflection fittings on all conduit runs that transition from underground to above ground within 12” of grade level.
11. With a coupling, terminate concealed conduit for future use at structural surfaces. Install a pipe plug flush with the surface.
12. Openings around electrical penetrations of fire-resistance rated walls, partitions, floors or ceilings shall maintain the fire resistance rating using approved methods. See NEC 300-21. Fire barrier shall be 3M 2001 RW silicone, RTV foam or approved equal.
13. Conduits shall be installed with uniform slope which will permit drainage toward manholes, pull boxes, or building walls. Utilize conduit drain as required to remove condensate in the conduits.
14. Seal all conduits with pliable sealant such as "Duraseal" where entering boxes, manholes, switchgear, motor control centers, panelboards, enclosures, etc.
15. PVC coated conduit shall be installed by certified installer. PVC coated conduit installation shall follow manufacturer recommendation.
16. All termination at an enclosure shall be made from the bottom of the enclosure, no overhead penetrations are allowed. When conduits are located above the enclosure route the conduit at the same height as the bottom of the enclosure, install a drip lane at the end of the conduit and use flexible conduit to terminate at the bottom of the enclosure.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

A. All raceways shall be swabbed clean after installation. There shall be no debris left inside. All interior surfaces shall be smooth and free from burrs and defects that would injure wire insulation. Coordinate approval of cleanliness with the Owner’s representative.

END SECTION

SECTION 26 05 33.16 - BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install outlet boxes, floor boxes, junction boxes, pull boxes and terminal boxes.

B. All boxes located outdoors containing heat sensitive equipment shall be factory painted white.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Submit to the Owner’s Representative, in accordance with Section1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittals shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. ANSI/NEMA Publication No. OS 1 - Cast Aluminum Outlet Boxes, Device Boxes, Covers and Box Supports, and Steel Covers.

B. ANSI/UL 514 - Electrical Outlet Boxes and Fittings.

C. NFPA 70 - National Electric Code.

1.05 QUALITY ASSURANCE

A. The general construction of the boxes and the materials used shall be similar to that used for boxes of the same size and rating in continuous production for at least 15 years and

successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.

B. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the boxes. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

B. Enclosures shall be stored in the original cartons in a favorable environment (cool and dry areas).

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENTED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of shipment from the factory. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Outlet Boxes

1. Flush Device Boxes:
    a. Provide cast aluminum boxes of sufficient size to accommodate wiring devices to be installed at outlet.
    b. Extension rings shall not be acceptable.
    c. Square or rectangular boxes may be supplied.
    d. Unless otherwise noted, provide boxes 3-1/2-inches deep by 4 inches wide.
    e. Boxes in hazardous locations shall be NEMA rated for the application.
    f. Boxes in contact with masonry or concrete shall be gray steel.
2. Exposed Device Boxes: Provide FD aluminum boxes for surface mounting in areas having exposed conduit systems. Provide gray steel boxes in areas in contact with

masonry or concrete. Coordinate box cover for proper use.

3. Boxes for Lighting Fixtures:
   a. Provide aluminum octagonal boxes with fixture stud supports and attachments as required to properly support ceiling and bracket-type lighting fixtures.
   b. Unless otherwise noted, provide boxes 2 inches deep by 4 inches wide.
   c. Boxes in contact with masonry or concrete shall be grey steel.
4. Masonry Boxes:
   a. Provide stamp metal masonry boxes.
   b. Use boxes with 1-gang capacity in excess of the number of devices to be installed.
   c. Extension ring covers shall not be acceptable.
5. Listing: UL 514.
6. Acceptable Manufacturers: Appleton, Bowers, Crouse-Hinds, Efcor, Midwest, OZ/Gedney, RACO, Steel City, T & B or approved equal.

B. Junction, Pull and Splice Boxes
1. Construction: Provide boxes conforming to NEC Article 314.
2. Interior Spaces: Provide surface mounted NEMA 12 aluminum boxes at least 4 inches deep, with continuous hinged cover.
3. Exterior Spaces: NEMA 4X stainless steel type 316 boxes at least 4 inches deep.
4. Embedded: Provide stainless steel 316 type with external recessed flanged cover when cast in concrete.
5. Listing: UL 514.
6. Acceptable Manufacturers: Hoffman, Keystone, OZ/Gedney, Stahlin, Crouse-Hinds.
7. Hazardous location: Box shall be NEMA rated for the application.
8. Chemical areas: Box shall be rated NEMA 4X, PVC or fiberglass reinforced polyester. Fiberglass enclosures shall not be used in the presence of sodium hypochlorite. Non-metallic boxes shall have UV inhibitors and shall not be mounted in direct sunlight.

C. Termination Cabinets & Boxes
1. Termination cabinets shall be NEMA 4X 316 stainless steel gasketed. Cabinets shall be of sufficient size to adequately contain all terminals, wire-duct, and cables as determined by the CONTRACTOR. Cabinets shall have removable doors (lift- off) not more than 30 inches wide and shall be equipped with a three-point locking latch handle.
2. Wire terminal blocks shall be square D type M Barrier Block system or equal.
   a. M4/6G or B 22014 AWG 6MM (0.234 inch) wide, grey blue, single level, 600 volt, 20A.
   b. M6/8G or B 22-8 AWG 8MM (0.315 inch) wide, grey blue, single level, 600 volt, 55A.
3. The wire terminal block system shall be for DIN rail mounting, and shall include fuse/switch blocks, circuit breaker block, and isolation switches.

4. Acceptable Manufacturers: Hoffman.

2.03 FABRICATION (NOT USED)

2.04 CONTROLS (NOT USED)

2.05 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION

A. Coordinate location of all boxes with all other work.

B. Verify location of floor boxes with Engineer before installation.

3.02 INSTALLATION

A. Outlet Boxes

1. Flush Boxes:
   a. Unless otherwise indicated, mount all outlet boxes flush within 1/4-inch of the finished wall or ceiling line.
   b. Securely fasten outlet boxes in position using clips or other suitable means.
   c. Provide plaster covers for all boxes in plastered walls and ceilings.
2. Fixture Boxes: Where boxes for suspended lighting fixtures are attached to and supported from suspended ceilings, adequately distribute the load over the ceiling support members.
3. Mounting Height:
   a. Mounting height of a wall-mounted outlet box means the height from finished floor to horizontal center line of the cover plate.
   b. Where outlets are indicated adjacent to each other, mount these outlets in a symmetrical pattern with all tops at the same elevation.
   c. Where outlets are indicated adjacent, but with different mounting heights, line up outlets to form a symmetrical vertical pattern on the wall.
   d. Verify the final location of each outlet with Owner’s Representative before rough-in.
   e. Remove and relocate any outlet box placed in an unsuitable location.
4. Back-to-Back Boxes:
   a. Do not connect outlet boxes back-to-back unless approval is obtained.
   b. Where such a connection is necessary to complete a particular installation, fill the voids around the wire between the boxes with sound insulating material.
5. Box Openings: Provide only the conduit openings necessary to accommodate the conduits at the individual location.

B. Floor Boxes

1. Completely envelop floor boxes in concrete except at the top. Increase slab thickness at

boxes if required for bottom covering. Adjust covers flush with finished floor.

C. Junction and Pull Boxes

1. Pull boxes and junction boxes shall be provided to facilitate the installation of cable and wires. "Condulet" type fittings shall not be used in lieu of boxes when the conduit contains wire #4 AWG or larger.
2. Installation:
    a. Install boxes as required to facilitate cable installation in raceway systems.
    b. Generally, provide boxes in conduit runs of more than 100 feet.
    c. Locate boxes strategically and make them of such shape and size to permit easy pulling of wire or cables. Size boxes in accordance to NEC Article 314.28 requirements.
3. Covers:
    a. Provide boxes so that covers are readily accessible and easily removable after completion of the installation.
    b. Include suitable access doors for boxes above suspended ceilings.
    c. Select a practical size for each box and cover.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 05 43 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment, and incidentals required and install concrete encasement around underground electrical raceways as shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical.

C. Excavation, backfilling, fill and grading are included in Section 31.

D. Concrete formwork, concrete joints, joint accessories and cast in place concrete are included in Section 3.

E. Furnishing and installing electrical conduit and furnishing and placing electrical warning tape are included in Section 26.

1.03 SUBMITTALS

A. Submit to the Owner’s Representative, in accordance with Section 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ANSI C80.1, Specifications for Zinc-Coated Rigid Steel Conduit.
2. ANSI/ACI 301, Specifications for Structural Concrete for Buildings.

3. ANSI/ASTM A615, Specifications for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
4. ANSI/NEMA TC6, PVC and ABS Plastic Utilities Duct for Underground Installation.
5. ANSI/NEMA TC9, Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Ducts and Fittings
   1. Unless otherwise noted, provide Schedule 40 PVC conduit encased in concrete. Provide fittings of the same type material as the conduit.
   2. Provide direct buried PVC conduit systems for outdoor lighting circuits where those do not cross roadways. At intersection with roadways, provide schedule 40 PVC conduit encased in concrete and reinforced with rebar. Extend rebar 5’ on both sides of the road.

B. Conduit and Fittings refer to section 26 05 33.13

C. Concrete
   1. Provide concrete conforming to the following.
      a. Compressive strength: 3,000 psi at 28 days.
      b. Slump: Not exceeding six inches.
      c. Aggregate size: Use pea gravel.
      d. Additive: Red ferrous oxide concrete coloring pigment mixed at the rate of 1- 1/2 pounds per sack of cement. Sprinkled color on the top of the duct bank will not be acceptable.
      e. All raceway concrete placements shall be continuous and watertight between manholes or handholes and between manholes or handholes and structures.
      f. Encasement shall be reinforced at all road crossings and where indicated on the drawings.
      g. Encasement shall be laid in trenches as and where indicated on drawings.
      h. Provide not less than 4 inches of concrete between the outside of a raceway and the earth unless otherwise noted on the drawings. Provide not less than 2 inches of

concrete between adjacent raceways unless otherwise noted on the Drawings. Form as specified in Section 3.

i. Where raceways pass through concrete walls, concrete encasements shall be extended through the finished flush with inside surfaces. Watertight construction joints with waterstops conforming to Section 3 shall be provided.

D. Reinforcing Bars

1. Provide Grade 40 steel reinforcing bars, for all duct banks.

E. Identifying Tape

1. Refer to specification section 26 05 53 Identification for Electrical Systems for detectable warning tape characteristics.

F. Manholes and Handholes

1. Manholes and handholes shall be of the precast concrete type, designed for a Class H-20 load with sizes as shown on the Drawings, and as manufactured by Oldcastle Precast, Foley Products, Shaw Precast Solution, Utility Concrete Products or approved equal.
2. Concrete for manholes and handholes shall have a 28-day compressive strength of 5,000 PSI. Cement shall be Type I or III. Reinforcing steel shall be Grade 60 with yield strength of 60,000 P.S. Design loadings shall be H-20-44 w/impact or 4,500 psi (minimum), suitable for H20 loading.
3. The top of all manholes shall be field removable and have stainless steel lifting eyes.
4. Duct bank entries into the manhole or handhole shall be centered on the entering wall and shall contain the appropriate number and size of duct terminators to match the corresponding duct bank.
5. Each manhole and handhole shall have a minimum size of 18” x 18” x 12” deep concrete sump in the middle of the floor of the manhole or handhole, or as shown on the Drawings.

G. Manhole Covers

1. Unless otherwise shown on the Drawings, manhole and handhole covers shall be heavy duty 36 in. machined gray iron, and AASHTO M306-04/ ASTM A48 CL35B Min., 40,000-pound proof load value (Class H20 X 2.5) “True Traffic” load covers, complete with frame, and “Electric” or “Communication” raised lettering recessed flush, as required, on the cover. Covers shall be V-1600-5, with drop handles as manufactured by East Jordan Iron Work or approved equal.

2. Manufacturer shall certify that all castings conform to the ASTM and AASHTO Designations as specified herein. All casting shall be true to pattern in form and dimension, free from pouring faults, sponginess, cracks, blow holes and other defects in positions affecting strength and value for the service intended. Angles shall be filleted and rises shall be sharp and true.

H. Access Hatch

1. Where access hatches are shown on the Drawings, hatches shall be heavy duty aluminum,

for H-20 load rating, sized as shown on the Drawings. Hatches shall be CHS Series as manufactured by East Jordan Iron Works or approved equal.

2. Material shall be 6061-T6 aluminum for bars, angle and extrusions. ¼" diamond plate shall be 5066 aluminum.
3. Unit shall have a heavy duty pneumatic-spring, for ease of operation when opening cover. Cover shall be counter-balanced so that one person can easily open the hatch door.
4. Frame shall be of extruded aluminum with a continuous 1¼" anchor flange. A dovetail groove shall be extruded into the seat of the frame with a 1/8" silicone gasket.
5. Hinges shall be of heavy-duty design, the material shall be grade 316 stainless steel, with a 3/8" grade 316 stainless steel pin. Hinge shall be bolted to the channel frame and diamond plate with grade 316 stainless steel bolts and Ny-lock nuts. Aluminum shall be supplied with mill finish. Exterior of frame which comes in contact with concrete shall have one coat black primer.
6. Each hatch shall be supplied with a stainless steel slam lock, with the keyway protected by a threaded aluminum plug. The plug shall be flush with the top of the ¼" diamond plate. The slam lock shall be fastened with grade 316 stainless steel bolts and washers.
7. Each hatch shall be equipped with a stainless steel lift handle. Lift handles shall be flush with top of ¼" diamond plate.
8. Each hatch shall be supplied with a 1 ½" threaded drain coupler on underside of channel frame for pipe connection.

or Frames and Covers: 24-inches by 36-inches minimum; hinged; heavy duty; H-20 rated. Provide cast iron covers for manholes in traffic areas. Aluminum covers are acceptable in off-street areas only. Equip aluminum covers with shock or spring assist devices, retractable handles, locking mechanisms, and kickstands.

I. Manhole and handhole ladders

1. shall be constructed of fiberglass reinforced plastic, safety yellow, 18-inch rung width with 12-inch rung spacings, Saferail as manufactured by Strongwell Corp or approved equal. Furnish a total of two (2) ladders, each of a length 4 ft. greater than the deepest manhole in the underground system.

J. Cable Racks:

1. Heavy duty nonmetallic stanchions and arms. Equal to Underground Devices CR36-B stanchions with RA8, RA14 or RA20 arms.

K. Wireway for Analog Signal Wiring:

1. As shown on the Drawings. Provide wireways in manholes only where analog signal wiring is installed.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Location and Inspection

1. Before beginning trenching operations stake out the proposed duct bank routing and obtain approval of the Owner. After trenching has begun and before any ducts or conduits are placed, notify the Owner so that the trenching and installation may be inspected. Also notify the Owner prior to any placement of concrete for duct banks, so that he may observe the placing. Placing concrete on muddy trench bottoms will not be acceptable.

3.02 INSTALLATION

A. Construction

1. Duct bank configurations are detailed on the drawings. A minimum of 3-inch concrete cover shall be required on all sides of the conduits. Conduits shall be spaced with 3-inch clearance on all sides.

B. Excavation and Backfill

1. Excavation: Excavate trenches for installation of duct banks. Form the trench bottom to follow closely the specified grade and depth for the duct banks.
2. Backfill: Trenches may be backfilled with excavated soil and supplemented as necessary with select materials. Compact the backfill and mound slightly above natural grade, compact to 95%.
3. Restoration: Restore adjacent areas disturbed by trenching or backfilling to a condition equal to the original or
4. Perform excavation in accordance with applicable OSHA requirements, including suitable bracing and shoring where required.
5. Excavation includes all excavation of trenches and pits, no matter what the substance encountered, and disposal of excess material.
6. Perform trench excavation by open cut. The top portion of the trench may be excavated with vertical or sloping sides to any width within the construction easement which will not cause unnecessary damage to adjoining structures, roadways, pavements, utilities, trees, or private property.
7. Backfill the first 18-inches with select material consisting of finely selected earth, stone dust, or sand. Place in 6-inch layers and compact with proper hand tools. Remaining backfill, if necessary, may be with general excavated material so long as the material consists of not more than 1/3 broken rock with no single rock weighing over 50 pounds.

C. BEDDING OF MANHOLES

1. Excavate manholes a minimum of 12-inches below the base elevation then bring the bed to the proper elevation with compacted stone or gravel, 3/4-inch and less in size. Thoroughly compact the bed by tamping or slicing with a flatbed shovel.

D. Placing of Duct Banks

1. Cover: Unless otherwise shown, provide a minimum 18” of earth and select materials

cover with warning tape 12” below finishished grade. Coordinate grade with other work, if in conflict, rework grade at no cost to Owner.

2. Grade: Place duct banks with a minimum grade of four inches per 100 feet. Grade between manholes may be from one manhole to the next manhole or from a high point between manholes. Where terminating ducts inside of buildings, always slope the grade away from building to the nearest manhole.
3. Changes in Direction: Make changes in direction of runs exceeding a total of 10 degrees, either horizontal or vertical, by using long sweep bends. Long sweep bends must have a minimum radius of curvature of 3 feet and may be made up of one or more curved or straight sections. Manufactured bends having a minimum radius of curvature of three feet may be used at the ends of duct runs which are less than 100 feet in length.
4. Joints: Make joints in ducts and conduits watertight, in accordance with manufacturers recommendations. Stagger joints in adjacent ducts and conduits a minimum of six inches. Make joints between ducts and conduit with appropriate no-thread-to-threaded adapters. Use appropriate sealant.
5. Spacing: Unless otherwise shown, space ducts and conduits with 3” spacers. Place spacers or separators on not greater than four-foot centers. Use spacers or separators made of plastic, concrete or a suitable nonmetallic, nondecaying material.
6. Drainage: All conduit duct banks shall be sloped sufficiently to drain into manholes, pull boxes or sumps.
7. Terminate conduit in end bell at manhole entries. Face of end bell shall be flush with interior wall of manhole. Label each conduit entering manholes identifying location of opposite end by writing on lip of end bell with permanent marker.
8. Where duct bank passes beneath footings or slabs resting on grade, excavate to provide a minimum of 6-inches clearance between the conduits and the structure. Backfill to the base of the structure with concrete. Where duct bank passes below building or structure with deep column footings, piers or piles, route duct bank between footings/piers/piles. Do not place duct banks below column footings.

E. Placing of Concrete

1. Place concrete using chutes and tremies as necessary to limit the free drop of the mix to a maximum of two feet. Carefully rod or vibrate the concrete to aid uniform encasement of the ducts. Smooth the top of the pour with a float. Encase the conduits in concrete, a minimum thickness of three inches, on all sides.

F. Special Project Requirements

1. Contractor shall employ hand trenching at locations where existing underground utilities are present.
2. All damaged utilities should be repaired immediately in manner acceptable to the Owner at Contractor's expense. Any damaged cables shall be replaced in full. Splices shall not be acceptable. Damaged conduits shall be replaced between the two closest manholes and cables repulled.
3. Install a #4/0 bare copper grounding conductor centered over the ductbank. Bond ductbank grounding conductor to building or transformer ground loop at one end and to the manhole ground electrode at the other end.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

A. Thoroughly clean all ducts and conduits before placing. During construction and after the duct line is completed; plug open ends of ducts and conduits to prevent the entrance of foreign matter. After the duct line has been completed, pull a flexible mandrel through each duct and conduit. The mandrel must not be less than 12 inches long with a diameter approximately 1/4 inch less than the inside diameter of the duct or conduit. After cleaning, place in each duct and conduit a No. 30 nylon line with a plastic tag on each end reading "Pulling Line", and a tag identifying the location of the other end.

END SECTION

HSECTION 26 05 53 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install tags/nameplate on all equipment, devices, instruments, conduit and conductor marking as indicated on the drawings and specified herein. Major equipment shall be furnished with nameplates in accordance with their individual specifications.

1.02 RELATED WORK

A. Section 26 00 00 – Electrical.

B. Section 01 33 00 - Submittal Procedures.

1.03 SUBMITTALS

A. Submit to the Owner's Representative, in accordance with Section 1, detailed catalog information or drawings describing electrical and physical characteristics of all equipment specified.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter showing all the exceptions to the specification. If no exceptions are taken the letter shall indicate no exception. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS (NOT USED)

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

2.01 MATERIALS

A. Wire Markers

1. Provide heat shrinkable sleeves and machine printed legends at every conductor. Sleeves and legends shall be high resistant to abrasion, solvents and chemicals. Provide Tyco

TMS, Brady Perma Sleeve XPS, or approved equal. Markers shall be white with black lettering.

2. Markers shall have conductor origin, termination and circuit number, terminal number whichever applies.
3. Large conductors, multi-conductor cable and tray cables to be identified with placards held on with wire ties and of the same quality as markers for smaller single conductors.
4. Cables in cable tray to be identified with place cards at the equipment and at 20 feet spans in between.
5. All control wiring in electrical equipment or manufactured supplied panels shall have wire markers.

B. Conduit Markers

1. Exposed Conduit
   a. Conduit markers to be stainless steel type permitting embossing on the job and attached to conduit with banding made of same material. Markers to be installed lengthwise and wrapped with clear adhesive tape.
   b. Conduits to be marked at the point of origin, the point of termination, upon crossing wall, each side of junction boxes and at 20-foot internals for all exposed and accessible conduits. Identify all exposed conduits by their panel, MCC, circuit numbers or loop numbers.
   c. Provide labels for high voltage conduit. Labels shall be vinyl for indoor exposed conduit or polyester for outdoor exposed conduit. Label shall be black letters on red/orange background. Labels shall be as manufactured by Thomas and Betts or Brady.

C. Nameplates

1. Nameplates:
   a. Externally mark electrical equipment by means of suitable nameplates identifying each and the equipment served.
   b. Provide each piece of equipment with a white phenolic nameplate with 3/16- inch-high black lettering secured to front of equipment.
   c. Supply blank nameplates for spare units and used spaces.
   d. Actual nameplate legend, which may consist of up to three lines, will be provided to the Owner’s Representative on submittals.
2. Nameplate Fasteners: Fasten nameplates to equipment only by means of appropriate 316 SS screws and gasket. Stick-ons or adhesives will not be allowed. Seal opening in order to maintain the NEMA rating of the enclosure.
   a. Nameplate Information: In general, the following information is to be provided for the types of electrical equipment as listed.
   b. Switchgear, Motor Control Centers and Distribution Panelboards: On the mains, identify the piece of equipment, the source, and voltage characteristics, i.e., 480V, 3PH, 3W, etc. For each branch circuit protective device, identify the load served and the primary side circuit number.

c. Transformers: Identify the service source and load served.

d. Panelboards: Identify the service source, panelboard designation and voltage characteristics.

3. Panelboards:

a. Prepare a neatly typed circuit directory behind clear heat-resistant plastic for each panelboard. Directory shall include circuit identification, protective device type, trip rating, number of poles and rating of main lugs or main circuit breaker.

b. Identify circuits by equipment served and by room numbers, where room numbers exist.

c. Use equipment names and room numbers selected by the Owner's Representative; names and numbers may be different from those shown on plans.

d. Indicate spares and spaces with light, erasable pencil markings.

e. Provide a final set of the panel schedule in the O&M manuals.

f. Provide an electronic editable file for each Panel to the Owner with the O&M manual.

4. Boxes, Small Equipment:

a. Pull boxes and similar items shall be marked with Nameplates.

b. Provide identification labels for high voltage equipment and raceways with the legend "DANGER HIGH VOLTAGE". Mark all exposed high voltage raceways every 25 feet. Safety labels shall be self-sticking polyester and as manufactured by Thomas and Betts (Panduit) or Brady.

5. Power Receptacles: Use nameplate or engraved plate to identify power receptacles where the nominal voltage between a pair of contacts is greater than 150 volts with circuit number, voltage, and phases.

6. Wall Switches: Engrave the switch plate of the switch with the function of the switch.

D. Power Outlets, Switches, and Pilot Devices

E. Mark power outlets with voltage, phase, panel name, and circuit number.

F. Identify all wall switches, disconnect switches, etc. with nametags, circuits served, and panel origin, list to be approved by Owner's Representative/Owner.

G. Identify all push-button stations with their functions and equipment served.

H. Detectable Warning Tape

1. Shall be red metal detectable polyester with a subsurface graphics to seal the legend from acid, alkalis, and other soil substances.

2. Minimum width shall be 2".

3. Warning tape shall meet OSHA regulation for covering location of underground utility lines.

4. The legend shall show CAUTION: BURIED ELECTRIC LINE BELOW

5. The warning tape shall be Red with black lettering.
6. Acceptable manufacturer shall be Brady 91601 or approved equal.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Furnish and install nameplates for all panelboards, motor starters, motor control center cubicles, disconnect switches, instrument panels, dry type transformers and control stations.

B. Engrave the equipment designation, (e.g., "Starter Pump P1"), on nameplates in 3/16- inch black letters on white background of laminated phenolic. Securely fasten nameplates using stainless steel 316 sheet metal screws or rivets; or contact cement if enclosure is sealed. All switches, indicating lights, pushbuttons, meters and parameter indicators on panels shall be clearly identified with it's function or tag, as required. Identification list to be approved by owner representative through the Owner's Representative.

C. Stainless Steel tags shall be used on instrument, motors and other devices, as applicable. The tags shall be affixed to the instrument with drive pins or stainless-steel chain in such a manner that it does not need to be removed to install the instrument. Motors shall carry the tag assigned to its driven equipment, (e.g., P-101).

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING (NOT USED)

3.05 CLEANING (NOT USED)

3.06 FIELD PAINTING (NOT USED)

3.07 CLEANING (NOT USED)

END SECTION

SECTION 26 05 73 - POWER SYSTEM STUDIES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Short Circuit studies, protective device evaluation studies, arc flash studies, protective device coordination studies, motor starting voltage drop studies, load flow studies, and power factor correction capacitor sizing studies shall be provided.

B. The studies shall be prepared and sealed by a registered Professional Engineer experienced in power system studies. The Engineer shall be independent of the Contractor, equipment supplier, or any other party having a financial interest in the results of the study, unless otherwise approved by the Owner.

C. The preparer shall certify that the recommended protective device settings represent a reasonable engineering compromise between equipment protection and selective coordination.

D. The Contractor shall provide a preliminary study, including system modeling and short circuit evaluation, submitted to the Owner's Representative prior to receiving final approval of the distribution equipment shop drawings, and/or prior to release of equipment for manufacture. If formal completion of the studies cause delay in equipment manufacture, approval from the Owner's Representative may be obtained for a preliminary submittal of sufficient study data to ensure that the selection of device ratings and characteristics will be satisfactory.

E. The studies shall include all portions of the electrical distribution system from the normal power source or sources down to, and including, the 120/240-Volt distribution system, including 480V main 3 phase circuit breaker and all 480V, 3 phase loads. Study shall also include all manufacturer supplied equipment. Normal system connections and those which result in maximum fault conditions, shall be adequately covered in the study. System showing the largest load or partial list of equipment on the bus will be rejected. One line diagram shall show all loads on the system. Combined circuits or partial one lines are not allowed. Utility owned transformer protection devices shall be included in each power system study.

F. Protective relay devices with microprocessor-based settings shall be determined with the study.

G. The work associated with this section is to be performed by or under the direction of a professional engineer licensed by the State of Washington.

H. A separate power system study shall be provided for each facility.

1.02 RELATED WORK

A. Section 26 00 00 – Electrical.

B. Section 01 33 00 - Submittal Procedures.

1.03 SUBMITTALS

A. The results of the power system study shall be summarized in a final report. Six bound copies of the final report shall be submitted. Report to be sealed by a professional engineer licensed in the State of Washington. Submit a preliminary report for approval prior to releasing equipment for manufacture.

B. The report shall include the following sections:

1. Description, purpose, basis, and scope of the study and a full size (22”x34”) single-line diagram of that portion of the power system which are included within the scope of the study.
2. Tabulations of circuit breaker, fuse, and other protective device ratings versus calculated short circuit duties and commentary regarding same.
3. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
4. Fault current calculations, including a definition of terms and guide for interpretation of computer printout.
5. A letter from utility provider showing available short circuit current at the service entrance, X/R ratios, impedances and characteristics of upstreams protective devices.
6. A copy of all the data obtained to perform the study.
7. A complete list of all recommended settings for all protective relays, including all solid-state protective relay packages.
8. A list of non-compliance and or recommendations on existing system.
9. A complete detail of the Arc Flash Study analysis as specified in 2.04.
10. An arc flash label showing the information requested in section 2.
11. An electronic version of the analysis using SKM software or ETAP , to be submitted for the final report.
12. The electronic version shall include the backup folder with all the libraries files.

C. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. The power system studies provided shall be performed in accordance with the following standards:

1. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis (Brown Book).
2. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (IEEE Buff Book).
3. IEEE 141 - IEEE Recommended Practice for Electric Power Distribution for Industrial Plants.

4. NFPA 70E – National Electrical Safety Code.
5. OSHA 29-CFR, Part 1910 Sub part S.
6. IEEE 1584 - IEEE Guide for Performing Arc Flash Hazard Calculations.
7. ANSI
8. NFPA 70 – National Electric Code

1.05 QUALITY ASSURANCE

A. The company and individual(s) performing the study shall have a minimum of 5 years documented experience in power system analysis and completed projects of similar size and scope.

B. The individual performing the study shall be a registered Professional Engineer in the state of Washington.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Data Collection for the Studies

1. The Contractor shall coordinate with the Owner to obtain all pertinent data necessary for the successful completion of the Power System Studies, including information on all new equipment and wiring pertinent to the Study. This shall be interpreted to include all cable and raceway data, data for new motors, data from all new switchgear, motor control centers, panel boards, and separately mounted fuses, starters and circuit breakers. Obtain all existing or new protective device information to include all present settings. The Contractor shall obtain any needed data or information from Contract Documents, various suppliers, the Electric Utility and from conducting his own field investigations. If, in his field investigations, the Contractor encounters conflicts between the Contract Documents and the field conditions, the Contractor shall immediately notify the Owner/Engineer for a resolution to the conflict. Copies of the data obtained shall be organized and submitted to the Owner/Engineer at the same time of transmittal to the Study Engineer, to show that all the requested data gathering work has been completed.
2. The Contractor shall expedite collection of the data to assure completion of the studies as required for final approval of the distribution equipment shop drawings, and/or prior to release of the equipment for manufacturer.

B. Short Circuit Study and Protective Device Evaluation Study

1. The short circuit study shall be performed with the aid of a digital computer program, SKM software or ETAP .
2. Provide a complete short circuit study. Include three phase and phase-to-ground calculations. Provide equipment interrupting or withstand evaluation based on the actual equipment and model numbers provided on this project. Generic devices are not acceptable. Normal system operating methods, alternate operation, and operations that could result in maximum fault conditions, shall be thoroughly addressed in the study. The study shall assume all motors are operating at rated voltage with the exception that motors, identified as "standby," shall not be included. Electrical equipment bus impedances shall be assumed as zero. The study shall be performed using actual available short circuit currents available as obtained from the Electric Utility. An assumption of

infinite bus for the purposes of the study is not acceptable.

3. Short circuit close and latch momentary duty values and interrupting duty values shall be calculated on the basis of assumed three-phase bolted maximum available fault short circuits at each switchgear bus, medium voltage controller, switchboard, low voltage motor control center, distribution panelboard, pertinent branch circuit panel, and other significant locations through the system. The short circuit tabulations shall include symmetrical fault currents and X/R ratios. For each fault location, the total duty on the bus, as well as the individual contribution from each connected branch, shall be listed with its respective X/R ratio and impedance.
4. A protective device evaluation study shall be performed to determine the adequacy of circuit breakers, molded case switches, automatic transfer switches, and fuses by tabulating and comparing the short circuit ratings of these devices with the calculated fault currents. Appropriate multiplying factors based on system X/R ratios and protective device rating standards shall be applied. Any problem areas or inadequacies in the equipment due to short circuit currents shall be promptly brought to the Owner's Representative's attention, and corrective measures implemented at no extra cost to the Owner.
5. As a minimum, each short circuit study shall include the following:
    a. One-Line Diagram:
        1) Location and function of each protective device in the system, such as relays, direct-acting trips, fuses, etc.
        2) Type designation, current rating, range or adjustment, manufacturer's style and catalog number for all protective devices.
        3) Power and voltage ratings, impedance, primary and secondary connections of all transformers. Use the ratings of the actual transformers being provided where available.
        4) Type, manufacturer, and ratio of all instrument transformers energizing each relay.
        5) Nameplate ratings of all motors and generators with their sub transient reactance.
        6) Sources of short circuit currents such as utility ties, generators, synchronous motors, and induction motors. Provide short circuit studies using each source of power separately. The study shall determine if there is sufficient short circuit current to adequately cause interruption of a protective device using the weaker power source (typically local generation), and shall determine if the equipment can safely interrupt the fault if the greater power source is connected. Additional short circuit calculations shall include emergency as well as normal switching conditions as well as normal and emergency power sources described here in.
        7) All significant circuit elements such as transformers, cables, breakers, fuses, reactors, etc shall be included.
        8) The time-current setting of existing adjustable relays and direct-acting trips, if applicable.
    b. Impedance Diagram:
        1) Available Mega-Volt-Amps (MVA) or impedance from the utility company.

2) Local generated capacity impedance.

3) Transformer and/or reactor impedances.

4) Cable impedances.

5) System voltages.

6) Grounding scheme (resistance grounding, solid grounding, or no grounding).

c. Calculations:

1) Determine the paths and situations where short circuit currents are the greatest. Assume bolted faults and calculate the 3-phase and line-to-ground short circuits of each case.

2) Calculate the maximum and minimum fault currents.

C. Protective Device Coordination Study

1. A protective device coordination study shall be performed to provide the necessary calculations and logic decisions required to select or to check the selection of power fuse ratings, protective relay characteristics and settings, ratios, and characteristics of associated current transformers, and low voltage breaker trip characteristics, and settings.

2. The coordination study shall include all medium and low voltage classes of equipment from the building or plant service protective devices down to and including the largest rated device in the MCC low voltage motor control center and panelboard. The phase and ground overcurrent protection shall be included, as well as settings of all other adjustable protective devices.

3. The undervoltage relay setting shall be carefully selected in order to override momentary voltage drop conditions. In addition, a time delay relay shall be used to help override undervoltage conditions. Switchgear manufacturer shall coordinate with utility company to determine a suitable relay setting and time delay setting to override the distribution system normal/abnormal voltage drop conditions.

4. The time-current characteristics of the specified protective devices shall be drawn on log-log paper. The plots shall include complete titles, representative one-line diagram and legends, significant motor starting characteristics, complete parameters of transformers, complete operating bands of low voltage circuit breaker trip curves, and fuses. The coordination plots shall include the types of protective devices selected, proposed relay taps, time dial and instantaneous trip settings, transformer magnetizing inrush and ANSI transformer withstand limits, and significant symmetrical and asymmetrical fault currents. All restrictions of the National Electrical Code shall be adhered to and proper coordination intervals and separation of characteristic curves shall be maintained. The coordination plots for phase and ground protective devices shall be provided on a system basis and on separate log sheets. A sufficient number of separate curves shall be used to clearly indicate the coordination achieved.

5. The selection and settings of the protective devices new and existing that will be modified shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios and connection, manufacturer and type, range of adjustment, and recommended settings. A tabulation of the recommended power fuse selection shall be provided for the medium voltage fuses where applied in the system. Any discrepancies, problem areas, or inadequacies shall be promptly brought to the Owner’s Representative's attention.

6. The coordination study shall be calculated by means of computer software package, SKM or ETAP.

D. Arc Flash Hazard Study

1. The Power System Study shall include an Arc Flash Hazard Study that shall present the level of arc flash hazard for each item of electrical equipment, and the appropriate level of protection required per OSHA standards.
2. The analysis shall be performed with the aid of computer software intended for the purpose, in order to calculate Arc-Flash Incident Energy (AFIE) levels and flash protection boundary distances.
3. Perform an arc flash hazard study after the short circuit and protective device coordination study has been completed based upon IEEE Std 1584, "IEEE Guide for Performing Arc Flash Hazard Calculations." safe approach requirements determined in accordance with NFPA-70E
4. The study shall be calculated by means of computer software package SKM or ETAP. Pertinent data, rationale employed, and assumptions in developing the calculations shall be incorporated in the introductory remarks of the study.
5. Determine the following:
    a. Flash Hazard Protection Boundary.
    b. Incident Energy.
    c. Working Distance.
    d. Minimum arc rating of clothing
    e. Site Specific level of PPE.
    f. Shock Hazard Voltage.
    g. Limited Approach.
    h. Restricted Approach
    i. Prohibited Approach.
6. Produce an Arc Flash Warning label listing items a-h above. Arc flash label size shall be 3"x3" minimum. Also include the bus name, system operating voltage, and date of issue. Labels shall be printed in color and be printed on adhesive backed labels.
7. Produce Bus Detail sheets that list the items D 3 a-h from above and the following additional items.
    a. Bus Name.
    b. Upstream Protective Device Name, Type, and Settings.
    c. Bus Line to Line Voltage.
8. Produce Arc Flash Evaluation Summary Sheet listing the following additional items:
    a. Bus Name.
    b. Upstream Protective Device Name, Type, and Settings
    c. Bus Line to Line Voltage.

d. Bus Bolted Fault.
e. Protective Device Bolted Fault Current.
f. Arcing Fault Current.
g. Protective Device Trip / Delay Time.
h. Breaker Opening Time.
i. Solidly Grounded Column.
j. Equipment Type.
k. Gap.
l. Arc Flash Boundary.
m. Working Distance.
n. Incident Energy.
o. Required Protective Fire Rated Clothing Type and Class.

E. MOTOR STARTING VOLTAGE DROP STUDY

1. The motor starting study shall be provided for motors over 100 HP, full voltage started.
2. The study shall select the largest motor on a bus and shall assume all other motors on that bus are running. Where a Main-Tie-Main bus configuration is present, the study shall be done with both Main breakers closed and the Tie breaker open, and with one Main open and the Tie breaker closed.
3. Where the Utility feeders are feeding the switchgear, the study shall be done for each feeder based on the actual system impedance for each utility feeder.
4. A motor starting analysis shall be made where on-site standby generation is available to power the MCC using only the available power from the generator. If the generator has been sized to run only part of the load, then the system shall be modeled with only that part of the load running.

F. POWER FACTOR CORRECTION CAPACITOR SIZING STUDY

1. The study shall include the appropriate sizing of the power factor correction capacitors for [both existing and] new motors. [The Contractor shall obtain all pertinent data from the existing motor name plates and their respective manufacturers to size the capacitors to deliver a power factor of 95 percent or as close to 95 percent as possible without over-excitation of the motor.] The Contractor shall obtain the maximum capacitor size from the new [and existing] motor manufacturers and present the data in the study. The settings, for the protective motor relays, shall consider the correction in both starting and running current and power factor where the capacitors are located near the motors and downstream from the protective relay.

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION (NOT USED)

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Protective Device, Calibration, and Adjustment

1. The equipment manufacturer shall provide the services of a qualified field Owner's Representative and necessary tools and equipment to test, calibrate, and adjust the protection relays and circuit breaker trip devices as recommended in the power system study.

2. As a part of this Contract, the manufacturer's system Owner's Representative shall make one formal presentation in the Owner's office to the Owner's personnel. The presentation shall include all training materials and visual aids.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 08 00 - COMMISSIONING OF ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section provides the guidelines for testing of electrical equipment, cable, protective relays, circuit breakers, motor control centers, motors, and related apparatus to be used for the site interior and exterior electrical distribution system. This specification does not release the Contractor or vendor from any further testing required for safe commissioning of the equipment. All tests shall be completely recorded on forms provided at the end of this section. Tests shall be submitted to Engineer/Owner for approval.

B. Contractor will provide and pay the cost of electrical testing by an independent testing firm.

C. The Contractor to update the protective device settings with the final power system study acceptance.

1.02 RELATED WORK

A. Related equipment specification in all sections of Section 26 Electrical.

1.03 SUBMITTALS

A. The testing result shall be summarized in a final report certified by the testing technician. Report shall be submitted per Section 01 requirement.

B. The report shall include the following sections:

1. Description, purpose, basis and scope of the work.
2. Field data sheet showing all visual, mechanical and electrical inspection done on the equipment. The data sheet shall show check marks and values of all the testing done and a description of the instrument used for testing.
3. A summary of the deficiency, concern, repairs and recommendation.
4. A table showing the final settings of all the adjustable equipment tested.
5. All the testing values shall be in accordance with the latest NETA standard.

C. Literature and drawings describe the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. InterNational Electric Testing Association Standards (NETA)/ANSI for acceptance testing for electrical power equipment and system, and IEEE Publication No. 141, are hereby made a

part of this section, unless otherwise modified herein.

B. NETA/ANSI Maintenance Testing Specifications for electrical power distribution equipment and system (latest edition).

C. NETA/ANSI Standard for Electrical Commissioning Specifications for Electrical Power Equipment and Systems (latest edition)

1.05 QUALITY ASSURANCE

A. Testing firm shall have a minimum of five years of experience in providing acceptance testing for pumping stations. Testing shall be performed per the latest InterNational Electric Testing Association Standards (NETA) standard. This cost will be included in the Contract Bid.

B. The Contractor shall immediately correct all deficiencies discovered during testing by the independent firm. The independent testing firm has the final say on the acceptance of the equipment. If testing determines the equipment is deficient, contractor shall be responsible for fixing the deficiency even if the manufacturer said the equipment is satisfactory.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY (NOT USED)

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Preparatory work:

1. Prior to the testing of any specific piece of equipment, the Contractor shall remove all shipping hardware and inspect for broken or missing parts and proper connections in accordance with the manufacturer's instructions.

3.02 INSTALLATION (NOT USED)

3.03 INSPECTION

A. Visual and Mechanical Inspection

1. Prior to any electrical testing Contractor shall perform a visual and Mechanical inspection as specified in the latest NETA standard.

B. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan on each major part piece of equipment (switchgear, transformer tap box, VFD). Remove front panels so joints and connections are accessible to

portable scanner. Infrared testing shall be performed on loaded equipment.

1. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan 11 months after date of Substantial Completion.
2. Instruments, Equipment, and Reports:
    a. Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

C. Prepare a certified report that identifies equipment included and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.04 FIELD TESTING

A. All tests, other than Low Voltage Systems and Equipment, shall be supervised by the Engineer/Owner and the contractor. Contractor shall give 30 days' notice of all scheduled tests to the Engineer/Owner in writing.

B. Contractor shall notify the Engineer/Owner of scheduled dates of electrical equipment installation completion. Equipment testing shall be coordinated at this time by Contractor with Engineer/Owner and appropriate Manufacturer's Representatives.

C. Under this specification the Contractor shall perform the electrical tests on specified equipment ad specified herein. The Contractor shall supply all equipment required to perform all testing responsibilities.

D. Device
    1. Air switches – Low voltage
        a. Electrical Tests
            1) Perform insulation-resistance tests on each pole, phase-to- phase and phase-to-ground for one (1) minute. Test voltage and minimum resistances should be in accordance with NETA Standard.
            2) Perform contact-resistance test across each switch blade and fuse holder or perform thermographic survey in accordance with the latest NETA Standard.
    2. Switchgear and Switchboard Assemblies
        a. Electrical Tests
            1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.
            2) Measure contact resistance across each switchblade and fuseholder.
            3) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with switch closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or NETA Standard whichever is more stringent.
            4) Perform an overpotential test on each pole with switch closed. Test each pole-to-ground with all other poles grounded. Test voltage shall be in accordance with manufacturer's published data or NETA Standard whichever is more stringent.

5) Measure fuse resistance.

6) Verify cubicle space heater operation.

3. Transformers – Dry-type

   a. Small Transformers: Dry-Type, Air-Cooled (600 Volt and Below) (less than 100 kVA single-phase or 300 kVA three-phase)

      1) Inspect for physical damage, broken insulation, tightness of connections, defective wiring, and general condition.

      2) Thoroughly clean unit prior to making any tests.

      3) Perform insulation-resistance test. Calculate polarization index. Measurements shall be made from winding-to-winding and windings-to-ground. Test voltages and minimum resistance shall be in accordance with NETA Standard. Results to be temperature corrected in accordance with NETA Standard.

      4) Verify that the transformer is set at the specified tap.

4. Cables – low-voltage, 600V maximum

   a. Electrical Tests

      1) Perform resistance measurements through bolted connections with low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.

      2) Perform insulation-resistance test on each conductor with respect to ground and adjacent conductors. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute.

      3) Perform continuity tests to ensure correct cable connection.

5. Surge Arresters, Surge Protection Devices (Low and Medium Voltage):

   a. Electrical Tests

      1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.

      2) Perform an insulation-resistance test at voltage levels in accordance with NETA Standard.

      3) Test grounding connection in accordance with NETA Standard.

6. Circuit Breakers – Air, Insulated Case/Molded Case

   a. Electrical Tests

      1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.

      2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or latest NETA standard.

      3) Perform a contact/pole-resistance test.

      4) Perform adjustments for final setting in accordance with coordination study.

5) Determine long-time pickup and delay by primary current injection.
6) Determine short-time pickup and delay by primary current injection.
7) Determine ground-fault pickup and time delay by primary current injection.
8) Determine instantaneous pickup by primary current injection.
9) Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.
10) Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, and antipump function.
11) Verify operation of charging mechanism.

7. Circuit breakers – Air, low voltage, power
   a. Electrical Tests
      1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA standard.
      2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with the circuit breaker closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data or latest NETA standard.
      3) Perform a contact/pole-resistance test.
      4) Adjust the trip settings in accordance with the coordination study.
      5) Determine minimum pickup current by primary current injection.
      6) Determine long-time pickup and delay by primary current injection.
      7) Determine short-time pickup and delay by primary current injection.
      8) Determine ground-fault pickup and time delay by primary current injection.
      9) Determine instantaneous pickup by primary current injection.
      10) Perform minimum pickup voltage test on shunt trip and close coils in accordance with latest NETA standard.
      11) Verify correct operation of any auxiliary features such as trip, and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, antipump function, trip unit battery condition, and reset all trip logs and indicators.
      12) Verify operation of charging mechanism.
8. Protective Relays
   a. Electrical Tests
      1) Perform insulation-resistance test on each circuit-to-frame. Do not perform this test on solid-state devices.
      2) Perform the following tests on the nominal settings specified by the Owner/user's electrical Engineer:
         a. Pickup parameters on each operating element.

b. Timing tests at two (2) or more points on time-current curve.
c. Pickup target and seal-in units.
d. Special tests as required to check operation of restraint, directional and other elements per manufacturer's instruction manual.
e. Conduct tests to verify satisfactory performance of each control feature.
f. Electrically confirm that CT and VT secondary circuits are intact.

9. Instrument Transformers
   a. Electrical Tests – Current Transformers
      1) Electrically confirm that CT secondary circuits are intact.
      2) Perform a ratio verification test of each current transformer. This shall be performed using the voltage method or current method in accordance with ANSI C57.13.1 (IEEE Guide for Field Testing of Relaying Current Transformers).
      3) Perform insulation-resistance tests on current transformer secondary winding. Value of test voltage on secondary wiring shall be 1000 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.
   b. Electrical Tests – Voltage Transformers
      1) Perform insulation-resistance tests on voltage transformers, winding-to- winding and winding-to-ground. Value of test voltage on secondary wiring shall be 500 volts dc for one (1) minute. Do not perform this test with solid-state devices connected.
      2) Electrically confirm proper secondary voltage.
      3) Perform a dielectric withstand test on the primary windings with the secondary windings connected to ground. The dc dielectric voltage shall be in accordance with NETA Standard.
10. Metering
   a. Electrical Tests
      1) Check calibration of meters at all cardinal points.
      2) Calibrate watthour meters to within manufacturer's published accuracy.
      3) Verify all instrument multipliers.
      4) Electrically confirm that CT and VT secondary circuits are intact.
11. Grounding Systems
   a. Electrical Tests
      1) Perform fall-of-potential test or alternative per IEEE Standard No. 81- 2012 on the main grounding electrode or system.
      2) Perform point-to-point test to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.
12. Ground-fault protection systems
   a. Electrical Tests

1) Measure the system neutral to ground insulation resistance with the neutral disconnect link temporarily removed. Replace neutral disconnect link after testing. Notify equipment Owner or operator of any improper neutral to ground connections detected.
2) Measure insulation resistance of the control wiring at 1000 volts dc for 1 minute. If necessary, disconnect the solid-state components.
3) Perform pickup tests as follows using primary injection.
    a. Verify the relay does not operate at 90% of the set pickup current.
    b. Determine the pickup current of the relay and verify that this current is no greater than 125% of the setting. Pickup must not be greater than 1200 amperes.
4) For summation type systems utilizing phase and neutral CT's, verify proper polarities by applying current to each phase-neutral CT pair. This test also applies to molded case breakers utilizing an external neutral CT.
    a. Relay should operate when current direction is the same relative to polarity marks in the two CT's.
    b. Relay should not operate when current direction is opposite relative to polarity marks I the two CT's.
5) Measure time delay of the relay at 150% of pickup or greater.
6) Verify the system can trip with control voltage at 55% of rated for systems utilizing ac control power and 80% of rated for systems utilizing dc control power.
7) Verify operation of zone interlock systems by simultaneously injecting current at the interlocked relays and monitoring the control signals.

13. AC motors
    a. Electrical Tests – Induction Motors
        1) Perform insulation-resistance tests in accordance with ANSI/IEEE Standard 43.
            a. Motors larger than 200 horsepower: Test duration shall be for 10 minutes with resistances tabulated at 30 seconds, one (1) minute, and 10 minutes. Calculate polarization index.
            b. Motors 200 horsepower and less: Test duration shall be for one (1) minute with resistances tabulated at 30 and 60 seconds. Calculate the dielectric absorption ratio.
        2) Perform dc overpotential tests on motors rated at 1000 horsepower and greater and at 4000 volts and greater in accordance with ANSI/IEEE Standard 95.
        3) Perform insulation power-factor or dissipation-factor tests.
        4) Perform surge comparison tests.
        5) Perform insulation-resistance test on pedestal per manufacturer's instructions.
        6) Perform insulation-resistance test on surge protection device in accordance with NETA Standard.
        7) Test motor starter in accordance with NETA Standard prior to re-energizing the motor.

8) Check resistance temperature detector (RTD) circuits for conformance with drawings. Check that metering or relaying devices using RTD's are of the proper rating.

9) Check that the motor space heater is operating.

10) Perform a rotation test to ensure proper shaft direction if the motor has been electrically disconnected.

11) Measure running current and evaluate relative to load conditions and nameplate full-load amperes.

12) Perform vibration tests:

a. Motors larger than 200 horsepower: Perform vibration base line test. Amplitude shall be plotted versus frequency.
b. Motors 200 horsepower and less: Perform vibration and amplitude test.

14. Motor control centers/Motor starters, Low Voltage

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with NETA Standard.

2) Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with starter closed and across each open pole for one minute. Test voltage shall be in accordance with manufacturer's published data and NETA Standard whichever is more stringent.

3) Measure insulation resistance of each control circuit-to-ground.

4) Perform insulation-resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. For units with solid-state components, follow manufacturer's recommendation.

5) Test motor protection devices in accordance with manufacturer's published data and NETA Standard whichever is more stringent.

6) Test circuit breakers in accordance with NETA Standard.

7) Perform operational tests by initiating control devices.

15. Dry Type Power Factor Correction Capacitor:

a. Electrical Test

1) Perform resistance measurements through bolted connections with low-resistance ohmmeter, in accordance with latest NETA standard.

2) Perform winding-to-ground insulation-resistance tests. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use latest NETA standard.

3) Measure winding resistance.

4) Perform overpotential tests on each winding-to-ground.

16. Emergency System Transfer Switches

a. Electrical Tests

1) Perform resistance measurements through bolted connections with a low-resistance ohmmeter, if applicable, in accordance with latest NETA Standard

2) Perform insulation resistance tests on all control wiring with respect to ground. Applied potential shall be 500 volts dc for 300 volt rated cable and 1000 volts dc for 600 volt rated cable. Test duration shall be one minute. For units with solid-state components or for control devices that cannot tolerate the applied voltage, follow manufacturer's recommendation.

3) Perform a contact/pole-resistance test.

4) Verify settings and operation of control devices.

5) Calibrate and set all relays and timers in accordance with latest NETA Standard.

6) Verify phase rotation, phasing, and synchronized operation as required by the application.

7) Perform automatic transfer tests:

a. Simulate loss of normal power.
b. Return to normal power.
c. Simulate loss of emergency power.
d. Simulate all forms of single-phase conditions.

8) Verify correct operation and timing of the following functions:

a. Normal source voltage-sensing relays.
b. Engine start sequence.
c. Time delay upon transfer.
d. Alternate source voltage-sensing relays.
e. Automatic transfer operation.
f. Interlocks and limit switch function.
g. Time delay and retransfer upon normal power restoration.
h. Engine cool down and shutdown feature.

17. Standby, Engine Generator

a. Electrical and Mechanical Tests

1) Test generator in accordance with latest NETA Standard.

2) Test protective relay devices in accordance with latest NETA Standard

3) Perform phase-rotation test to determine compatibility with load requirements.

4) Functionally test engine shutdown for low oil pressure, overtemperature, overspeed, and other protection features as applicable.

5) Perform vibration test for each main bearing cap.

6) Conduct performance test in accordance with ANSI/NFPA 110.

7) Verify correct functioning of governor and regulator.

18. Fiber-Optic cables

a. Field Test

1) Perform cable length measurement and detect fiber fractures or other defects through analysis of the backscattering signal with an optical time domain reflector (OTDR).
2) Perform a continuity test to detect splice fractures or other defects through analysis of the backscattering signal using the OTDR.
3) Perform attenuation measurement of the cable loss with a multimode optical loss test set (MOLTS).
4) Perform attenuation measurement of losses at each splice and connector.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 22 13 - LOW VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install three phase and single phase, individually mounted, dry-type transformers.

B. General purpose.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.

2. 26 00 00 - Electrical.

1.03 SUBMITTALS

A. The following information shall be submitted to the Owner’s Representative:

1. Dimension drawing and weight.

2. Technical certification sheet.

3. Conduit entry/exit locations.

4. Transformer ratings including:

5. Primary and secondary kVA.

6. Voltage.

7. Taps.

8. Primary and secondary continuous current.

9. Basic Impulse level for equipment over 600-volts.

10. Impedance.

11. Insulation class and temperature rise.

12. Sound level.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

A. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. ANSI/NEMA Publication No. ST 20 - Dry-Type Transformers for General Application.

2. ANSI/UL 506 - Specialty Transformers.

3. NFPA 70 - National Electric Code.

4. UL 1561- Dry Type General Purpose and Power Transformers.

1.05 QUALITY ASSURANCE

A. Manufacturer’s Qualifications

1. The general construction of the transformer and the materials used shall be similar to that used for transformers of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.

2. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the transformer. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

B. Acceptable Manufacturers

1. ABB/General Electric.

2. Siemens.

3. Square D.

4. Eaton/Cutler Hammer.

5. Or approved equal

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE/SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of substantial completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Ratings

1. Transformer shall be designed for continuous operation at rated kVA, voltages, phases and winding configurations are indicated on the drawings. Transformers must be rated for 60 hertz operation and shall be ventilated or totally enclosed type.

B. Coils

1. Windings: Use copper windings. Aluminum windings shall not be acceptable. The windings shall be treated to resist the effect of moisture.

2. Taps: Furnish transformers with full load rated taps in the primary windings as follows:

kVA Rating	Taps
3-15 kVA, single phase;	Two 5 percent taps below rated voltage
9-15 kVA, three phase	Two 5 percent taps below rated voltage
25-167 kVA, single phase	Two 5 percent taps below
30-150 kVA, three phase	below and two above rated voltage

3. All transformers shall be UL listed and certified and carry the UL label.

C. Insulation

1. Provide UL recognized 220°C insulation system capable of continuous operation at 40°C ambient without exceeding 150°C winding temperature rise.

D. Sound Requirements

1. Average sound levels must not exceed the following values as measured in accordance with NEMA ST 20-4.12.

0 – 9	40
10 – 50	45
51 - 150	50

2.02 FABRICATION

A. Indoor: Unless otherwise specified or indicated, transformers installed in NEMA 1 area shall be ventilated type, with corrosion resistant finish.

B. Outdoor: For outdoor mounted transformers provide total enclosed NEMA 4X 316 stainless steel enclosure.

C. Totally Enclosed Transformers: Totally enclosed non-ventilated transformers shall be installed in areas subject to washdown or corrosives. The transformers shall be rated at insulation class of 220ºC with 150ºC temperature rise at ambient temperature of 40ºC in a 316 stainless steel enclosure.

D. Wiring Compartment: Locate the wiring compartment below the core and coil. Have the compartment cooled by air circulation or insulated from the core and coil with a suitable thermal barrier.

E. Grounding: Ground the core of the transformer to the enclosure with a flexible grounding conductor sized according to NEC requirements.

F. Mounting Brackets: Furnish mounting brackets, as required, for wall or ceiling mounting of transformers rated 45 kVA and less.

G. Transformers shall be provided with integrated vibration insulation to completely isolate the core and coil assembly from the transformer enclosure.

H. Provide transformer nameplates of type 316 stainless steel, marked in accordance with NEC. Fasten nameplate to transformer with stainless steel screws or rivets.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Examine elements and surfaces to receive transformers for compliance with installation tolerances and other conditions affecting performance.

B. Check that concrete pads are level and free of irregularities.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Conduit Connections

1. Attach incoming and outgoing conduits to the transformer enclosure with 24-inch long flexible conduit.

B. Run a bonding jumper, sized per NEC Table 250-122, on inside and along the outside of flexible conduit.

C. Cable Connections

1. Make transformer cable connections with compression-type lugs suitable for termination of 75ºC rated conductors. Position lugs so that field connections and wiring will not be exposed to temperature above 75^0 C.

D. Floor Mounting

1. Construct concrete pad for floor-mounted transformers in accordance with Section 26 00 00 - Electrical General Provisions and division 3.

2. Maintain a minimum of 6 inches free air space between enclosure and walls.

E. Wall Mounting

1. Securely anchor type 316 stainless steel mounting brackets to the wall to provide adequate transformers support.

F. Provide vibration isolation for mounting the transformers.

3.03 INSPECTION

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture’s recommendations.

B. Check all installed transformers for proper grounding, fastening and alignment.

3.04 FIELD TESTING

A. Refer to section 26 08 00 - Commissioning of Electrical Systems.

3.05 FIELD PAINTING

A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

END SECTION

SECTION 26 24 16 - PANELBOARDS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install distribution and branch circuit panelboards.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 - Electrical.
3. 26 43 13 - Surge Protective Devices for Low-Voltage Electrical Power Circuits.

1.03 SUBMITTALS

A. The following information shall be submitted to the Owner’s Representative:

1. Breaker layout drawing with dimensions indicated and nameplate designation.
2. Component list.
3. Conduit entry/exit locations.
4. Assembly ratings including:
    a. Short-circuit rating.
    b. Voltage.
    c. Continuous current.
5. Cable terminal sizes.

B. Submittals shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. The following standards shall apply as if written here in their entirety:

1. UL 50 - Cabinets and Boxes.
2. UL 67 - Electric Panelboards.
3. NEMA AB 1 - Molded Case Circuit Breakers.
4. NEMA AB 2 - Procedures for Verifying the Performance of Molded Case Circuit Breakers.
5. NEMA KS 1 - Enclosed Switches.
6. NEMA PB 1 - Panelboards.

1.05 QUALITY ASSURANCE

A. Manufacturer’s Qualifications

1. The general construction of the panelboard and the materials used shall be similar to that used for panelboards of the same size and rating in continuous production for at least 15 years and successfully operating in the field in substantial quantities. Upon request, the manufacturer shall submit a copy of his Quality Assurance Manual detailing the quality control and quality assurance measures in place at his facility.
2. The manufacturer shall have available for audit detailed descriptions of the method by which his various manufacturing processes and production test are recorded, thus enabling the "traceability" of the panelboard. All steps in the manufacturing process, from receipt of raw material to the final tests, are to be included. Where multiple records are used, the method for cross-referencing shall be noted.

B. Acceptable Manufacturers

1. ABB/General Electric.
2. Siemens.
3. Square D.
4. Eaton / Cutler Hammer.
5. Or approved equal.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer’s Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components that fails in materials or workmanship within specified warranty period.

B. Warranty Period: Two (2) years from date of Substantial Completion. Cost for the removal,

shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Bus

1. Material:
    a. Provide tin plated, copper bus bars, 98 percent IACS conductivity, full-sized throughout their length.
    b. Use buses with tin-plated contact surfaces.
    c. Include a copper bus bar ground bus in panelboard rated.
    d. Full size (100% rated) insulated neutral bus shall be included in the panel board, shown with neutral.
    e. The ground and neutral bus shall be at least one terminal screw for each circuit.
    f. Provide through feed or sub feed lugs where indicated.
    g. Provide lugs and connection points on phase, neutral and ground bus suitable for copper conductors.
    h. Spaces for future circuit breakers shall be bussed for the maximum devices that can be fitted.
2. Size bars as indicated and brace them to withstand the available symmetrical short circuit current.
3. Installation:
    a. Install buses in allotted spaces so that devices can be added without additional machining, drilling or tapping.
    b. Mount neutral bars, as required, on the opposite end of the main lugs.

B. Protective Devices

1. Circuit Breakers: Provide circuit breakers for the specified service with the number of poles and ampere ratings indicated.
    a. Provide breakers which are quick-make and quick-break on both manual and automatic operation.
    b. Use a trip-free trip indicating breaker.
    c. Incorporate inverse time characteristic by bimetallic overload elements and instantaneous characteristic by magnetic trip. Where indicated, provide ground fault circuit breakers (GFCB).
    d. For 2-pole and 3-pole breakers, use the common-trip type so that an overload or fault on one pole will trip all poles simultaneously. Handle ties are not acceptable.
    e. Unless otherwise indicated, provide circuit breakers with the following interrupting ratings:

i. Each circuit breaker used in 120/240 Volt panelboards shall have an interrupting capacity of not less than 10,000 Amps, RMS symmetrical.
ii. Each circuit breaker used in 277/480 Volt and 480 Volt panelboards shall have an interrupting capacity of not less than 42,000 Amps, RMS symmetrical.
iii. GFCI (ground fault circuit interrupter) shall be provided for circuits where shown on the drawings. GFCI units shall be 1 Pole, 120 Volt, molded case, bolt-on breakers, incorporating a solid-state ground fault interrupter circuit insulated and isolated from the breaker mechanism. The unit shall be UL listed Class A Group I device (5 milliamp sensitivity, 25 millisecond trip time) and an interrupting capacity of 10,000 Amps, RMS.
iv. Circuit breakers shall be as manufactured by the panelboard manufacturer.

f. Connect breakers to the main bus by means of a solidly bolted connection.

g. Use breakers which are interchangeable, capable of being operated in any position within the panel.

h. Each panelboard shall be equipped with a minimum of 20 percent spare breakers, with spaces, bus work, and terminators to complete the next standard size panelboards above the 20% requirement.

i. Independently mount breakers so that a single unit can be removed from the front of the panel without disturbing or removing the main bus, other units or other branch circuit connections.

j. Provide individual breaker handle lock for all circuits that supply exit signs, emergency lights, and fire alarm panels.

k. Provide GFI circuit breakers for heat trace circuit. The rating shall be as per NEC. Provide UL listed ground fault interrupter tripping at 30 mA for equipment ground fault protection for circuits that supply electric heat tracing.

2. Surge Suppressor

a. All the 480V panelboards and 3 phase panelboards shall be provided with a surge protective device in accordance with Specification 26 43 13.

3. Service Entrance

a. The panelboard shall have a connection for housing and grounding neutral conductor.

b. Provide a UL label for the panelboard.

2.02 FABRICATION

A. Enclosure

1. Cabinet:

a. Construct cabinets in accordance with UL 50. Use painted galvanized sheet steel 16-gauge or more.

b. Provide a minimum 4-inch gutter wiring space on each side.

c. Reinforce cabinets and securely support bus bars and over-current devices to prevent vibration and breakage in handling.

d. Provide standard conduit knockouts in cabinet ends.

e. Finish cabinets of surface-mounted panelboards to match doors and trim as specified below.

f. Panelboards mounted outdoors shall be weatherproof and shall have a door behind door type construction.

g. Panelboards mounted outdoor in wet or corrosive areas shall have NEMA 4X stainless steel 316 enclosures.

h. Panelboards mounted indoor shall be NEMA 12 gasketed enclosures for areas classified as NEMA 12.

2. Doors and Trim:

a. Fabricate doors and trim from cold-rolled sheet steel.

b. Equip doors with flush-type combination catch and key lock.

c. Key all locks alike. Fasten trim for flush-mounted panelboards to cabinets by an approved means which permits both horizontal and vertical adjustment.

d. Trim for surface-mounted panelboards must fit the cabinet with no overhang.

e. Apply a finish to trim and doors consisting of two coats of enamel over a rust-inhibiting prime coat.

B. Circuit Identification

1. Directory:

a. For each panelboard, provide a directory frame mounted inside the door with a heat-resistant transparent face and a directory card for identifying the load served.

b. Type directory as specified in Section 26 05 53.

2. Nameplate:

a. Provide a black on white phenolic nameplate on the face of the panelboard using the following as an example:

Panel HA

277/480V, 30, 4W

Feeder from MCC-B/Section

b. The nameplate shall have a minimum thickness of 1/8" and be mounted above the panel door.

c. Provide a UL service entrance label for panelboards used as service entrance equipment.

C. Listing

1. UL 67 - Electric Panelboards.

D. Special Requirements

1. All copper items, including wiring, terminal blocks, lugs, connectors, bus, etc., shall be tin plated copper.

2. All steel shall be primed and painted as specified. Galvanized items shall also be painted.

3. All hardware, including nuts, bolts, washers, screws, anchor bolts, door hinges, etc., shall be made of 316 stainless steel.
4. The panelboard steel parts shall be cleaned and sprayed in control cleaning solutions by a multi-stage spray washer. The operation shall produce a coating of a minimum of 150 milligrams per square foot to meet MIL Specification TT-C490. The primed metal parts shall be electrostatically coated with power paint to a thickness of 2.5mils. The paint finish shall withstand a minimum of 1000hours salt spray test.

E. UNITIZED POWER CENTER

1. Unitized, encapsulated dry-type transformer, primary main breaker, and a secondary distribution panel with a main breaker all integrally assembled with factory interconnect wiring; UL listed.
2. Enclosure**:** Stainless steel meeting NEMA 3R requirements for outdoor locations, and NEMA 12 requirements for indoor locations.
3. Circuit Breakers: As specified above, and as follows:
   a. Primary main circuit breaker rated 480 VAC, coordinated with transformer, interrupting rating as indicated on Drawings.
   b. Secondary main breaker rated 120/240 VAC, coordinated with transformer, interrupting rating as indicated on Drawings.
   c. Feeder breakers shall be bolt-on type with an interrupting rating of 10 kAIC.
4. Transformer: NEMA ST-20; 2 winding type. 3-phase units are connected delta primary and wye secondary. Insulation shall be 185º C, 115º C rise for ratings 30 kVA and below. Provide 2, 5 percent FCBN taps for ratings 15 kVA and smaller; 6, 2-1/2 percent taps for ratings larger than 15 kVA.

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Install panelboards in the locations as shown and as recommended in NEMA PB1.1.

B. In wet and corrosive areas, including outdoor locations, install stainless steel 316 panelboard enclosures on Type 316 stainless steel unistrut support to provide clearance behind the mounting surface.

C. In wet and corrosive areas, including outdoor locations, connect conduits to the bottom of the enclosure and to the lower 30 percent of the sides.

D. All conduit connections shall be by use of Myers hub.

E. Install the panelboards such that the center of the switch or circuit breaker in the highest position will not be more than 6-1/2 feet above nor lower than 24inches above the floor or working platform.

F. Install boxes so they are rigidly supported and correctly aligned. Anchor panelboards to the wall or support stand [in accordance with the applicable Structural Section of these Specifications] using a minimum of 4 anchors.

3.03 INSPECTION

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture's recommendations.

B. Check all installed panels for proper grounding, fastening and alignment.

3.04 FIELD TESTING

A. Refer to section 26 08 00 - Commissioning of Electrical Systems.

3.05 FIELD PAINTNG

A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

END SECTION

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete lighting and receptacle systems, including lighting fixtures, receptacles, switches, and all accessories and appurtenances as shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Section 26 - Electrical

1.03 SUBMITTALS

A. Submit shop drawings showing complete construction details for all equipment in compliance with Section 1 - General Provisions.

B. Submittal shall be clearly marked showing only equipment provided. Mark through equipment option not provided.

C. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

D. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

1.04 REFERENCE STANDARDS

A. Wiring Devices shall be in compliance with the National Electrical Code, and shall be constructed in compliance with the Underwriters' Laboratories and shall be Underwriters' Laboratories labeled

1.05 QUALITY ASSURANCE (NOT USED)

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, HANDLING, AND STORAGE (NOT USED)

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components that fails in materials or workmanship within specified warranty period.

B. Warranty Period: One (1) year from date of shipment from the factory. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as

correction of defective work.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Switches:

1. Wall switches shall be of the heavy-duty specification grade, toggle action, and flush mounting quiet type.
2. Wall switches shall be of the following types and manufacturer, or equal.
    a. Single Pole: Arrow-Hart, Catalog No. 1221I, or Pass and Seymour 20AC1-I, or Leviton 1221-2I.
    b. Double Pole: Arrow-Hart, Catalog No. 1222I, or Pass and Seymour 20AC2-I, or Leviton 1222-2I.
    c. Three-Way: Arrow-Hart, Catalog No. 1223I, or Pass and Seymour 20AC3-I, or Leviton 1223-2I.
    d. Momentary Contact, 2 Circuit, Center Off: Arrow-Hart, Catalog No. 1895I, or Pass and Seymour 1250-I, or Leviton 1256-I.
    e. Weatherproof switch covers shall be Crouse-Hinds rain-tight Type DS with PVC coating where used with aluminum.
    f. Lock out attachment when used for instrument disconnect shall be NEMA 4X.
3. Switch to be installed in classified area shall be rated for application per NEC 500.

B. Receptacles:

1. Wall receptacles shall be 120 volts, single-phase, single or duplex, industrial specification hospital grade, and be of the following types:
    a. Duplex, 20A, 125V, 2P, 3W: Arrow-Hart, Catalog No. 8300I, or Pass and Seymour 9300-HG, or Leviton 8300-I.
    b. Ground fault interrupter, lockout type, duplex, 20A, 125V, 2P, 3W: Leviton 7899I.
    c. Stainless steel indoor mounting plate for GFCI receptacle: Arrow-Hart, Catalog No. S2G, or Pass and Seymour S-26N, or Leviton 84401-40.
    d. Weatherproof cover for GFCI receptacle in FS box while in use: Leviton 5997 GY.
    e. Computer or computer related equipment: Leviton 8380IG, or Pass and Seymour, Catalog No. IG6362ISP, ivory with translucent surge suppressor, 5- 20R, 20A, 125V duplex hospital grade with audible alarm.
2. Receptacles listed as weatherproof shall be provided with a watertight back box and hinged cover.
3. Receptacles to be installed in classified area shall be rated for the application per NEC 500.

C. Safety Switches

1. Safety Switches shall be of heavy duty, specification grade.

2. Switch shall be UL listed.
3. Switch shall be NEMA 4X 316ss when located outdoor.
4. Switch shall be NEMA 4X fiberglass when located in a chemical room.
5. Switch shall be NEMA 12 aluminum when located indoor in a controlled environment unless otherwise noted.
6. Switch located in classified area shall be rated for the application per NEC 500.
7. Switch shall be quick-make, quick-break construction.
8. Operating handle shall be of box mounted type that directly drives the switch mechanism suitable for padlocking in the off position with up to three padlocks. Switch shall be interlock defeat.
9. The interior shall be easily removable. The wiring gutter shall be clear of any obstructions and moving parts.
10. Fusible switch, fuse selection shall be rated for the application, minimum KAIC rating shall match the protective device on the line side of the switch.
11. Switch shall be provided with grounding kit.
12. Mount safety switches 48” above finished floor. No safety switches shall be mounted above a height that requires a ladder for access.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS (NOT USED)

2.04 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Wiring devices must be operating properly at final completion.

B. Provide hangers and support members for wiring devices as required for proper installation.

C. Provide appurtenances which include stud supports, stems, mounting brackets, frames, and plaster rings.

D. Support wiring devices from the building structure, or from furring channels. Furring channels must be a minimum of 1-1/2 inches wide.

E. Receptacle and Switch Installation:
   1. Mounting Heights (from the bottom of the device):
      a. Mount receptacles 48 inches above finished floor except finished indoor areas.
      b. Mount outdoor receptacles at least 24 inches above finished grade.
      c. Mount receptacles in control room 12 inches above finished floor.

d. Mount all wall switches 54 inches above finished floor.

e. Mount thermostats 60 inches above floor.

2. Boxes:

a. Finished areas such as offices: Flush mounted devices in aluminum boxes.

b. Other areas: Surface mounted cast aluminum metal boxes.

3. Weatherproof Receptacle Lift Covers: Install with hinge pin horizontal at top of the finished plate. Provide oversized covers for plug-in devices.

4. Install receptacles with grounded blade up.

5. Switches and receptacles shall be mounted in 4” x 4” aluminum outlet boxes concealed in the office walls.

6. Indoor and outdoor boxes shall be grounded by use of a No. 12 green insulated ground wire run with the wiring per Section 16 specification.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. All GFCI outlets shall be tested per industry standard practices and manufacturer’s recommendations.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

A. Remove debris from installation site and wipe dust and dirt from all components.

END SECTION

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish labor, materials, equipment and incidentals necessary to install enclosed switches and circuit breakers. Electrical work shall be in accordance with Section 26 – Electrical.

B. Section Includes:
1. Fusible switches.
2. Nonfusible switches.
3. Receptacle switches.
4. Molded-case circuit breakers (MCCBs).
5. Enclosures.

1.02 RELATED WORK

A. Section 26 – Electrical.

B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section 01 – General Provisions and Section 26 - Electrical Specification Sections, apply to this Section.

1.03 SUBMITTALS

A. Submit per Section 01 – General Provisions and Section 26– Electrical.

B. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and Manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
1. Enclosure types and details.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate). When the KAIC of the switch or circuit breaker is not indicated in the project plans, the KAIC shall be the same as the KAIC of the serving electrical supply connection (Switchboard, panelboard, or MCC).
4. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
5. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

C. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
1. Wiring Diagrams: For power, signal, and control wiring.

D. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked

in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

E. Manufacturer's field service report.

F. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 1 Section "Operation and Maintenance Data," include the following:
   1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.04 QUALITY ASSURANCE

A. Submit per Section 1 – General Provisions, and Section 26 – Basic Electrical Requirements.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single Manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

E. Comply with NFPA 70.

1.05 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.06 PROJECT CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:
   1. Ambient Temperature: Not less than minus 22 deg F (minus 30 deg C) and not exceeding 104 deg F (40 deg C).
   2. Altitude: Not exceeding 6600 feet (2010 m).

B. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
   1. Notify Engineer no fewer than seven days in advance of proposed interruption of electric service.
   2. Indicate method of providing temporary electric service.
   3. Do not proceed with interruption of electric service without Engineer's written permission.

4. Comply with NFPA 70E.

1.07 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

1.08 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: Two for each size and type.

PART 2 PRODUCTS

2.01 FUSIBLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. ABB/General Electric.
2. Square D.
3. Siemens.
4. Eaton/Cuttler Hammer
5. Or approved equal

B. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position. 0

D. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

5. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
    a. Hookstick Handle: Allows use of a hookstick to operate the handle.
    b. Lugs: Mechanical type, suitable for number, size, and conductor material.
    c. Service-Rated Switches: Labeled for use as service equipment.

2.02 NONFUSIBLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    1. ABB/General Electric.
    2. Square D.
    3. Siemens.
    4. Eaton/Cuttler Hammer
    5. Or approved equal

B. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.

C. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

E. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

F. Accessories:
    1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
    2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
    3. Isolated Ground Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
    4. Auxiliary Contact Kit: One NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open.
    5. Hookstick Handle: Allows use of a hookstick to operate the handle.
    6. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.03 RECEPTACLE SWITCHES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    1. Hubble.

B. Type 4, IP66 Rated, Twist lock, amp rated, combination safety switch and receptacle

C. Receptacle: Twist lock, three-phase, four-wire or five-wire receptacle (one wire connected to enclosure ground lug).

2.04 MOLDED-CASE CIRCUIT BREAKERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
1. ABB/General Electric.
2. Square D.
3. Siemens.
4. Eaton/Cuttler Hammer
5. Or approved equal

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front- mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

G. Integrally Fused Circuit Breakers: Thermal-magnetic trip element with integral limiter- style fuse listed for use with circuit breaker and trip activation on fuse opening or on opening of fuse compartment door.

H. Ground-Fault, Circuit-Interrupter (GFCI) Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (5-mA trip).

I. Provide GFI circuit breakers for heat trace circuit. The rating shall be as per NEC. Provide UL listed ground fault interrupter tripping at 30 mA for equipment ground fault protection for circuits that supply electric heat tracing.

J. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical type, suitable for number, size, trip ratings, and conductor material.

3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self- powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor. (Provide only when shown on the single line or required by code).
5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact. (Provide when indicated on drawing).
6. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay. (Provide when indicated on drawings).
7. Auxiliary Contacts: One SPDT switch with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts. (Provide when indicated on drawing).
8. Alarm Switch: One NO contact that operates only when circuit breaker has tripped. (Provide when indicated on drawing).
9. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position. (Provide when indicated on drawing).

2.05 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 4X stainless steel.
3. Corrosion Areas: NEMA 250, Type 4X fiberglass.
4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X stainless steel.
5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 4X stainless steel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Install fuses in fusible devices.

D. Comply with NECA 1.

3.03 IDENTIFICATION

A. Comply with requirements in Section 26 – Electrical.
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 FIELD QUALITY CONTROL

A. Inspect and test according to NETA ATS.

B. Perform circuit breaker inspections and tests listed in NETA ATS.

3.05 ADJUSTING

A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by Manufacturer.

B. Set field-adjustable circuit-breaker trip ranges as specified in Section 26 05 73 – Power System Studies.

END OF SECTION

SECTION 16700

COMMON CONTROL PANEL REQUIREMENTS FOR EQUIPMENT

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish and install a functional control panel to operate the control system as specified in the detailed mechanical equipment requirements of this Section.

B. Obtain all required control descriptions and data from the detailed mechanical equipment requirements to this section, the system description and the control schematic diagrams on the electrical contract drawings.

C. Provide control system engineering to produce customary elementary drawings showing interwiring and interlocking with remote devices.

D. All control devices, unless specified otherwise, shall be mounted in the control panel.

E. This section includes control panels supported by the equipment manufacturers to manually or automatically operate the mechanical equipment.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:
1. General Requirements.
2. Electrical.
3. Process Interconnections.

1.03 SUBMITTALS

A. Submit to the Owner’s Representative, in accordance with Division 1, shop drawings and product data for the following:
1. Equipment outline drawings showing elevation, plan and interior views, front panel arrangement, dimensions, weight, shipping splits, conduit entrances and anchor bolt pattern. Indicate all options, special features, ratings and deviations from this Section. Furnish complete Bill of Materials indicating manufacturer's part numbers.
2. Power and control schematics including external connections. Show wire and terminal numbers and color coding.
3. Instruction and replacement parts books.
4. Certified shop test reports.
5. As-built final drawings.
6. Field tests and inspection reports.

B. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

A. Submittal shall be clearly marked showing only equipment provided.

B. Submit letter certifying full and complete compliance with the specifications, drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reason for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.01 REFERENCE STANDARDS

A. Institute of Electrical and Electronics Engineers (IEEE).

B. National Electrical Manufacturers Association (NEMA).

C. Where reference is made to one of the above standards, the revision in effect at the time of bid opening shall apply.

1.02 QUALITY ASSURANCE

A. A factory authorized service and parts organization shall be able to respond to any service call for the project within 8 hours. Provide the name and address of the factory authorized service and parts organization nearest to the project location at the time of the bid.

B. Equipment components and devices shall be UL labeled to the extent possible wherever UL standards exist for such equipment.

C. The control panel manufacturer shall demonstrate at least three years of continuous field operating experience in control panel design and fabrication. Submit customer/user list with telephone numbers, addresses and names of customer/user representatives.

1.03 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

A. Refer to the detailed mechanical equipment specifications for description of system operation.

B. The equipment manufacturer shall furnish a complete control panel consisting of a main circuit breaker, variable frequency drive for each applicable motor, input disconnect or branch circuit protection, control power transformer, control relays, terminal blocks, control switches, and all required control and protection components necessary for a complete and functional installation. The VFD shall be sized and coordinated with the furnished motor and equipment operating requirements. The VFD shall provide motor speed control, motor overload protection, fault protection, and automatic/manual operation as required. All control components shall be mounted in one common enclosure unless otherwise indicated.

1.04 DELIVERY, HANDLING AND STORAGE

A. Package the control panel for maximum protection during delivery and storage.

B. Store the control panel indoors in a clean, dry, heated storage facility until ready for installation. Do not install the control panel in its final location until the facilities are permanently weather tight. Protect the control panel at all times from exposure to moisture, chemicals, hydrogen sulfide and chlorine gas.

1.05 MAINTENANCE/SPARE PARTS (NOT USED)

1.06 WARRANTY/EXTENDED WARRANTY

A. Manufacturer shall warrant equipment to be free from defects in materials and workmanship for a period no less than the controlled equipment warranty and a minimum of (1) year from date of substantial completion.

PART 2 PRODUCTS

2.01 MATERIALS (NOT USED)

2.02 FABRICATION

A. Rating:
1. The control panel shall operate on a power supply as indicated on drawings.
2. The overall withstand and interrupting rating of the equipment and devices shall not be less than 42,000 amperes R.M.S, symmetrical at 480 Volts. All circuit breakers and combination motor starters shall be fully rated for the above fault current interrupting capacity. Series connected short circuit ratings will not be acceptable.
3. The complete control panel assembly shall be UL certified or carry a UL listing for "Industrial Control Panels.
4. The control panel shall meet all applicable requirements of the National Electrical Code.
5. The control panel enclosure shall be in accordance with the electrical area classification indicated on the Electrical Contract Drawings

B. Components:
1. The main circuit breaker shall be a thermal-magnetic molded case breaker, Type HCL. Provide a flange mounted main power disconnect operating handle with mechanical interlock having a bypass that will allow the panel door to open only when the switch is in the OFF position.
2. A mechanical disconnect mechanism, with bypass, shall be installed on each motor circuit protector, capable of being locked in the "OFF" position to provide a means of disconnecting power to the motor.
3. Motor starters shall be provided with motor circuit protectors and equipped to provide under-voltage release and overload protection on all three phases.
   a. Motor starters shall be 2 or 3 Pole, 1 or 3-phase as required, 60 Hz, 600 Volt, magnetically operated, full voltage non-reversing except as shown on the drawings. NEMA sizes shall be as required for the horse power shown on the drawings.

b. Each motor starter shall have a 120 Volt operating coil and control power transformer. Starters shall have motor overload protection in each phase. Auxiliary contacts shall be provided as shown on the drawings. A minimum of one N.O. and N.C. auxiliary contacts shall be provided in addition to the contacts shown on the drawings.
c. Overload relays shall be adjustable ambient compensated and manually reset.
d. Control power transformers shall be sized for additional load where required. Transformer primaries shall be equipped with time-delay fuses.

4. Auxiliary contacts shall be provided for remote run indication and indication of each status and alarm condition. Additional controls shall be provided as specified herein, as required by the detailed mechanical equipment requirements, Division 26, Division 40 and as shown on the Drawings.
5. All operating control devices and instruments shall be securely mounted on the exterior door. All controls shall be clearly labeled to indicate function and shall be in accordance with the electrical area classification indicated on the Electrical Drawings. All indicator lamps, mode selector switches and push buttons shall be as specified in section 40 78 00 Panel Mounted Instruments.
6. A six-digit, non-resettable elapsed time meter shall be connected to each motor starter.
7. A failure alarm with horn and beacon light shall be provided as required by contract document. Silence and reset buttons shall be furnished.
8. The control panel shall be provided with a Surge Protective Device Unit on the load side of the main circuit breaker. Surge Protective Device shall be rated 120Ka per phase for all unit rated for 480V. Provide a surge capacitor for all the 120 panels located outdoor.
9. All interfaces between control panel and remote devices shall be isolated via an interposing relay. Interposing relays shall have contacts rated for 250 VAC and 10 Amps continuous.
10. An alternator shall be provided to sequence motors as required by contract document.
11. Intrinsically safe relays shall be solid state type with 5 Amp output contacts, suitable for use on a 120 Volt, 60 Hz power supply and shall be Factory Mutual approved for pilot devices in Class I, Division I, Group D hazardous atmospheres.
12. Control relays and timers shall be 300 Volt, industrial rated, plug-in socket type, designed in accordance with UL Standard 508 for motor controller duty. Continuous contact rating shall be 10 Amps resistive, 1/4 Hp, at 120 VAC, with an operating temperature of minus 10 to plus 55 degrees C. Ice cube relays are not acceptable.
13. Include air conditioners for panelboards located outdoors or in non-air conditioned space. Air conditioners shall be sized such that the interior components will not be degraded due to temperature when ambient temperature is -20 to 50 degrees C.
14. Panel mounted timers shall be flush mounted, plug-in type with ranges as shown on the Drawings, or as required by the detailed mechanical equipment specifications and Division 17.
15. Specific control devices, control descriptions and other data are specified under the detailed specification for the mechanical equipment with which the control panel is supplied.

C. Enclosure types:
1. The control panel enclosure specified herein shall be rated NEMA 4X made out of 316 stainless steel. Control panels located in chemical rooms shall be constructed of PVC or FRP body and door.
2. Control panels located indoors other than those listed in 2.02.C.1 shall be NEMA 12 made out of aluminum.
3. Steel enclosures shall be 14 gauge and constructed with continuously welded seams. The panel door(s) shall have continuous hinge and neoprene gasket. Door clamps shall be provided.
4. The enclosure shall incorporate a removable back panel on which control components shall be mounted. Back panel shall be secured to the enclosure with collar studs. The enclosure door shall be interlocked with the main circuit breaker by a door mounted operating mechanism. Back panel shall be tapped to accept all mounting screws. Self-tapping screws shall not be used to mount any components.
5. Print storage pockets shall be provided on the inside of the panel.
6. Overload tables shall be laminated and adhered to the inside of the door.
7. All hardware and fittings shall be 316 stainless steel.
8. Enclosures located outdoors shall be painted white in the factory.

D. Nameplate markings and identification:
1. Provide 2-in by 5-in, nominal, engraved phenolic master nameplate on the control panel fastened with stainless steel type 316 screws or rivets. Nameplate shall be black with white core, 3/8-in high lettering and shall indicate equipment designation as shown on the Drawing.
2. Provide legend plates or 1-in by 3-in engraved nameplates with 1/4-in lettering for identification of door mounted control devices, pilot lights and meters.
3. Provide permanent warning signs as follows:
   a. "Danger- High Voltage- Keep Out" on all doors.
   b. "Warning- Hazard of Electric Shock - Disconnect Power Before Opening or Working on This Unit" on main power disconnect.

E. Condensation heaters:
1. A strip heater shall be mounted inside the control panel.
2. Heater shall be rated 240V, but operated at 120V, single phase, 150 watts, with rust resisting iron sheath.
3. A control thermostat mounted inside the control Panel.
4. The strip heater terminals shall be guarded by a protective terminal cover.
5. High temperature connecting lead wire shall be used between the thermostat and the heater terminals. Wire shall be No. 12 AWG stranded, nickel-plated copper with Teflon glass insulation.

F. Wiring:
1. Power and control wire shall be 600 Volt class, Type XHHW insulated stranded copper and shall be of the sizes required for the current to be carried, but not smaller than No. 14 AWG. All wiring shall be enclosed in PVC wire trough with slotted side openings and removable cover

2. All interconnecting wires between panel mounted equipment and external equipment shall be terminated at numbered terminal blocks.
3. All control panel wiring shall be numbered at both ends with type written heat shrinkable wire markers.

G. Terminal Blocks

1. Terminal blocks shall be one-piece molded plastic blocks with screw type terminals and barriers rated for 600 volts. Terminals shall be double sided and supplied with removable covers to prevent accidental contact with live circuits. Terminals shall have permanent, legible identification, clearly visible with the protective cover removed. Each terminal block shall have 20 percent spare terminals, but not less than two spare terminals.
2. Wires shall be terminated to the terminal blocks with crimp type, pre-insulated, ring-tongue lugs. Lugs shall be of the appropriate size for the terminal block screws and for the number and size of the wires terminated.
3. Provide an AC ground bar bonded to the panel enclosure (if metal) with 20 percent spare terminals.
4. Provide an intrinsically safe ground terminal bar isolated from the control panel enclosure. Provide 20 percent spare terminals but not less than two spare terminals.
5. Terminal points for current transformer leads shall be provided with a shorting bar

2.03 CONTROLS (NOT USED)

2.04 FACTORY TEST

A. Perform manufacturer's standard production testing and inspection in accordance with NEMA and ANSI standards.

PART 3 EXECUTION

3.01 DEMOLITION/PREPARATION (NOT USED)

3.02 INSTALLATION

A. Any work not installed according to the Drawings and this Specification shall be subject to change as directed by the Owner's Representative. No extra compensation will be allowed for making these changes.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Check mechanical interlocks for proper operation. Make any adjustments required.

B. Adjust motor circuit protectors and voltage trip devices to their correct settings.

C. Install overload heaters per actual motor nameplate currents.

D. Adjust motor circuit protectors for actual motor nameplate currents.

E. In the event of an equipment fault, notify the Owner's Representative immediately. After the cause of the fault has been identified and corrected, a joint inspection of the equipment shall be conducted by the Contractor, the Owner's Representative and the control panel manufacturer's factory service technician. Repair or replace the equipment as directed by the Owner's Representative prior to placing the equipment back into service.

3.05 FIELD PAINTING

A. Repaint any damage to factory applied paint finish using touch-up paint furnished by the control panel manufacturer.

3.06 CLEANING

A. Remove all rubbish and debris from inside and around the equipment. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint-free rags. Do not use compressed air.

END OF SECTION

SECTION 26 29 93

VARIABLE FREQUENCY MOTOR CONTROLLERS

PART 1: GENERAL

1.01 SCOPE OF WORK

A. Furnish and supply microprocessor-based, solid-state variable frequency drives (VFD) rated 600V and below as indicated on plans.

B. Provide drives as proposed on plans. The size of the drives shall be verified with the equipment supplier. If larger drives are required, they shall be provided at no extra cost to the Owner. It shall be the drive suppliers' and the Contractor's responsibilities to coordinate the drive requirements with the driven equipment suppliers. The VFD's shall supply the current needed by the motors at every point of their operating curves. The Contractor shall be advised that certain factors can cause the need for a higher horsepower VFD, e.g. a low RPM motor requires more amps, which may require a larger VFD to be needed. The VFD manufacturer shall provide in writing that the motor to be used is suitable for use with the VFD.

C. Provide complete services of factory field engineers for installing, debugging, start-up, testing, and training.

D. Provide harmonic study and conduct Harmonic Distortion Testing.

E. Training of Owner Personnel: one day minimum. Training shall be conducted at Owner's facility. Coordinate schedule with owner minimum 2 weeks prior to training anticipated date.

F. Responsibility
1. The Contractor shall be responsible for the erection, installation, and start-up of the equipment covered by this Specification. The manufacturer shall furnish the services of a qualified representative to provide technical assistance of installation start-up as indicated under Part 3.
2. The variable frequency drive manufacturer shall maintain and staff engineering services personnel trained to do start-up services, emergency service calls, repair work, service contracts, and maintenance and troubleshooting training of customer personnel.
3. Coordinate the drive requirements with the driven equipment.
4. VFD manufacturer shall ensure the VFD system will not have any detrimental effect on the pump station power system.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1 01 00 00 – General Requirements.

2 01 33 00 - Submittal Procedures.

3 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Submittals shall comply with Division 1 General Requirements.

B. Complete drawings shall be furnished for approval before proceeding with manufacturing. They shall consist of elementary or control schematics including coordination with other electrical control devices operating in conjunctions with the drive, and suitable outline drawings with sufficient details for locating conduit stub-ups and field wiring.

C. Final master wiring diagrams shall be provided with delivery of the VFD's.

D. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

E. Submit a letter certifying full and complete compliance with the Specifications, Drawings, Reference Standards, Bulletins, and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals.

1.04 REFERENCE STANDARDS

A. IEEE Standard 519-2014 - IEEE Recommended Practice and Requirements for Harmonic Control in Electrical Power Systems.

B. CTI Bulletin ESG-151 (13)- Cooling Tower Institute- Variable Frequency Drive Application Guidelines for Cooling Towers.

C. NFPA 70 - National Electric Code.

1.05 QUALITY ASSURANCE

A. Manufacturer's Qualifications

1. The variable frequency drive shall be UL certified and shall comply with the latest applicable standards of ANSI, IEEE, and NEMA. The controllers shall be rated as shown on the Drawings, As a minimum, the full load output current of the controller shall be equal to the equivalent motor horsepower as listed by National Electrical Code Table 430-250.
2. Units shall fit into the space available with adequate clearance for service per manufacturer's recommendation. Submitted units, which do not meet these criteria, shall be rejected. Do not assume that all of the manufacturers listed

as acceptable manufacturers will provide a unit that will fit in the space allocated. Selection of acceptable manufacturers is not based on whether the manufacturer's standard stock unit will fit into every space allocated.

B. Acceptable Manufacturers
1. Rockwell/ Allen-Bradley,
2. Toshiba,
3. ABB
4. Square D,
5. Eaton/ Cutler Hammer.

All such VFDs are to be the same manufacturer.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. VFD's shall meet or exceed the harmonic requirements of IEEE 519 following harmonic limits at the point of common coupling (PCC) for any combination of the motor operated from 30% to 100% speeds under actual pumping conditions:
1. PCC defined as the panelboard bus.
2. Voltage: 5% total harmonic distortion (THD) per IEEE 519.
3. Current: limits for 20 < Isc/IL < 50 per IEEE 519.
4. All calculations shall be performed assuming no other load is running.

B. VFD manufacturer shall ensure the following:
1. VFD system will not have any detrimental effect on the pump station power system.
2. VFD system will not have any detrimental effect on any communications system including telephone and SCADA systems.
3. VFD system will not produce crosstalk between VFD's.
4. VFD system will not produce any electrical resonance problems.
5. VFD system will not produce any torsional resonance problems.
6. VFD torque pulsations shall not exceed 30% of the motor or pump shaft rated torque.

C. If harmonic filters are required to meet these requirements, the VFD manufacturer must select and size filtering to meet acceptable harmonic levels and provide these at no extra cost to Owner. Compliance shall be verified with on-site field measurements of the harmonic distortion at the point of common coupling with and without the VFD's operating. Refer to part 3 of this specification for description of this testing.

D. VFD system shall maintain a 0.97 minimum power factor from 10 percent to 100 percent speed. VFD system, including power factor correction and/or harmonic filter, shall never have a leading power factor under operation or at any other time. Refer to paragraph 3.04 regarding field testing of power factor.

E. It is the responsibility of the VFD supplier to obtain source impedance and other circuit data from the utility upon receipt of order. This data shall be included for information with approval data.

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

B. Deliver in sections or lengths that can be moved past obstructions in delivery path.

C. The variable frequency drive shall be protected against damage at all times. The controller shall be stored inside in a clean, dry environment with temperature and humidity within the range specified by the controller manufacturer. Space heaters shall be energized during storage, as recommended by the manufacturer. The Contractor is responsible for providing the indoor storage facility or enclosure.

1.08 MAINTENANCE/SPARE PARTS

A. The following spare parts shall be provided as a minimum:
   1. Replaceable circuit boards and recommended power electronic components.
   2. Control Fuses.
   3. Power Fuses.

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of that fails in materials or workmanship within specified warranty period.

B. Warranty Period: From date of Substantial Completion. Cost for the removal, shipment, repair, and installation by Contractor shall be included in warranty, as well as correction of defective work. Warranty shall be (5) years from date of completion of start-up and commissioning support at site by factory representative.

PART 2: PRODUCTS

2.01 MATERIALS

A. General
   1. Pulse Width Modulation (PWM), 6-pulse minimum, with harmonic mitigation as required to meet the project requirements.
   2. The VFD shall be sized as listed below, without exceeding 95% of the drive's thermal rating under the specified operating conditions
   3. As a minimum, the VFD output current rating shall be equal to or greater than the motor full-load current listed in NEC Table 430.250, or the motor nameplate full-load current, whichever is greater.

4. For 2-pole and 4-pole motors, the VFD shall be sized based on the full-load current of an 1800 RPM motor one NEMA size larger than the motor supplied, unless otherwise indicated.
5. For motors with more than 4 poles, the VFD shall be sized for a minimum of 115 percent of the motor rated full-load current.
6. The VFD shall be UL listed and shall comply with the latest applicable ANSI, IEEE, NEMA, and NEC requirements.
7. Where VFDs are provided as part of a packaged equipment control panel, the equipment manufacturer shall furnish the VFD, control panel, protection devices, control devices, wiring, and accessories as a complete coordinated assembly suitable to operate the furnished motor and equipment as intended.
8. The VFD and all associated components shall have a minimum short-circuit current rating of 65 kAIC, unless otherwise indicated on the Drawings.
4. The VFD shall have the minimum efficiencies rated below:
   a. At full load and speed: 96.5%.
   b. At 50% speed and load: 90%.

B. Bus Structure
   1. Materials:
      a. Bar:
         (i) Fabricate buses from 98 percent IACS conductive copper.
         (ii) Tin plated.
         (iii) Use full lap construction and make main bus connections using a minimum of two bolts.
      b. Cable: Tinned copper, sized according to the NEC.

2.02 **FABRICATION**

A. The variable frequency drive shall be rated 460V, 3 phase, 60 hertz, with the features for both variable torque applications motors having 1.15 service factor.
B. The output carrier frequency shall not be greater than 3kHZ.
C. The variable frequency drive shall be rated as indicated on the drawings. The controllers shall provide digitally based speed adjustment of three-phase motors. The variable frequency and voltage output shall provide constant volts per Hertz excitation for the motor up to 60 Hertz.
D. The VFD shall be able to be stopped from a local control panel without damage to the drive.
E. The variable frequency drive shall have 125% overload for up to (1) minute and 180% for up to 3 seconds.

F. The drive shall be capable of converting incoming three phase, 460V (+10 percent to 10 percent) and 60 Hertz (+2 Hertz) power to a fixed potential DC bus level in the converter section. The DC voltage shall be inverted by a pulse width modulated (PWM) inverter to a variable frequency output to simulate a usable sine wave. The controller shall maintain power factor at .975 or greater at any speed or load power factor shall never exceed unity.

G. The converter shall use a diode bridge for the conversion of AC to DC. The inverters shall use transistors as switching devices. Silicon controller rectifiers, current source inverters, and paralleling of devices are unacceptable.

H. The complete system shall be rated for and operate in an ambient temperature of 0° to 45°C and humidity of 0 to 100 percent.

I. Fans shall be furnished for VFDs as required by the manufacturer to provide air circulation and cooling. Fan operation shall be selectable for operation continuously or for automatic operation such that it runs when the VFD runs and stops when the VFD stops. Louvers, if provided, shall have externally removable filters. The filters shall be metallic and washable.

J. Fan motors shall be protected by an input circuit breaker. Fan power shall be obtained from a tap on the main control power transformer.

K. All standalone enclosures shall be 316SS. Provide cooling fans, thermostat, and air filters as needed.

L. Doors shall include metal plates for mounting up to six operator devices. Factory-mounted operator devices shall be factory wired.

M. The operating handle of the disconnect shall always remain connected to the breaker and shall not be mounted on the door. The position of the handle shall indicate ON, OFF, or TRIPPED condition of the circuit breaker. The handle shall have provisions for padlocking in the OFF position with at least three padlocks. Interlock provisions shall prevent unauthorized opening of closing of the controller door with the disconnect handle in the ON position.

N. Filters when applicable: Provide line filters to reduce harmonics and noise from propagating into the distribution system.

O. The VFD manufacturer shall evaluate the location of the motor in reference to the VFD and shall furnish and install necessary reactor inside the VFD enclosure to mitigate the reflected walls.

P. Lights, push buttons, selector switches and relays shall be NEMA 4X, 30mm, oil tight. All relays shall be of the industrial type. VFDs provided with general purpose relays will be rejected without further review.

Q. Motor Protection

1. Provide motor monitoring and protection features as described below, as shown on contract drawing and driven equipment specification.
2. The following ANSI relaying device functions shall be provided:
   a. #27 - Under voltage.
   b. #37 - Under current.
   c. #46 - Phase Reversal.
   d. #47 - Phase Sequence.
   e. #49 - I^2T Thermal Motor Overload.
   f. #50 - Instantaneous overcurrent relay.
   g. #51 - Time Overcurrent.
   h. #55 - Power Factor.
   i. #59 - Overvoltage.
   j. #81 - Frequency.
   k. #86 - Lockout/Start Inhibit.

S. Protective Devices

1. Provide protective device as shown on control schematic.

2.03 CONTROLS

A. All microprocessor control boards shall be interchangeable for all units.

B. The following standard basic control features shall be provided on the variable frequency controller:

1. Remote Start, Stop, and speed control via remote input 4-20 mA DC signal.
2. Linear independent time acceleration and deceleration adjustable setting.
3. Isolated process signal follower for 4-20 mA DC control of output frequency.
4. Process output of 4-20 mA DC for remote speed indication.
5. Variable torque performance from 4 to 60 Hertz.
6. Frequency stability of 0.5 percent for 24 hours with voltage regulation of plus or minus two percent of maximum rated output voltage.
7. Individual door mounted LED type pilot lights for indication of signals shown on control schematic.
8. 115 VAC isolated control power for operator devices. Low voltage DC control power is not acceptable. VFD manufacturer to size control power transformer for the entire load including space heaters and cooling fans plus 25% spare capacity.
9. Five-cycle logic power carry-over during utility loss of power.
10. Insensitive to input line rotation.
11. Fixed dwell time at start to increase motor starting torque.

12. Auto restart to automatically restart on phase loss, overvoltage, and undervoltage trips only.
13. Provide all necessary control relays, timers, indicating lights, etc. as shown on the Drawing. All of these devices shall be installed in the VFD enclosure.
14. Conformal coated circuit boards.

C. The following standard protective features shall be provided on the controller:
1. Input AC circuit breaker with an interlocked, padlockable handle mechanism.
2. AC input line current limiting fuses for fault current protection of AC to DC converter section.
3. Electronic overcurrent trip for instantaneous and inverse time overload protection.
4. AC input line undervoltage and phase loss protection.
5. Overfrequency protection.
6. Overtemperature protection.
7. Surge protection from input AC line transients.
8. Electrical isolation between the power and logic circuits, as well as between the 15 Volt AC control power and the static digital sequencing.
9. Ability to withstand output terminal line-to-line short circuits without component failure.
10. Input power line reactors for all units. For any protective condition 1 through 7, the controller shall trip and an internal fault relay contact shall close for remote indication/alarm.

D. The following standard independent adjustment shall be provided on the controller:
1. Minimum Speed: 4 to 40 Hertz.
2. Maximum Speed: 40 to 90 Hertz.
3. Acceleration: 0.5 to 30 Hertz per second with ranges of 0-2000 seconds for 0-60 Hz.
4. Deceleration: 0.5 to 30 Hertz per second with ranges of 0-2000 seconds for 0-60 Hz.
5. Low Frequency Boost: Up to 60 Volts at 2 Hertz.
6. Volts per Hertz: Adjustable from 3.83 to 11.5 volts per Hertz.

E. The following modifications shall be furnished with the controller:
1. Process control output signal of 4-20 mA DC, proportional to controller frequency (speed) including gain and bias adjustments.
2. Controller status relay with two Form C relay pairs, rated 2 amps resistive at 115 Volt AC for indication of on condition.
3. Fused thermostat-controlled space heaters to minimize possible condensation upon controller shutdown.
4. Human Machine Interface analyzer to monitor the performance and operating conditions of the controllers shall be panel mounted for each drive.

B. Each VFD shall utilize the communication LAN for interface with the PLC. The Contractor shall coordinate with the Owner and PLC/SCADA integrator to confirm the Owner's required communication protocol prior to procurement. The VFD supplier shall furnish

the required network communication card, support software, and accessories necessary for a complete and functional communication interface.

C. The following indication shall be provided via VFD communication LAN:
   1. VFD POWER ON, RUN, STOP AND FAULT indication.
   2. VFD input and output voltage, current, and frequency.

D. VFD could be operated and controlled via communication LAN. The following control and operation modes shall be provided:
   1. Start/Stop Command.
   2. Motor speed reference set point and feedback.
   3. VFD fault.
   4. VFD reset

2.04 FACTORY TESTS

A. Manufacturer shall submit standard test procedures to Engineer and Owner's representative with VFD shop drawings. In addition, the following tests shall be performed:
   1. Variable frequency drive power transistors and diodes shall be 100 percent inspected and tested including temperature cycling (0ºC to 50ºC) and ambient high temperature (+55ºC) load testing.
   2. All integrated circuits shall be 100 percent inspected and tested. Testing shall include pass/fail testing, temperature cycling (-20ºC to 70ºC) and ambient high temperature (+70ºC) testing.
   3. Small signal semiconductors, resistors, capacitors, and diodes shall be lot sampled (one percent AQL). Testing will include parameter, as well as functional characteristics.
   4. All printed circuit boards shall be tested under a temperature cycling (0ºC to 50ºC) 20-hour load test and then functionally tested via fault and find bench equipment prior to unit installation.

B. Certification that all of the testing above has been performed shall be provided by the variable frequency drive manufacturer.

PART 3: EXECUTION

3.01 INSTALLATION

A. Wiring and handling shall be per manufacturer's recommendations.

3.03 INSPECTION

A. Examine elements and surfaces to receive Variable Frequency Motor Controllers for compliance with installation tolerances and other conditions affecting performance. B. Check that concrete pads are level and free of irregularities.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.04 FIELD TESTING

A. Provide all testing and recording instruments as part of the field testing, at no extra cost to the Owner.

B. Make the following minimum test and checks before the manufacturer's representative is called in for testing and adjustment.
   1. Verify that all connections are completed in accordance with shop drawings.
   2. Verify supply voltage and phase sequence is correct.
   3. Check mechanical interlocks for proper operation.
   4. Test ground connections for continuity and resistance
   5. Check control circuit interlocking and continuity.
   6. Test each drive through the specified speed ranges and loads for a minimum of two hours.
   7. Test each drive by using the actual control signals for remote and local operations.
   8. Test each drive alarm function.

C. Retain a qualified representative of the manufacturer for a minimum period of 8 hours per variable speed drive (standalone) and 2 hours per variable speed drive (MCC lineup/control panel) to perform the following services:
   1. Equipment Installation:
      a. Inspect the completed installation and note deficiencies.
      b. Be present and assist the Contractor during start-up, adjusting, and field testing of the completed installation.
   2. Furnish all test forms and procedures for field testing.

D. In the event of an equipment fault, notify the Owner's Representative immediately. After the cause of the fault has been identified and corrected, a joint inspection of the equipment shall be conducted by the Contractor, the Owner's Representative and the equipment manufacturer's factory service technician. Repair or replace the equipment as directed by the Owner.

E. Make all VFD internal adjustments and all adjustments necessary for manual and automatic operation of the entire system of driven equipment.

3.05 FIELD PAINTING

A. Repaint marred and scratched surfaces with touch up paint to match original finish.

3.06 CLEANING

A. Remove all rubbish and debris from inside and around the equipment. Remove dirt, dust, or concrete spatter from the interior and exterior of the equipment using brushes, vacuum cleaner, or clean, lint-free rags. Do not use compressed air.

END OF SECTION

SECTION 26 32 13.13 - DIESEL ENGINE DRIVEN GENERATOR SETS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish and install complete Packaged engine generator systems, including accessories and appurtenances as shown on the drawings and as specified herein.

1. Engine generator set.
2. Weatherproof sound attenuated custom enclosure.
3. Fuel sub-base tank.
4. Battery and charger.
5. Exhaust silencer.
6. Spring isolators.

A total of 1 generator sets shall be provided.

1.02 RELATED WORK

A. Section 01 33 00 - Submittal Procedures

B. Division 26 – Electrical

1.03 SUBMITTALS

A. Shop Drawings

1. Furnish shop drawings showing plan and elevation views with overall and interconnection point dimensions, weight, fuel consumption rate curves at various loads, ventilation and combustion air requirements, and electrical diagrams including schematic and interconnection diagrams.
2. Furnish product data showing dimensions, weights, ratings, interconnection points and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, vibration isolators, and day tank.
3. Furnish generator data sheets including weights, excitation currents, per unit reactance’s (subtransient, transient, synchronous, negative sequence and zero sequence), motor starting capabilities (kVA), time constants (subtransient, transient, open circuit and DC) and winding resistances. Submit expected performance data for the engine generator set.
4. Furnish generator connection diagram.
5. Submit computer analysis for generator loading, motor starting, critical speed and vibratory stress.
6. Furnish enclosure sound performance data.
7. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, to indicate full conformance with the Specifications.

B. Certifications and Shop Tests

1. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

C. Operations and Maintenance Manuals

1. Provide operation and maintenance manual. Furnish instructions for installation, maintenance, normal operation and emergency operation.

1.04 REFERENCE STANDARDS

A. The following standards and codes shall be applicable:

1. IEEE32 - Standard Requirements, Terminology, and Test Procedures for Neutral Grounding Devices.
2. NFPA 110 – Standard for Emergency and Standby Power Systems.
3. NFPA 70 - National Electrical Code.
4. NFPA 37 - Standard for the installation and use of Stationary Combustion Engines and Gas Turbines.
5. UL508 - UL Safety Standard for Industrial Control Equipment.
6. UL2085 - UL Standard for Safety Protected Above Ground Tanks for Flammable and Combustible Liquids.
7. ISO8528 - Reciprocating Internal Combustion Engine Driven Alternating Current Generating Sets.
8. UL142 - Steel Above Ground Tanks for Flammable and Combustible Liquids.
9. UL2200 - Standard for Safety Stationary Engine Generator Assembly.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in packaged engine generator systems for a minimum period of ten (10) years and at least ten successful working installations of this type of equipment.

B. Acceptable Manufacturers

1. Cummins.
2. Caterpillar.
3. Generac.
4. Rehklo.

C. Services of Manufacturer’s representative

1. Training

a. Provide one day of on-site training to instruct the owner’s personnel in the proper operation and maintenance of the equipment. Review operation and maintenance

manuals, parts manuals, and emergency service procedures. Date shall be coordinated with Owner two weeks minimum prior to anticipated session.

2. Demonstration

   a. Provide system demonstration to Owner and Engineer.

   b. Simulate power outage by interrupting normal source and demonstrate that system operates to provide power that all controls are operative and that units operate satisfactorily in the event of interruption of normal power.

   c. Schedule the demonstration a minimum of two (2) weeks in advance.

D. Supplier Qualifications: Authorized local distributor of engine generator manufacturer with staffed service facilities within 50 miles of project site.

E. The engine-generator supplier shall maintain 24-hour parts and service capability within 50 miles of the project site. The distributor shall stock parts as needed to support the generator set package for this specific project. The supplier must carry sufficient inventory to cover no less than 80% parts service within 24hrs and 95% within 48 hours.

F. Generator package shall be factory assembled, and prototype tested.

G. Units shall fit into the space available with adequate clearance for service as determined by the Engineer. Submitted units, which do not meet these criteria, shall be rejected. Do not assume that all of the manufacturers listed as acceptable manufacturers will provide a unit that will fit in the space allocated. Selection of acceptable manufacturers is not based on whether the manufacturer's standard stock unit will fit into every space allocated.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS

A. Generator Set Performance

1. Steady-State Voltage Operational Bandwidth: 1 percent of rated output voltage from no load to full load.

2. Steady-State Voltage Modulation Frequency: Less than one Hz.

3. Transient Voltage Performance: Not more than 25 percent variation for 100 percent step-load. Voltage recovers to remain within the steady-state operating band within 5 seconds.

4. Steady-State Frequency Operational Bandwidth: Plus or minus 0.25 percent of rated frequency from no load to full load.

5. Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there are no random speed variations outside the steady- state operational band and no hunting or surging of speed.

6. Transient Frequency Performance: Less than 13 percent variation for a 100 percent step-load increase or decrease. Frequency recovers to remain within the steady- state operating band within 5 seconds.

7. Output Waveform: The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic and no 3rd order harmonics or their multiples. The telephone influence factor, determined according to NEMA MG 1, does not exceed 50.

8. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at the system output terminals, the system will supply a minimum of 300 percent of rated full- load current for not less than 10 seconds and then clear the fault automatically, without damage to winding insulation or any other generator system component.
9. The generator set shall be provided with a 200 amp main circuit breaker sized to carry the rated output current of the generator set. Main circuit breaker to be provided inside the generator enclosure.
10. Starting Time: The unit shall be capable of reaching full rated voltage and frequency and accepting full rated load in one step within 10 seconds after receiving a start signal, under the ambient conditions specified herein.
11. Transient Overspeed Response: During recovery from transients caused by step load increases or decreases, or resulting from 100 percent load rejection, the speed of the diesel generator shall not reach the overspeed shutdown setpoint.
12. The generator shall be capable of starting and running the following loads with an instantaneous voltage dip (as define by NEMA MG-1) not to exceed 25% using the NEMA sizing method:

B. Ratings

1. The generator set at the site shall be rated for standby duty at a minimum of 100 KW, 1800 RPM, 0.8 power factor, 480/277 VAC, 3 phase, 4 wire, 60 hertz including radiator fan and all parasitic loads.
2. The generator set shall be sized to operate at the specified load at a maximum ambient of 122° F or 50° C and altitude of 1000 feet.
3. Standby duty operation is defined per the following operational guidelines:
    a. Power is available for the duration of an emergency outage.
    b. Average Power Output = 70% of standby power.
    c. Load = Varying.
    d. Typical Hours/Year = 200 Hours.
4. Maximum Expected Usage = 500 hours/year.

1.07 DELIVERY, HANDLING AND STORAGE

A. Equipment shall be packaged to avoid breakage and shall be clearly labeled for shipment. Equipment prone to breakage during shipment will be packaged in a separate container that is also clearly labeled.

B. All connections shall be either capped or covered with a watertight material to avoid dirt, debris and moisture from reaching internal surfaces of the equipment before installation.

1.08 MAINTENANCE/SPARE PARTS

A. Furnish extra materials described below that match products installed. All materials need to be packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.

1. Fuses: 1 for every 10 of each type and rating, but not less than 1 of each.

2. Indicator Lamps: 2 for every 6 of each type used, but not less than 2 of each.
3. Filters: One set each of lubricating oil, fuel, and combustion air filters for each engine.

1.09 EXTENDED WARRANTY

A. The manufacturer's standard warranty for standby duty applications shall in no event be for a period of less than five (5) years from date of field acceptance testing of the system and shall include repair parts, labor, reasonable travel expense necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Running hours shall be limited to 500 hours annually for the system warranty by both the manufacturer and servicing distributor. The warranty shall include mandatory service calls every twelve (12) months and shall cover additional service calls as necessary for maintenance.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Engine
1. Type: Liquid-cooled, four stroke turbo-charged internal combustion engine with pressure lubrication system.
2. Fuel System: Appropriate for use of No. 2 diesel fuel.
3. Engine Speed: Not more than 1800 RPM.
4. Emissions: Engine emissions shall comply with EPA Tier 3 requirements for stationary generator sets. Generator shall also comply with all Federal, State and local emission requirements.
5. The engine governor shall be an electronic Engine Control Module (ECM) with 12- volt DC Electric Actuator. The ECM shall be enclosed in an environmentally sealed, die-cast aluminum housing which isolates and protects electronic components from moisture and dirt contamination. Speed drop shall be adjustable from 0 (isochronous) to 10%, from no load to full rated load. Steady state frequency regulation shall be +/- 6 RPM. Speed shall be sensed by a magnetic pickup off the engine flywheel ring gear. A provision for remote speed adjustment shall be included. The ECM shall adjust fuel delivery according to exhaust smoke, altitude and cold mode limits. In the event of a DC power loss, the forward acting actuator will move to the minimum fuel position.
6. Safety Devices: Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer. Individual indicating lights for each function.
7. Engine Jacket Heaters: Provide jacket water heater with circulation pump and integral thermostatic control, sized to maintain engine jacket water at 90° F and suitable for operation on 240VAC single phase, manually adjustable. Heater shall be equipped with isolation valves at the engine block to enable repairs without draining the engine coolant.
8. Engine Water Pumps: Engine-driven water pump(s) sized to maintain safe engine temperature using a 50 percent ethylene glycol and water mixture thru the engine mounted radiator.
9. Engine Mounted Radiator: Air-cooled radiator with blower type fan sized to maintain

safe engine temperature in 122° F or 50° C ambient air with 50 percent ethylene glycol solution.

10. Engine Accessories:
    a. Fuel filters, lube oil filters, intake air filters, fuel transfer pump, fuel priming pump, flex fuel lines.
    b. Fuel primary filter, Racor triplex type, 30 micron, with isolation valves, water detection and filter restriction sensors. Wire alarms to the engine control system.
    c. Engine driven charging alternator, 24 VDC, 45 amps.
11. Mounting: Mount engine, generator and cooling system on a common structural base.
12. Electric Starters: One (1) electric starting motors shall be furnished on the engine. One starter motor shall be capable of starting the engine. The starting motors shall be 12 VDC with positive engagement drive.
13. Batteries: Two (2) set of heavy-duty, diesel starting type lead-acid storage batteries, one battery string per starting motor. Provide (2) 4D battery per starter, minimum 380 amp-hour capacity. Match battery voltage to starting system. Include necessary cables and clamps and racks. Size battery system to provide minimum of five consecutive 10-second cranking cycles at minimum ambient temperature of 40 degrees F.
14. Battery heater pads: Provide battery heater pads, Kim Hotstart or equal, with thermostat and interconnecting cables. Battery pads shall be connected to the auxiliary AC panel in the enclosure.
15. Battery Charger: Two (2) set of battery chargers, 2-rate automatic type, Sens Model NRG or equal, 10 amp output. Provide dry contacts for low dc, high dc, and charger failure. The chargers shall be internally protected against overload while the engine alternator is operating. Chargers shall be UL listed.

B. Generator
    1. Each generator shall be rated as specified on 1.06.
    2. The synchronous three phase generator shall be a self-ventilated, drip-proof design in accordance with NEMA MG 1 and directly connected to the engine flywheel housing with a flex coupling.
    3. The insulation material shall meet NEMA MG-1 standards for Class H insulation and be vacuum impregnated with epoxy varnish to be fungus resistant. Temperature rise of the rotor and stator shall not exceed 105° C in a 40° C ambient. Stator windings shall be form wound construction.
    4. Each generator shall utilize a permanent magnet excitation system capable of sustaining at least 300% rated current for 10 seconds under a 3 phase symmetrical fault. The excitation system shall be of brushless construction.
    5. Voltage Regulator:
        a. The digital voltage regulator shall be microprocessor based with fully programmable operating and protection characteristics. The regulator shall maintain generator output voltage within +/- 0.5% for any constant load between no load and full load. The regulator shall be capable of sensing true RMS in three phases of alternator output voltage. The voltage regulator shall include a VAR/PF control feature as

standard. The regulator shall provide an adjustable dual slope regulation characteristic in order to optimize voltage and frequency response for site conditions. The voltage regulator shall include standard the capability to provide generator paralleling with reactive droop compensation and reactive differential compensation.

b. The voltage regulator shall communicate with the Generator Control Panel via a J1939 communication network with generator voltage adjustments made via the controller keypad. Additionally, the controller shall allow system parameter setup and monitoring, and provide fault alarm and shutdown information through the controller.

6. Provide two embedded resistance temperature detectors per phase in the stator and one per each generator bearing connected to a transducer at each generator. Monitoring of stator and bearing temperatures with alarm or shutdown shall be capable through the engine control panel.
7. Provide generator winding space heater with thermostat suitable for operation on 240VAC, single phase.
8. Mount differential current transformers supplied by the switchgear manufacturer. These current transformers shall be tied to the generator differential protective relay located in the Paralleling Switchgear.

C. Weatherproof Sounds Attenuated Enclosure

1. Provide a sound attenuated non walk-in type weatherproof enclosure with a resulting sound level not to exceed 50 dbA @ 62 feet. Enclosure shall be constructed of formed galvanized sheet metal panels. The enclosure shall be sized to adequately house the generator set and all accessories. Enclosure shall be designed for a minimum wind load rating of 100 mph.
2. Walls and roof shall be constructed of minimum 14 gauge galvanized sheet metal. The roof shall be adequately braced to support the exhaust silencers and other roof mounted components. Provide acoustic insulation and a perforated galvanized liner in the walls and roof as needed to achieve the sound level specified. Enclosure shall be equipped with 4 point lifting means to remove the enclosure from the base.
3. Provide a structural base with full steel floor engineered to support the generator, enclosure and all related accessories. All conduits shall enter through an electrical stub-up located directly under the generator terminal box. Provide four point lifting lugs suitable for lifting the entire package.
4. Provide two entrance doors on each side. Doors shall be strategically located to provide easy access and serviceability. One door shall be located directly in front of the generator terminal box. Door latches shall be refrigerator type. Door hinges and hardware shall be stainless steel.
5. Intake air shall enter the enclosure through an acoustic baffle section located in the rear wall of the enclosure and shall include birdscreen. Air intake shall be 1250 feet per minute of less or minimize water intrusion. The radiator discharge air shall pass through an acoustic baffle section or vertical discharge plenum section, which incorporates a gravity damper and birdscreen. Intake louvers shall be fixed open galvanized construction. The air handling system shall be engineered and constructed so as not to exceed a total of 0.50 inches of water gauge static pressure drop with minimal water intrusion.

6. Provide a complete pre-fabricated two-stage exhaust system to achieve the specified sound level to include internal mounting of the first stage silencer, external mounting of the second stage silencer, including stainless steel flex connector, silencer, elbow, rain cap, rain shield and silencer mounting brackets. The first stage silencer shall be internally insulated and associated internal piping wrapped with blankets. The exhaust system shall be completely assembled by the generator set supplier prior to shipment and the external second stage silencer removed for shipment.
7. Provide four (4) 12 VDC lights powered from the engine cranking batteries with spring wound 1 hour timer.
8. Enclosure shall be as manufactured by Industrial Noise Control (INCC), ACS Manufacturing or approved equal.

D. Fuel Tank Base

1. The complete generator package and sound attenuated weatherproof enclosure shall be mounted on a structural steel base that incorporates an integral double wall fuel storage tank. The base shall be designed with adequate provisions to lift and transport the complete package to the jobsite.
2. The generator sub-base tank shall be listed and labeled as UL142. The fuel tank shall be sized for 24 hours operation of the standby generator at 100% load.
3. The primary tank shall be fabricated from minimum 3/16” steel. The tank shall be designed, tested and labeled per UL requirements. Lift lugs shall be approved by UL with a 4 to 1 safety factor. The primary fuel tank and secondary tank shall be tested at 3-5 PSI air pressure as outlined in UL 142.
4. The tank shall incorporate internal stiffeners to create a smooth tank top surface and limit the accumulation of water on top of the tank. No external support beams shall be permitted on top of the tank to maintain a clear walkway around the generator. Provide a non-skid walk surface on the tank top.
5. The tank shall be clearly labeled with the label indicating the type of product, the volume capacity and the manufacturer.
6. Updraft and emergency venting systems shall be provided by tank manufacturer per UL 142 requirements. The normal vent shall extend thru the enclosure roof with a watertight penetration.
7. The tank is intended for stationary installation and in accordance with NFPA 37, NFPA 110 and Uniform Fire Code.
8. The following accessories shall be installed in the tank:
    a. Leak sensor switch installed in interstitial space and wired to generator I/O module.
    b. Low level switch set to alarm at 30% of tank capacity and wired to generator I/O module.
    c. High level switch set to alarm at 95% of tank capacity and wired to generator I/O module.
    d. Internal spill containment fill, 5 gallon capacity, affixed to the top of the tank. Provide a handle pull drain to allow spilled fuel to return to the tank.
    e. Mechanical fill limiter with tight fill adapter and high level alarm.

f. Mechanical level gauge.

g. Engine supply pick-up tube and return connections with suction drop tube.

h. Electrical stub-up, rectangular type, located directly beneath the generator power terminations.

9. Capped fuel lines for future external fuel tank storage.

E. Exhaust System

1. A two-stage exhaust system shall be provided to meet the specified sound level. The first stage silencer shall be a Silex power puck (or approved equal) with internal insulation. The second stage silencer shall be Silex cylindrical type (or approved equal) for external mounting with elbow and rain cap. Mounting brackets for external mounting on the enclosure shall be included. Provide acoustic and pressure drop report for the silencer system indicating compliance with specs.

2. Stainless steel convoluted bellows type flexible couplings shall be furnished to isolate the exhaust piping from engine vibrations.

3. Provide companion flanges and hardware for silencer and flex connectors.

F. Spring Isolators

1. Provide spring type vibration isolators with seismic restraints rated for Zone 2 requirements. The isolators shall have a minimum 1-inch deflection with vertical limit stops to control vertical land lateral movement due to load change and seismic forces. Isolators shall be sized as recommended by the manufacturer. Isolators shall be Ace Mount 824 series or equal.

2.02 FABRICATION (NOT USED)

2.03 CONTROLS

A. Engine Generator Control System

1. Provide a fully solid-state, microprocessor based, generator set control. The control panel shall be designed and built by the engine manufacturer. The control shall provide all operating, monitoring, and control functions for the generator set. The control panel shall provide real time digital communications to all engine and regulator controls via SAE J1939. The control panel enclosure shall be NEMA 1 and shall be located inside the Generator Enclosure.

2. The generator set control shall be tested and certified to the following environmental conditions:

a. –40°C to +70 C Operating Range.

b. 95% humidity non-condensing, 30 C to 60 C.

c. IP22 protection.

d. 5% salt spray, 48 hours, +38 C, 36.8V system voltage.

e. Sinusoidal vibration 4.3G's RMS, 24-1000Hz.

f. Electromagnetic Capability (89/336/EEC, 91/368/EEC, 93/44/EEC, 93/68/EEC, BS EN 50081-2, 50082-2).

g. Shock: withstand 15G.

3. The following functionality shall be integral to the control panel.
   a. The control shall include a minimum 64 x 240 pixel, 28mm x 100mm, white backlight graphical display with text-based alarm/event descriptions.
   b. The control shall include a minimum of 2-line data display.
   c. Audible horn for alarm and shutdown with horn silence switch.
   d. Multiple language capability.
   e. Remote start/stop control.
   f. Local run/off/auto control integral to system microprocessor.
   g. Cooldown timer.
   h. Speed adjust.
   i. Lamp test.
   j. Push button emergency stop button.
   k. Voltage adjust.
   l. Voltage regulator V/Hz slope - adjustable.
   m. Password protected system programming.
4. The controls shall provide the following digital readouts for the engine and generator. All readings shall be indicated in either metric or English units.
   a. Engine
      1) Engine oil pressure.
      2) Engine oil temperature.
      3) Engine coolant temperature.
      4) Engine RPM.
      5) Battery volts.
      6) Engine hours.
   b. Generator
      1) Generator AC volts (Line to Line, and Line to Neutral).
      2) Generator AC current (and Per Phase).
      3) Generator AC Frequency.
      4) Generator kW (Per Phase).
      5) Generator kVA (Per Phase).
      6) Generator kVAR (Per Phase).
      7) Power Factor (Per Phase).
   c. The following information shall be available as service data only:
      1) Fuel temperature.

2) Fuel pressure.
3) Fuel filter differential pressure.
4) Fuel consumption rate.
5) Total fuel consumed.

5. The control shall monitor and provide alarm indication and subsequent shutdown for the following conditions. All alarms and shutdowns are accompanied by a time, date, and engine hour stamp that are stored by the control panel for first and last occurrence:
   a. Engine Alarm/Shutdown
      1) Low oil pressure alarm/shutdown.
      2) High coolant temperature alarm/shutdown.
      3) Overspeed shutdown.
      4) Overcrank shutdown.
      5) High air inlet temperature alarm/shutdown.
      6) Emergency stop depressed shutdown.
      7) Low coolant temperature alarm.
      8) Low battery voltage alarm.
      9) High battery voltage alarm.
      10) Battery charger failure alarm.
   b. Generator Alarm/Shutdown
      1) Generator over voltage.
      2) Generator under voltage.
      3) Generator over frequency.
      4) Generator under frequency.
      5) Generator reverse power.
      6) Generator overcurrent.
   c. Voltage Regulator Alarm/Shutdown
6. The Controller shall include the ability to accept ten (10) programmable digital input signals. The signals may be programmed for either high or low activation using programmable Normally Open or Normally Closed contacts.
7. The control shall include the ability to operate ten (10) programmable relay output signals, integral to the controller. The output relays shall be rated for 2A @ 30VDC and consist of six (6) Form A (Normally Open) contacts and ten (10) Form C (Normally Open & Normally Closed) contacts. These signals are shown on the P&ID drawings.
8. All engine, voltage regulator, control panel and accessory units shall be accessible through a single electronic service tool. The following maintenance functionality shall be integral to the generator set control.
9. All engine, voltage regulator, control panel and accessory units shall be accessible through a single electronic service tool. The following maintenance functionality shall be

integral to the generator set control.

a. Engine running hours display.

b. Service maintenance interval (running hours or calendar days).

c. Engine crank attempt counter.

d. Engine successful starts counter.

e. 20 events are stored in control panel memory.

f. Programmable cycle timer that starts and runs the generator for a predetermined time. The timer shall use 14 user-programmable sequences that are repeated in a 7-day cycle. Each sequence shall have the following programmable set points:

1) Day of week.

2) Time of day to start.

3) Duration of cycle.

10. The control shall include Modbus TCP or MODBUS RTU Communication.

11. Provide a local, control panel mounted, annunciator to meet the requirements of NFPA 110, Level 1.

a. Annunciators shall be networked directly to the generator set control.

b. Local Annunciator shall include a lamp test pushbutton, alarm horn and alarm acknowledge pushbutton.

c. Provide the following individual light indications for protection and diagnostics.

1) Overcrank.

2) Low coolant temperature.

3) High coolant temperature warning.

4) High coolant temperature shutdown.

5) Low oil pressure warning.

6) Low oil pressure shutdown.

7) Overspeed.

8) Low coolant level.

9) High battery voltage.

10) Low battery voltage.

11) Battery charger AC failure.

12) Emergency stop.

13) Spare.

14) Spare.

12. All push buttons, selector switches and indicating lights shall be industrial rated, heavy duty oil resistance type, 30 mm. Lights shall be push to test, transformer type, and LED type.

2.04 FACTORY TESTS

A. Prior to shipment to the jobsite, each generator set package shall be tested as per the following guidelines:

1. Verify safety shutdowns as follows:
    a. Verify Emergency Stop works.
    b. Simulate low oil pressure pre-alarm.
    c. Simulate low oil pressure shutdown.
    d. Simulate high water temperature pre-alarm.
    e. Simulate high water temperature shutdown.
    f. Simulate low water level.
    g. Simulate over speed shutdown.
    h. Simulate over crank shutdown.
2. Block load the generator set at rated voltage and 0.80 power factor and record the resulting voltage dip, frequency dip and recovery time using a strip chart recorder for the following load steps:
    a. 0-25%.
    b. 0-50%.
    c. 0-75%.
    d. 0-100%.
3. After a warm-up period, perform steady state load bank testing at full rated load and 0.80 power factor for four (4) hours. Record the following parameters at 15-minute intervals:
    a. Generator voltage.
    b. Generator current.
    c. Generator frequency.
    d. Engine oil pressure.
    e. Engine coolant temperature.
    f. Engine oil temperature.
    g. Ambient air temp.
    h. Exhaust outlet temperature.
4. Correct any defects that become evident during the test and re-test as necessary until successful operation is achieved.
5. Provide certified test results within 10 days of completion of test.

PART 3 - EXECUTION

3.01 DEMOLITION/PREPARATION

A. Examine elements and surfaces to receive generators for compliance with installation

tolerances and other conditions affecting performance.

B. Check that concrete pads are level and free of irregularities.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. The Contractor shall provide manpower and equipment to manufacturer's field representative and assist with supervision of unloading, installation, adjustment, and testing of the equipment. The Contractor shall observe equipment in operation after startup and report any irregularities in equipment operation to Owner and Engineer. The Contractor shall assist equipment manufacturer in making and testing adjustments to equipment to improve its performance and to reduce operating irregularities, rough operation, vibration, and noise such that equipment operates within acceptable limits set by manufacturer and typical for other similar installations.

B. The Contractor shall install concrete equipment pad. Equipment bases shall be set level and in alignment and shall be grouted in place in accordance with supplier’s recommendations and drawings.

C. Do not cut or weld any galvanized steel component in the field. Violation of this requirement will result in rejection of affected components.

3.03 INSPECTION

A. Inspect completed installation for physical damage, proper alignment, anchorage, and grounding.

3.04 FIELD TESTING

A. Coordinate all start-up and testing activities with the Construction Manager, Engineer and Owner.

B. After installation is complete and normal power is available, the manufacturer’s local dealer shall perform the following:

1. Verify that the equipment is installed properly.
2. Check all auxiliary devices for proper operation, including battery charger, jacket water heater(s), generator space heater, remote annunciator, etc.
3. Test all alarms and safety shutdown devices for proper operation and annunciation.
4. Check all fluid levels.
5. Start engine and check for exhaust, oil, fuel leaks, vibrations, etc.
6. Verify proper voltage and phase rotation at switchgear before connecting to the load.
7. Connect the generator to building load and verify that the generator will start and run all designated loads in the plant.
8. Perform a four (4) hour load bank test at 1.0 power factor at full nameplate load using a resistive load bank and cables supplied by the local generator dealer. Observe and record

the following data at 15-minute intervals:

a. Service meter hours.

b. Volts AC - All phases.

c. Amps AC - All phases.

d. Frequency.

e. Power factor or Vars.

f. Jacket water temperature.

g. Oil Pressure.

h. Fuel pressure.

i. Ambient temperature.

j. Top off all fluids after performance test.

k. Repeat performance test in case of failure and replace the system after 3 attempts.

9. Fuel for start-up services shall be included in Contractor’s price. Generators shall be turned over to Owner with a full fuel tank.

3.05 FIELD PAINTING

A. Touch-up minor scratches and scrapes in galvanized finishes using at least three mils of zinc-rich compound conforming to Federal Specification MIL-P-26915A. Clean surface with wire brush and wipe clean with damp rag. Allow to dry before application.

B. The Contractor shall provide touch-up painting, as required, for equipment, which is delivered painted, in accordance with manufacturer's instructions for the paint system used for manufacturer's equipment.

3.06 CLEANING

A. The Contractor shall provide cleanup and disposal of unneeded or surplus materials which were delivered with equipment after installation of equipment. If the Owner desires, the Contractor shall remove unneeded or surplus materials, deliver to location designated by the Owner, and unload and place in designated storage location for the Owner's future use.

END SECTION

SECTION 16301 – AUTOMATIC TRANSFER SWITCH DOCKING STATION

PART 1 - GENERAL

1.01. GENERAL

1.02. QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ETL/UL LISTED to 1008 Standards

C. UL 50 LISTED

1.03. COORDINATION

A. Coordinate layout and installation of Generator Docking Station, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels

1.04. GUARANTEE/WARRANTY

A. Manufacturer Warranty shall be provided for a minimum of 1 Year,

1. Extended Warranty will be supplied upon at user's request at an additional charge from Manufacturer.

B. The equipment installed under this contract shall be left in proper working order

C. New materials and equipment shall be guaranteed against defects in composition, design or workmanship. Guarantee certificates shall be furnished.

PART 2 - PRODUCTS

2.01. DOCKING STATION

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. TRYSTAR: Single Purpose Docking Station
2. TRYSTAR Model No.: TATS-2
3. TRYSTAR One-Line Code: TATS-2
4. TRYSTAR Representative: https://www.trystar.com/contact/ and/or info@trystar.com

2.02. GENERAL REQUIREMENTS

A. Enclosure

1. NEMA 3R Rain-Tight Aluminum Enclosure
    i. Pad-lockable front door shall include a hinged access plate at the bottom for entry of temporary cabling that prevents unauthorized tampering while in use.
    ii. NEMA 3R Integrity shall be maintained while temporary cabling is connected during use
    iii. Front and Side shall be accessible for maintenance
    iv. Top, Side, and Bottom shall be accessible for permanent cabling
2. Powder coat
    i. Paint after fabrication shall be Hammer tone Gray

B. Phase, Neutral, and Ground Busbar

1. Material: Silver-plated Copper
2. Equipment Ground Bus: bonded to box.
3. Isolated Ground Bus: insulated from box.
4. Ground Bus: 50% of phase size.
5. Neutral Bus: Neutral bus rated 100 percent of phase bus.

C. Temporary generator and Load Bank connectors shall be Camlok style mounted on gland plate.

1. Camlok shall be Posi-Lok EO400 model and color coded according to system voltage requirements.
2. Camlok connections shall be Bus Bar Style, Cabling or Double Set Screw is not acceptable
3. Camlok connection shall be protected against accidental contact while not in use

D. Permanent Connection shall be factory installed broad range set-screw mechanical type, located behind a physical barrier

E. Transfer Switch Configuration

1. TATS Docking Station shall have integrated Rotary Transfer Switch (ATS).
    i. ATS shall have three positions – Utility/Permanent Line – OFF – Temporary Line
    ii. ATS shall be located behind pad lockable door to prevent any tampering by unauthorized personnel.
2. SBDS-4/DBDS-1

i. SBDS/DBDS shall have Kirk Key interlocked circuit breakers to serve as MTS function.
ii. Interlock circuit breakers shall be located behind pad lockable door to prevent any tampering by unauthorized personnel.

F. Short Circuit & Withstand Rating
1. Shall be minimum 200Amp 25KAIC unless otherwise indicated on drawings

G. Voltage & Amperage
1. Shall be rated for 200Amp and 480V unless otherwise indicated on drawings

H. Factory Installed Phase Rotation Monitor Device:
1. Phase monitoring relay to be Siemens 3U4512-1AR20 or equal and factory installed

I. Optional Breaker Disconnects as Indicated on Project Drawings and Manufacturer Submittal Drawings:
1. Must be UL 489 Listed Breaker
2. Breakers shall be removable for service and maintenance

J. Additional accessories shall be included in submittal drawing as follows:
1: Two Wire Auto Start
2: Battery Charger Receptacle 20A DUPLEX 125V
3: Battery Charger Receptacle 20A GFCI 125V
4: Block Heater Receptacle 30A L5-30 125V
5: 50A Twist-Lock 125V/250V
6: SCADA Terminal Port
7: Kirk Key Door Interlock
8: Listed Monitoring Device
9: Strip Heater & Thermostat
10: Surge Protection Device
11: Load Dump Receptacle
12: Utility Light/Alarm (Customer Specified)

PART 3 - EXECUTION

3.01. EXAMINATION

A. Examine elements and surfaces to receive Generator Docking Station for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected

3.02. INSTALLATION

A. Surface, Flush or Base Mounted: Determined by Application
    1. Install anchor bolts to elevations required for proper attachment to Generator Docking Station.

3.03. IDENTIFICATION

A. Comply with requirements in "Identification for Electrical Systems."
B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
C. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04. FACTORY COMMISSIONING

A. Upon completion of the installation, the docking station shall be commissioned by the Manufacturer’s factory authorized technician.
B. SCOPE OF WORK SHALL INCLUDE:
    1. Review and verify the installation of all Trystar components and verify the correct electrical flow as depicted on the one-line drawings.
    2. The Manufacturer’s authorized technician will set the long time, short time, instantaneous and ground fault protection settings on the Generator Docking Station circuit breaker(s) in accordance with the engineers specifications or as provided as part of the coordination study.
    3. Factory training for on-site personnel to educate them on how to connect the GDS to a portable generator
    4. The Manufacturer’s factory authorized technician shall, upon completion of the commissioning provide a written report to the electrical contractor and electrical engineer indicating the completion of the work.
    5. Any issue that is found during the start-up that is determined at that time to be a warranty issue will be covered by Manufacturer. Any issues that are specific to the scope for the electrical installing contractor are the sole responsibility of the installing contractor.
    6. Upon successful completion of the commissioning, Trystar will provide a complimentary 12-month warranty extension, above and beyond the 12-month manufacturer warranty.

3.05. FIELD QUALITY CONTROL

A. Third Party Tests and Inspections to include the following:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

B. Prepare test and inspection reports, including a certified report that identifies Generator Docking Station and that describes scanning results. Include notation.

END SECTION

SECTION 26 43 13 - SURGE PROTECTIVE DEVICES FOR LOW VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section includes surge protective devices (SPDs) for low-voltage power equipment.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Section 1 Specification Sections, apply to this Section.

B. Other sections that may relate to the work in this section include, but are not limited to, the following:

1. 01 33 00 - Submittal Procedures.
2. 26 00 00 – Electrical.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated, include rated capacities, operating weights, operating characteristics, furnished specialties, and accessories.

B. Product Certificates: For surge protective devices, signed by product manufacturer certifying compliance with the following standards:

1. UL 1283 - Electromagnetic.
2. UL 1449 4th Edition – UL Standard for Surge Protective Devices

C. Qualification Data: For testing agency.

D. Field quality-control test reports, including the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Failed test results and corrective action taken to achieve requirements.

E. Operation and Maintenance Data: For transient voltage suppression devices to include in emergency, operation, and maintenance manuals.

F. Submit a letter certifying full and complete compliance with the Specifications, Drawings and other project requirements. The letter shall list any exceptions or deviations from specified requirements, if any and reasons for same. Exceptions or deviation shall also be clearly marked in a separate color in submittals. Submittal will be rejected without preliminary review if the letter is not submitted.

1.04 REFERENCE STANDARDS

A. The surge protective devices referenced herein shall be designed and manufactured according

to the following standards.

1. UL 1283 – Electromagnetic Interference Filters.
2. UL 1449 4th Edition – UL Standard for Surge Protective Devices.
3. IEEE C62.41.1 – IEEE Guide on the Surge Environment in Low-Voltage (1000 V and Less) AC Power Circuits.
4. IEEE C62.41.2, IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits.
5. IEEE C62.45, IEEE Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000 V and Less) AC Power Circuits.
6. National Electrical Code: Article 285, 700, and 708.

1.05 QUALITY ASSURANCE

A. Manufacturer shall be ISO 9001 or 9002 certified.

B. The manufacturer of this equipment shall have produced similar equipment for a minimum period of (10) years. When requested by the Owner's Representative, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

C. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of suppressors and are based on the specific system indicated. Refer to Section1 Section "Product Requirements."

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.06 SYSTEM DESCRIPTION / DESIGN REQUIREMENTS

A. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner's Representative not less than two days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's Representative's written permission.

B. Service Conditions: Rate surge protection devices for continuous operation under the following conditions, unless otherwise indicated.

1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage.
2. Operating Temperature: 30 to 120 deg F (0 to 50 deg C).
3. Humidity: 0 to 85 percent, non-condensing.
4. Altitude: Less than 20,000 feet (6090 m) above sea level.

1.07 DELIVERY, HANDLING AND STORAGE

A. Handle and store equipment in accordance with manufacturer's Installation and Maintenance Manuals. One (1) copy of this document shall be provided with the equipment at time of shipment.

B. Each internally mounted SPD shall be delivered fully assembled and installed as part of the associated electrical equipment.

1.08 MAINTENANCE / SPARE PARTS (NOT USED)

1.09 EXTENDED WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of surge suppressors that fail in materials or workmanship within ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB/General Electric Company.
2. Siemens.
3. Square D.
4. Eaton/ Cutler Hammer

C. Subject to compliance with the Contract Documents, the following Manufacturers are acceptable for Control Panel and Related Equipment Protection:

1. Edco SLAC Series
2. Phoenix Contact
3. Brick Wall Model PWOM20
4. Approved Equal

2.02 480V SWITCHBOARD AND 480V MCC SUPPRESSORS

A. Surge Protective Devices with the following features and accessories:

1. Fuses, rated at 200-kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.

3. Integral disconnect switch.
4. Redundant suppression circuits.
5. Redundant or replaceable modules.
6. Arrangement with copper bus bars and for bolted connections to phase buses, neutral bus, and ground bus.
7. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
8. LED indicator lights for power and protection status.
9. Audible alarm, with silencing switch, to indicate when protection has failed.
10. One set of dry contacts rated at 5 A and 250Vac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
11. Surge-event operations counter.
12. Per UL96A service entrance SPD's shall have a nominal discharge current (In) rating of 20Ka

B. Peak Single-Impulse Surge Current Rating: 150kA/mode.

C. Connection Means: Permanently wired.

D. Protection modes and UL 1449 Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 480Y/277, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 1200V
2. Line to Ground: 1200V
3. Neutral to Ground: 1200V

2.03 PANELBOARD SUPPRESSORS

A. SPD with the following features and accessories:

1. Fuses, rated at 200-kA interrupting capacity.
2. Fabrication using bolted compression lugs for internal wiring.
3. Integral disconnect switch.
4. Redundant suppression circuits.
5. Redundant replaceable modules.
6. Arrangement with wire connections to phase buses, neutral bus, and ground bus.
7. LED indicator lights for power and protection status.
8. Audible alarm, with silencing switch, to indicate when protection has failed.
9. One set of dry contacts rated at 5 A and 250Vac, for remote monitoring of protection status. Coordinate with building power monitoring and control system.
10. Surge-event operations counter.

B. Peak Single-Impulse Surge Current Rating: 100 kA per mode

C. Protection modes and UL 1449 VPR for grounded wye circuits with voltages of 480Y/277, 208Y/120, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 1200 V for 480Y/277.
2. Line to Ground: 1200 V for 480Y/277.
3. Neutral to Ground: 1200 V for 480Y/277

2.04 CONTROL PANEL AND RELATED EQUIPMENT PROTECTION

A. Fully Integrated Component Design: All of the SPD's components and diagnostics shall be contained within one discrete assembly. SPDs or individual SPD modules that must be ganged together in order to achieve higher surge current ratings or other functionality will not be accepted.

B. Maintenance Free Design: The SPD shall be maintenance free and shall not require any user intervention throughout its life. SPDs containing items such as replaceable modules, replaceable fuses, or replaceable batteries are not acceptable. SPDs requiring any maintenance of any sort such as periodic tightening of connections are not acceptable.

C. Electrical Noise Filter: Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be up to 50 dB from 10 kHz to 100 MHz using the MIL-STD-220A insertion loss test method.

D. Internal Connections: No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be soldered, hardwired with connections utilizing low impedance conductors.

E. Power and ground connections shall be prewired within the protected equipment.

F. Local Monitoring: Visible indication of proper SPD connection and operation shall be provided. The indicator light shall indicate that the module is fully operable. The status of each SPD module shall be monitored on the front cover of the module.

G. SPD shall be Listed in accordance with UL 1449 Third Edition and UL 1283, Electromagnetic Interference Filters.

H. SPD shall be tested with the ANSI/IEEE Category C High exposure waveform (20kV-1.2/50µs, 10kA-8/20µs).

I. Protection modes and UL 1449 Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 208Y/120, 3-phase, 4-wire circuits shall be as follows:

1. Line to Neutral: 800V
2. Line to Ground: 800V
3. Neutral to Ground: 800V

J. Protection modes and UL 1449 Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 240/120, circuits shall be as follows:

1. Line to Neutral: 1200/800V

2. Line to Ground: 800V
3. Neutral to Ground: 800V

2.05 ENCLOSURES

A. Install surge protective devices in the same cabinet as the 480V panelboard and control enclosure.

PART 3 - EXECUTION

3.01 DEMOLITION / PREPARATION (NOT USED)

3.02 INSTALLATION

A. Surge protective devices specified above shall be installed manufacturer at the factory.

B. Do not energize or connect service entrance equipment, panelboards, control terminals, data terminals to their sources until surge protection devices are installed and connected.

C. Firestop caulk SPD connections.

3.03 INSPECTION

A. Check tightness of all accessible mechanical and electrical connections to assure they are torqued to the minimum acceptable manufacture’s recommendations.

3.04 FIELD TESTING

A. Check all installed panels for proper grounding, fastening and alignment.

B. Remove and replace malfunctioning units and retest.

C. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transient voltage suppression devices.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING (NOT USED)

END SECTION

SECTION 26 50 00 - LIGHTING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required and install a complete lighting system ready for operation as shown on the Drawings and as specified herein.

B. Material includes:

1. Interior luminaires and accessories.
2. Exterior luminaires and accessories.
3. Lamps.
4. Ballasts and drivers.
5. Poles.

1.02 RELATED WORK

A. Section 01 33 00 - Submittal Procedures.

B. Section 26 00 00 - Electrical.

C. Section 26 05 29 Hangers and Supports for Electrical Systems.

1.03 SUBMITTALS

A. Submittals shall be made in accordance with the requirements of Section 011, Section 26 00 00 and as specified herein.

B. Submittals shall also contain information on related equipment to be furnished under this Specification but described in the related sections listed in the Related Work paragraph above. Incomplete submittals not containing the required information on the related equipment will be returned un-reviewed.

C. Manufacturer's technical information for the materials proposed for use in the systems.

D. For all light pole foundations shown to be installed in earth, provide installation and anchoring drawings that are stamped and sealed by a licensed engineer in the state of Washington. The soil condition shall be assumed to be disturbed earth. If compaction is assumed, a compaction test shall be performed on all foundation locations, showing the minimum field density assumed in the foundation design.

E. Submit manufacturer's name and catalog data for all lighting equipment specified in this Section and on the lighting fixture schedule.

F. Shop drawings:

1. Clearly indicate luminaire type and name of the job. Contractor shall endeavor to submit all luminaires, drivers and integral controls shop drawings at one time, in one package.

Any re-submittals shall include all luminaire, driver and integral controls previously rejected or requiring further information. Specialty SSL, custom, or modified fixtures may be submitted as a separate package.

2. Reproductions of the contract drawings are not acceptable as shop drawings.
3. Indicate any dimensions and components for each luminaire that are not a standard product of the manufacturer.

G. Product Data: Provide dimensions, ratings and specific catalog number and identification of items and accessories and performance data.

H. Wiring Diagrams – as needed for special operation or interaction with other system(s)

I. Photometric Data: Where indicated below or for substitutions, supply complete photometric data for the fixture, including optical performance, rendered by NVLAP approved laboratory developed according to the methods of the Illuminating Engineering Society of North America. Submit electronically, in IESNA LM-63 standard format. Types XX and YY.

J. Submit photometric data for all substitute luminaries. Photometric reports are not required from specified manufacturers unless noted in paragraph H above.

K. Specification Sheets: If lacking sufficient detail to indicate compliance with contract documents, standard specification sheets will not be accepted. This includes, but is not limited to, luminaire type designation, manufacturer's complete catalog number, voltage, LED type, CCT, CRI, specific driver information, system efficacy, L70 life rating, and any modifications necessary to meet the requirements of the contract documents.

L. Substitutions shall include complete photometric data as outlined in paragraph H above and point by point calculations for the specific conditions on the project. Samples shall be required for consideration of any substitutions and must be submitted in accordance with the terms outlined in paragraph below. Any submittal containing lighting fixtures other than those specifically listed in the Fixture Schedule shall include an illumination study clearly indicating footcandle levels for the entire illuminated region. Maintained average illumination levels and uniformity of proposed layout must meet or exceed the combined performance of equipment listed in the Fixture Schedule and arrangement indicated on the Drawings for proposed equipment to be considered for substitution. Engineering design data will not be available to the Contractor. Therefore, a comparative illumination study shall also be submitted using the “as designed” fixtures. Both studies shall utilize identical parameters (including, but not limited to, luminaire mounting height, luminaire orientation, reflectances, light loss factors, and calculation grid). No substitutions will be considered without accompanying lighting design data**.**

M. Working Samples of all substitutions: Samples shall be 120 volts with cord and plug attached and shall include specified LEDs and all modifications necessary to meet the requirements specified in the Contract Documents.

N. Energy Efficiency:

1. Submit documentation for Energy Star qualifications for equipment provided under work of this Section.
2. Submit data indicating luminaire efficiency.

3. Submit data indicating Ballast Efficacy Factor (BEF).
4. Submit data indicating Luminaire Efficacy rating (LER).
5. Submit data indicating color rendition index of light source.

O. Submit environmental data in accordance with Table 1 of ASTM E2129 for products provided under work of this Section.

P. Manufacturer's technical information for the materials proposed for use in the systems.

1.04 REFERENCE STANDARDS

A. All lighting fixtures shall be in accordance with the National Fire Protection Association (NFPA) NFPA 70 “National Electrical Code” (NEC) and shall be constructed in accordance with the latest edition of the Underwriters Laboratories (UL) "Standards for Safety, Electric Lighting Fixtures".

B. National Energy Policy Act of 2005, Public Law No. 109-58.

C. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information.

D. NFPA 70 - National Electrical Code.

E. IESNA LM-79-08 IESNA - Approved Method for Electrical and Photometric

F. Measurements of Solid-State Lighting Products.

G. IESNA LM-80-08 IESNA - Approved Method for Measuring Lumen Maintenance of LED Light Sources.

H. IESNA LM-80-08 IESNA - Approved Method for Measuring Lumen Maintenance of LED Light Sources.

I. IESNA TM-21 – Projecting Long Term Lumen Maintenance of LED Light Sources.

J. UL 8750 – Light Emitting Diode (LED) Equipment for Use in Lighting Products.

K. OSHA 29CFR1910.7 – luminaires shall be listed by national recognized testing laboratory approved by United Stated Department of Labor, Occupational Safety and Health Administration (OSHA).

1.05 QUALITY ASSURANCE

A. The luminaires shall be manufactured in accordance with a manufacturer quality assurance (QA) program. The QA program shall include two types of quality assurance: (1) design quality assurance and (2) production quality assurance. The production quality assurance shall include statistically controlled routine tests to ensure minimum performance levels of the modules built to meet this specification. These tests shall include: CCT, CRI, Lumen output and wattage. Tests shall be recorded, analyzed and maintained for future reference.

B. QA process and test results documentation shall be kept on file for a minimum period of seven years.

C. LED luminaire designs not satisfying design qualification testing and the production quality assurance testing performance requirements described below shall not be labeled, advertised, or sold as conforming to this specification.

1.06 SYSTEM DESCRIPTION/DESIGN REQUIREMENTS (NOT USED)

1.07 DELIVERY, STORAGE AND HANDLING

A. Prior to jobsite delivery, the Contractor shall have successfully completed all submittal requirements, and present to the Owner/Engineer upon delivery of the equipment, an approved copy of all such submittals. Delivery of incomplete constructed equipment, onsite factory work, or failed factory tests will not be permitted.

B. Protect equipment during shipment, handling, and storage by suitable complete enclosures. Protect equipment from exposure to the elements and keep thoroughly dry.

C. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Repaint damaged painted surfaces to the satisfaction of the Owner/Engineer.

D. Equipment shall be installed in its permanent location shown on the Drawings within seven calendar days of arriving onsite. If the equipment cannot be installed within seven calendar days, the equipment shall not be delivered to the site, but stored offsite, at the Contractor's expense, until such time that the site is ready for permanent installation of the equipment.

E. Shipping groups shall be designed to be shipped by truck, rail, or ship. Indoor groups shall be bolted to skids. Breakers and accessories shall be packaged and shipped separately.

F. Ship laminated finish wood poles individually wrapped in moisture resistant paper.

1.08 MAINTENANCE/SPARE PARTS

1.09 EXTENDED WARRANTY

A. The manufacturer shall provide a warranty against loss of performance and defects in materials and workmanship for the Luminaires for a period of five years after acceptance of the Luminaires. Warranty shall cover all components comprising the luminaire. All warranty documentation shall be provided to customer prior to the first shipment

B. The equipment shall be warranted to be free from defects in workmanship, design, and materials. If any part of the equipment should fail during the warranty period, it shall be replaced and the unit(s) restored to service at no additional cost (including parts, labor, and travel expenses) to the Owner.

C. The manufacturer's warranty period shall run concurrently with the Contractor's warranty period. No exception to this provision shall be allowed.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Fixtures: Equal to fixtures shown on Fixture Schedule on the Drawings.

B. Lamps: Equal to General Electric, Sylvania, Philips Lighting, NLS Lighting.

C. Ballasts: Equal to Advance, General Electric, Holophane, Universal, NLS Lighting.

D. LEDs: Equal to Cree, Philips, Holophane, Inter-lux, NLS Lighting.

E. Poles:

1. Steel: Equal to KW Industries, Valmont, NLS Lighting, US Pole Co.
2. Aluminum: Equal to Union Metal, US Pole, Hapco.
3. Concrete: Equal to Union Metal, Hughes, Centrecon.
4. Fiberglass: Equal to Shakesphere, Whatley, Engineered Fiberglass Products.
5. Wood: Equal to Koppers, Ryther Purdy, Weyerhauser.

F. Luminaires

1. Each luminaire shall consist of an assembly that utilizes LEDs as the light source. In addition, a complete luminaire shall consist of a housing, LED array, and electronic driver (power supply) and integral controls as per this specification.
2. Each luminaire shall be designed to operate at an average operating temperature of 25 degrees C.
3. The operating temperature range shall be 0 degrees C to +25 degrees C.
4. Each luminaire shall meet all parameters of this specification throughout the minimum operational life when operated at the average operating temperature.
5. Nominal luminaire dimensions:

G. LED LUMINAIRE (INTERIOR AND EXTERIOR)

1. Lumen output shall not decrease by more than 30% over the minimum operational life of 50,000 hours.
2. Individual LEDs shall be connected such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
3. LED Boards shall be suitable for field maintenance or service from below the ceiling with plug-in connectors. LED boards shall be upgradable.
4. Light Color/Quality-
   a. Correlated Color temperature (CCT) range as specified, between 3000K, 4100K and 5000K shall be correlated to chromaticity as defined by the absolute (X, Y) coordinates on the 2-D CIE chromaticity chart.
   b. The color rendition index (CRI) shall be 80 or greater.

c. Color shift over 6,000 hours shall be <0.007 change in u' v' as demonstrated in IES LM80 report.

H. Power Supply and Driver

1. Driver: AccuDrive, 120 – 277 volt, UL Listed, CSA Certified, Sound Rated A+. Driver shall be > 80% efficient at full load across all input voltages. Input wires shall be 18AWG solid copper minimum.
2. Driver shall be suitable for full-range dimming. The luminaire shall be capable of continuous dimming without perceivable flicker over a range of 100% to 10% of rated lumen output with a smooth shut off function. Dimming shall be controlled by a 0-10V signal. Dimmers shall be specifically listed by the fixture manufacturer for use with the drivers supplied.
3. Driver shall be UL listed or ETL listed.
4. Maximum stand-by power shall be one Watt.
5. Driver disconnect shall be provided where required to comply with codes.
6. The electronics/power supply enclosure shall be internal to the SSL luminaire and be accessible per UL requirements.
7. The surge protection which resides within the driver shall protect the luminaire from damage and failure for transient voltages and currents as defined in ANSI/IEEE C64.41 2002 for Location Category A, where failure does not mean a momentary loss of light during the transient event.

I. Electrical

1. Operation Voltage - The luminaire shall operate from a 50 or 60 HZ ±3 HZ AC line over a voltage ranging from 120 VAC to 277 VAC. The fluctuations of line voltage shall have no visible effect on the luminous output. The standard operating voltages are 120 VAC, 277 VAC, 480 VAC.
2. Power Factor: The luminaire shall have a power factor of 90% or greater at all standard operating voltages and full luminaire output.
3. THD: Total harmonic distortion (current and voltage) induced into an AC power line by a luminaire shall not exceed 20 percent at any standard input voltage.
4. Surge Suppression: The luminaire shall include surge protection to withstand high repetition noise and other interference.
5. RF Interference: The luminaire and associated onboard circuitry must meet Class A emission limits referred in Federal Communications Commission (FCC) Title 47, Subpart B, Section 15 Non-Consumer requirements for EMI/RFI emissions.
6. Electrical connections between normal power and driver must be modular utilizing a snap fit connector. All electrical components must be easily accessible after installation and be replaceable without removing the fixture from the ceiling.
7. All electrical components shall be RoHS compliant.

J. Exit Sign:

1. UL listed. Provide with automatic power failure device with integral self- testing module

and fully automatic high/low trickle charger in a self-contained power pack. Battery shall be sealed electrolyte type; shall operate unattended; and require no maintenance, including no additional water, for a period of not less than five years. LED exit sign shall have emergency run time of 1-1/2 hours (minimum). The light emitting diodes shall have rated lamp life of 70,000 hours (minimum).

PRODUCT TYPE	WATTS/FIXTURE
All Exit Signs Fixtures	5 watts or less

K. Photometric Requirements

1. Luminaire performance shall be tested as described herein.
2. Luminaire performance shall be judged against the specified minimum illuminance in the specified pattern for a particular application.
3. Luminaire lighting performance shall be adjusted (depreciated) for the minimum life expectancy.
4. The performance shall be adjusted (depreciated) by using the LED manufacturer's data or the data from the IESNA Standard TM-21 test report, which ever one results in a higher level of lumen depreciation.
5. The luminaire may be determined to be compliant photometrically, if:
   a. The initial minimum illuminance level is achieved in 100% of the area of the specified lighting pattern.
   b. The measurements shall be calibrated to standard photonic calibrations.
   c. Add specific project requirements.

L. Thermal Management

1. The thermal management (of the heat generated by the LEDs) shall be of sufficient capacity to assure proper operation of the luminaire over the expected useful life.
2. The LED manufacturer's maximum junction temperature for the expected life (Section 1.2.9 c) shall not be exceeded at the average operating ambient.
3. The LED manufacturer's maximum junction temperature for the catastrophic failure shall not be exceeded at the maximum operating ambient.
4. The luminaire shall have an UL IC rating.
5. The Driver manufacturer's maximum case temperature shall not be exceeded at the maximum operating ambient. Thermal management shall be passive by design. The use of fans or other mechanical devices shall not be allowed.

M. Interior Luminaires and accessories

1. Provide fixtures as shown in the Lighting Fixture Schedule on the Drawings.
2. Where flat acrylic lenses are specified in fluorescent fixtures, use 100 percent virgin acrylic, pattern as indicated; 0.125-inch thickness.
3. Provide fixture housings and frames to match the ceilings called for on the Drawings.
4. Recessed Luminaires: Prewired type with thermal protection.

5. HID Luminaires: Prewired, with integral ballast.
6. Lighting Track: 1 circuit 20 ampere lighting busway for recessed mounting, by manufacturer of busway mounted luminaires. Provide as shown in Fixture Schedule.

N. Exterior Luminaires and accessories

1. Provide low temperature ballasts and power supply/drivers, with reliable starting to -20ºF

O. Emergency Lighting Battery Units

1. Emergency lighting units shall be as specified in the "Lighting Fixture Schedule" shown on the Drawings.
2. Battery units shall be of the self-contained, fully automatic type with sealed lead acid batteries, volt-meters.
3. Unit enclosures shall be compatible to their environment and units shall comply with the requirements of NFPA 70 (NEC).
4. It shall be the responsibility of the contractor to provide all necessary mounting hardware.
5. Shall be factory installed and provide a range of 800 to 1400 lm of light for 90 minutes. Output is based on the size and wattage of the luminaire.
6. Integral or remote test switch shall be provided as per specification.

P. Flexible Fixture Hangers

1. Flexible fixture hangers used in non-hazardous areas shall be type ARB and flexible fixture supports used in hazardous areas shall be Type EFH as manufactured by the Crouse-Hinds Co., similar by Appleton Electric Co; Killark a Division of Hubbell Inc.
2. Where required in Section 26 00 00, all pendent-mounted and recessed in suspended ceilings, recessed lighting fixtures shall be provided with four anti- sway supports to meet Type I seismic requirements.

Q. Fixtures

1. Refer to drawing for fixture ID and model number.

R. Lighting Pole

1. Refer to drawing for pole ID and model number.
2. Pole shaft shall be one piece.
3. Hand-hole: 4-inch x 6-1/2-inch (round poles) and 2-1/2-inch x 5-inch (square poles) with removable weatherproof cover installed 18-inches above bottom of pole. Provide matching gasketed cover plate and fasteners.
4. Non-structural steel fasteners shall be stainless steel.
5. Steel anchor bolts shall be 316 stainless steel. Nuts and washers shall be stainless steel. As recommended by pole manufacturer. Provide template, flat washers, lock washers, and 2 sets of hex nuts for each pole. Coordinate length of anchor bolts with structural slab where poles are mounted directly to concrete structure.

2.02 LIGHTING CONTROL

A. Provide occupancy sensors, manual switches or integral photocells as indicated.

B. Major corridor lighting shall be timer controlled (with dual technology occupancy sensor override) to reduce footcandles to code approved minimum at night and weekends.

C. Control of any automatic lighting systems shall be included in the Building Automation System (BAS).

2.03 OUTDOOR LIGHTING CONTROL PANEL (LCT)

A. Provide a photo/time control center with selector switches, pilot lights and of the 7-day calendar dial type suitable to operate] mechanically held relays in accordance with Section 26. When permitted by the time switch, the photocontrol operates the control center to energize whenever natural lighting falls below 25 footcandles

B. Provide manual switching for each circuit to maintain lighting “ON” or “OFF” until manually returned to the “Automatic” position. Provide a case cover to provide external accessibility of the selector switches.

C. Provide a spring driven timing motor or lithium battery to operate time switch controls at least 16 hours after power failure.

D. Provide a photocell with the control center (shipped loose).

E. Provide the control center with the capability of controlling circuits in any of the modes described below:

1. Mode A: Dusk (Photocell) On Preset (Timeswitch) Off.
2. Mode B: Dusk (Photocell) On Dawn (Photocell) Off.
3. Mode C: Preset (Timeswitch) On Preset (Timeswitch) Off.

F. Enclosure: NEMA 4X 316 stainless steel.

G. Lighting Controller

1. Lighting Controller shall have 32-channel, 365-day/astronomical time clock, with modem.
2. Large display which acts as programming interface.
3. Non-volatile memory which holds all programming indefinitely.
4. Battery back-up for time-of-day.
5. Controller shall have a minimum of eight relays.
6. Operating voltage: 120/277VAC.
7. Manual override of individual relays, zones or entire panel.
8. Provide digital switches for local control using CAT % cable and RJ45 connectors.
9. Lighting Controller Model: Pharos

2.04 FABRICATION

A. Luminaire Construction

1. Luminaire housing to have no visible welding, screws, springs, hooks, rivets, bare LEDs or plastic supports.
2. The luminaire shall be a single, self-contained device, not requiring onsite assembly for installation. The power supply and circuit board for the luminaire shall be integral to the unit.
3. Luminaires shall be fabricated from post painted cold rolled steel and shall be a rigid structure with integral T-bar clips.
4. Finish: Polyester powder coat painted with 92% high-reflective paint after fabrication.
5. Reflector: rugged one-piece cold rolled steel with embossed multi-facets, echoing the frequency of the refractor prisms to distribute soft light at multiple angles, without flashing thus reducing high luminance contrast.
6. End caps shall be sloped at 70 degrees to create depth.
7. Luminaire to have smooth transition between T-bar and reflector arch. No doorframe or exposed hardware.
8. Polymeric materials (if used) of enclosures containing either the power supply or electronic components of the luminaire shall be made of UL94VO flame retardant materials. Luminaire lenses are excluded from this requirement.
9. Integral Grid Clips required on recessed mounted luminaires along with integral tie wire mounting points.
10. Luminaire to have air removal capability as specified.
11. The assembly and manufacturing process for the SSL luminaire shall be designed to assure all internal components are adequately supported to withstand mechanical shock and vibration.

2.05 CONTROLS (NOT USED)

2.06 FACTORY TESTS (NOT USED)

PART 3 - EXECUTION

3.01 DEMOLITION/PREPATATION (NOT USED)

3.02 INSTALLATION

A. Each fixture shall be a completely finished unit with all components, mounting and/or hanging devices necessary, for the proper installation of the particular fixture in its designated location and shall be completely wired ready for connection to the branch circuit wires at the outlet.

B. All flush mounted fixtures shall be supported from the structure and shall not be dependent on the hung ceilings for their support.

C. Fixtures noted to be installed flush in suspended ceilings shall be of mounting types suited for the type ceiling involved. It shall be the responsibility of the electrical contractor to verify the

ceiling types prior to ordering fixtures.

D. Fixture to be recessed mounted in suspended lay-in grid ceiling, dry wall or other ceiling type up to 1 ½ inch thick. Contractor to verify exact ceiling type prior to ordering luminaires to insure compatibility with ceiling thickness. Provide ceiling adaptor as required to accommodate ceiling thickness up to 2 inches. Bottom of luminaire shall be flush with ceiling.

E. Flexible fixture hangers shall be used for all pendant mounted fixtures. Fixtures two feet long and larger shall be supported with a minimum of two fixture hangers.

F. Conduit run in areas with hung ceilings shall be installed in the space above the hung ceiling as close to the structure as possible. Conduits shall be supported from the structure.

G. Exterior lighting poles shall be mounted plumb.

H. Fixture locations are shown on the Drawings in approximate locations; however exact locations shall be coordinated so as to avoid conflicts with HVAC ducts, equipment, and other obstacles.

I. Where the Drawings state a particular mounting height, it shall imply that the bottom of the fixture shall be mounted at the stated mounting height above the finished floor, unless specifically noted otherwise.

J. The minimum mounting height for the bottom of lights and exit signs shall be 80 inches above the finished floor in compliance with Americans with Disabilities Act (ADA).

K. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 501.

L. Flangeless fixtures for recess mounting in drywall shall be provided with mud ring and plaster guard, install per manufacturer’s instructions.

M. Install all required hardware and mounting brackets to secure luminaires to structure per local code requirements.

N. Bond luminaires and metal accessories to branch circuit equipment grounding conductor.

O. Install lamps in luminaires and lampholders equipped with replaceable lamps.

P. Install fixtures to center or replace acoustical tile sections. Support fixtures from the building structure through the use of the ceiling support system, where the ceiling support system is designed for the lighting fixture’s weight. For lighting fixtures installed in exposed ceiling grid ceilings, provide 2 “safety clips” or “safety hooks” for securing fixture to ceiling grid, and located at opposite corners of fixture.

Q. Where “lay-in” lighting fixtures are installed in exposed grid ceilings provide a 14-gauge galvanized safety hanger wire which attaches the fixture to the building structural system to prevent the fixture from falling due to movements in ceiling suspension channels. Attach the safety wire to fixture at a point other than where safety clips are attached.

R. Provide suspended fixtures with swivel hangers and threaded rods. For single unit suspended

linear fixtures, provide twin suspension hangers.

S. Support surface lighting fixtures of more than 10 pounds in weight with threaded rods from the building structure.

T. Attach wall-mounted fixtures to outlet boxes or directly to building or structure with stainless steel mounting hardware. Apply clear silicone sealant between edges of the fixture and building surfaces (top and sides of wall mounted fixtures) where fixtures are located outdoors or in wet areas if not supplied with gaskets from the manufacturer.

U. Install plaster frames for lighting fixtures recessed in plastered ceilings.

V. Mount continuous rows of linear luminaires in straight line. Utilize alignment clips between reflectors, where applicable.

W. HID Luminaires: Use power hook hangers rated 500 pounds minimum or provide safety chain between ballast and structure. Provide safety chain between reflector and ballast.

X. Luminaire Pole Bases: Size and constructed as indicated on Drawings. Project anchor bolts 3-inches minimum above base or as required by the pole manufacturer. Install poles on bases plumb. Provide double nuts for adjustment. Grout around pole base. Provide weep hole in grout.

Y. Embedded Luminaire Poles: Depth as indicated. Install plumb.

Z. Use belt slings or non-chafing ropes to raise and set prefinished luminaire poles.

3.03 INSPECTION (NOT USED)

3.04 FIELD TESTING

A. Perform field inspection, testing, and adjusting in accordance with manufacturer's recommendations.

B. Operate each luminaire after installation and connection. Inspect for improper connections and operation.

C. Test and calibrate all controls associated with luminaires, i.e. integral photo cells and occupancy sensors.

3.05 FIELD PAINTING (NOT USED)

3.06 CLEANING

A. Clean electrical parts to remove conductive and deleterious materials.

B. Remove dirt and debris from lens enclosures.

1. For cleaning acrylic lenses or diffusers, use a feather duster or dry cotton cheesecloth to rid the lens/diffuser of any minor dust. For fingerprints, smudges, or other dirt present, use an ammonia-based cleaner (such as Windex) and wipe carefully with cotton cheesecloth (so as to avoid injury from any prismatic texture of the lens).

2. Job site contamination may not necessarily be removed using the above recommendations. In that case the lens would need to be replaced.

C. Clean photometric control surfaces as recommended by manufacturer.

D. All fixtures shall be left in a clean condition, free of dirt and defects, before acceptance by the Engineer.

END SECTION

SECTION 310513 - SOILS FOR EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Subsoil.
2. Topsoil.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-in. Drop.
2. AASHTO T 310 - Standard Method of Test for In-Place Density and Moisture Content of Soil and Soil–Aggregate by Nuclear Methods (Shallow Depth)

B. ASTM International:

1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).
2. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).
3. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
4. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 013300 – Submittal Procedures: Requirements for submittals

B. Product Data: Submit name of imported materials source.

C. Testing Results: Submit gradation, standard proctor & optimum moisture content, from a qualified testing firm.

D. Source Quality-Control Submittals: Indicate results of shop tests and inspections.

1.4 QUALITY ASSURANCE

A. Perform Work according to Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31,2025 and Washington State Department of Transportation Standard Specifications.

B. Furnish each subsoil and topsoil material from single source throughout Work.

PART 2 - PRODUCTS

2.1 TOPSOIL

A. Type S1: Excavated material, up to 18 inches below stripped surface, free of rocks larger than 3 inches, roots, refuse, brush and other debris.

2.2 SUBSOIL

A. Type S2: Excavated material below Topsoil Type S1 which fits the U.S.C.S. soil texture Class “SP”, free of rocks larger than 3 inches, roots, refuse, brush or other debris.

B. Type S3: Excavated material below Topsoil Type S1 which fits the U.S.C.S. soil texture class “SM” or “ML”, uncemented, free of rocks larger than 3 inches, roots, refuse, brush and other debris.

C. Type S4: Excavated material below Topsoil Type S1 which fits the U.S.C.S. soil texture class “CL” with a liquid limit between 26% and 40% and a plasticity index between 4 and 22, free of rocks larger than 3 inches, roots, refuse, brush and other debris.

D. Type S5: Excavated material below Topsoil Type S1 which does not meet the requirements established for Subsoil Type S2, S3, S4 classification (e.g. cemented soil), free of rocks larger than 3 inches, roots, refuse, brush and other debris.

E. For other Uncrushed Aggregates see Section 310516.

2.3 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Testing and Analysis:

1. Subsoil Material: Comply with AASHTO T 310.
2. Topsoil Material: Comply with AASHTO T 310.
3. If tests indicate materials do not meet specified requirements, change material and retest.

C. Compaction
1. See minimum relative compaction percentages within Section 023200 – Geotechnical Engineering Evaluation.

2. Topsoil/ Finished Grade
   a. All areas not specified in this section or Section 023200 – Geotechnical Engineering Evaluation shall be compacted to a density of no less than 95%.

D. Owner Inspection:

1. Make subsoil and topsoil available for inspection at source prior to hauling.
2. Notify Owner at least seven days before inspection is allowed.

E. Owner Witnessing:

1. Allow witnessing of source testing at supplier's test facility.

2. Notify Owner at least seven days before tests are scheduled.

F. Certificate of Compliance:

1. If supplier is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at source conforms to Contract Documents.
2. Specified source tests are not required for Work performed by approved supplier.

PART 3 - EXECUTION

3.1 INSTALLATION OF SUBSOIL AND TOPSOIL

A. Excavation:

1. Excavate subsoil and topsoil as necessary to complete the Work.
2. Strip topsoil to full depth of topsoil in designated areas.
3. Remove excess excavated subsoil and topsoil not intended for reuse from Site.
4. Remove excavated materials not meeting requirements for subsoil and topsoil materials from Site.

B. Stockpiling:

1. Stockpile excavated material meeting requirements for subsoil and topsoil materials.
2. Stockpile materials on Site at locations as at approved staging areas.
3. Stockpile in sufficient quantities to meet Project schedule and requirements.
4. Separate differing materials with dividers or stockpile apart to prevent intermixing of soil types or contamination.
5. Direct surface water away from stockpile to prevent erosion or deterioration of materials.
6. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching until they are disposed.

3.2 CLEANING

A. Section 017000 – Execution and Closeout Requirements: Requirements for cleaning.

B. Stockpile:

1. Remove stockpile and leave area in pre-existing condition, including stabilization and revegetation if required.

2. Grade Site surface to prevent freestanding surface water.

END OF SECTION 310513

SECTION 310516 - AGGREGATES FOR EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Coarse aggregate.
2. Fine aggregate.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 11: Materials Finer Than No. 200 Sieve in Mineral Aggregated by Washing
2. AASHTO T 27: Sieve Analysis of Fine and Course Aggregates.
3. AASHTO T 96 – Los Angeles Abrasion Test
4. AASHTO T 99 – Moisture-Density Relations of Soils using 5.5-pound Rammer with a 12-inch Drop
5. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base, and Surface Courses.
6. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and an 18-inch Drop.
7. AASHTO T 310 - Standard Method of Test for In-Place Density and Moisture Content of Soil and Soil–Aggregate by Nuclear Methods (Shallow Depth)
8. AASHTO T 335: Determining the Percentage of Fracture in Cover Aggregate.

B. ASTM International:

1. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3)
4. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
5. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
6. ASTM D6938 - Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit name of imported materials source.

C. Samples: Submit, in airtight containers, one (1), 45-lb sample of each type of aggregate to testing laboratory for gradation, sand equivalent, Los Angeles abrasion loss, liquid limit and plasticity index that meet minimum requirements of the Contract Documents.

D. Supplier's Certificate: Certify that products meet or exceed specified requirements.

E. Source Quality-Control Reports: Indicate results of shop tests and inspections.

1.4 QUALITY ASSURANCE

A. Perform Work according to Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31, 2025 and Washington State Department of Transportation Standard Specifications.

B. Furnish each coarse and fine aggregate material from single source throughout Work.

C. Maintain one (1) Copy of each standard affecting Work of this Section on Site.

PART 2 - PRODUCTS

2.1 COARSE AGGREGATE

A. Type A1 Gravel Borrow:
1. Aggregate for gravel borrow shall consist of granular material, either naturally occurring or processed, and shall meet the following requirements for grading and quality per WSDOT 9-03.14(1):

Sieve Size	Percent Passing
4″	99-100
2″	75-100
No. 4	50-80
No. 40	30 max.
No. 200	7.0 max.
Sand Equivalent	50 min.

All percentages are by weight.

B. Type A2 Crushed Surfacing – Base Course and Top Course:

1. Crushed surfacing shall be manufactured from ledge rock, talus, or gravel in accordance with the provisions of WSDOT Standard Specifications Section 4-01. The materials shall be uniform in quality and substantially free from wood, roots, bark, and other extraneous material and shall meet the following quality test requirements:

Los Angeles Wear, 500 Rev.: 35 percent max.
Degradation Factor – Top Course: 25 min.
Degradation Factor – Base Course: 15 min.

Crushed surfacing of the various classes shall meet the following requirements for grading and quality per WSDOT Section 9-03.9(3). The fracture requirement shall be at least one fractured face and will apply to the combined aggregate retained on the No. 4 sieve in accordance with FOP for AASHTO T 335. The portion of crushed surfacing retained on a No. 4 sieve shall not contain more than 0.15 percent wood waste.

Sieve Size	Base Course	Top Course and Keystone
	Percent Passing	
1¼″	99-100	
1″	80-100	
¾″		99-100
⅝″	50-80	
½″		80-100
No. 4	25-45	46-66
No. 40	3-18	8-24
No. 200	7.5 max.	10.0 max.
% Fracture	75 min.	75 min.
Sand Equivalent	40 min.	40 min.

All percentages are by weight.

Type A2a Aggregate for Gravel Base:
Gravel base shall consist of granular material, either naturally occurring or processed. It shall be essentially free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact readily, and the maximum particle size shall not exceed 8 inches in diameter or ⅔ of the depth of the layer being placed. Gravel base shall meet the following requirements for grading and quality per WSDOT Section 9-03.10. Gravel base material retained on a No. 4 sieve shall contain not more than 0.20 percent by weight of wood waste.

Sieve Size	Percent Passing
2″	75-100
No. 4	22-100
No. 200	0-10
Dust Ratio:	⅔ max.
Sand Equivalent	30 min.

All percentages are by weight.

2.2 FINE AGGREGATE

A. Type A3 Gravel Backfill for Pipe Zone Bedding:

Gravel backfill for pipe zone bedding shall consist of crushed, processed, or naturally occurring granular material. It shall be free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact and shall meet the following Specifications for grading and quality per WSDOT 9-03.12(3).

Sieve Size	Percent Passing
1½″	99-100
1″	75-100
⅝″	50-100
No. 4	20-80
No. 40	3-24
No. 200	10.0 max.
Sand Equivalent	35 min.

All percentages are by weight.

If, in the opinion of the Engineer, the native granular material is free from wood waste, organic material, and other extraneous or objectionable materials, but otherwise does not conform to the Specifications for grading and Sand Equivalent, it may be used for pipe bedding for rigid pipes, provided the native granular material has a maximum dimension of 1½ inches.

2.3 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Testing and Analysis:

1. Coarse-Aggregate Material: Comply with AASHTO T 310.
2. Fine-Aggregate Material: Perform according to AASHTO T 99, or AASHTO T 310.
3. If tests indicate materials do not meet specified requirements, change material and retest.

C. Owner Inspection:

1. Make coarse aggregate and fine aggregate available for inspection at source prior to hauling.
2. Notify Owner at least seven days before inspection is allowed.

D. Owner Witnessing:

1. Allow witnessing of source testing at supplier's facility.
2. Notify Owner at least seven days before tests are scheduled.

E. Certificate of Compliance:

1. If supplier is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at source conforms to Contract Documents.
2. Specified source tests are not required for Work performed by approved supplier.

PART 3 - EXECUTION

3.1 EXCAVATION

A. Excavate aggregate materials from Site locations as necessary to complete the Work and as specified in Sections 312316 "Excavation." and 312316.13 "Trenching."

B. Remove excess excavated coarse aggregate and fine aggregate materials not intended for reuse from Site.

C. Remove excavated materials not meeting requirements for coarse aggregate and fine aggregate from Site.

3.2 STOCKPILING:

A. Stockpile materials on Site at approved staging areas.

B. Stockpile excavated material meeting requirements for coarse aggregate and fine aggregate materials.

C. Stockpile in sufficient quantities to meet Project schedule and requirements.

D. Separate different aggregate materials with dividers or stockpile apart to prevent intermixing of aggregate types or contamination.

E. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

F. Stockpile unsuitable materials on impervious material and cover to prevent erosion and leaching until they are disposed.

3.3 CLEANING

A. Section 017000 – Execution and Closeout Requirements: Requirements for cleaning.

B. Stockpile:

1. Remove stockpile and leave area in pre-existing condition, including stabilization and revegetation if required..
2. Grade Site surface to prevent freestanding surface water.

3. Leave unused materials in neat, compact stockpile at Owner approved locations.

END OF SECTION 310516

SECTION 312316.00 - EXCAVATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Soil densification.
2. Excavating for building foundations.
3. Excavating for paving, and parking areas.
4. Excavating for slabs on grade.
5. Excavating for Site structures.
6. Excavating for landscaping.

B. RELATED REQUIREMENTS
1. Section 023200 Geotechnical Engineering Evaluation
2. Section 026100 Soil and Groundwater Management Plan

1.2 REFERENCE STANDARDS

A. OSHA 1926.651 Excavations.

B. OSHA 1910.146 Confined Spaces

C. OSHA 1926.1410 Operations around Power Lines

D. OSHA 1910.120 Hazardous Material Operations

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:

1. Indicate soil densification grid for each size and configuration footing requiring soil densification.
2. Excavation Protection Plan:

a. Describe sheeting, shoring, and bracing materials and installation, as required, to protect excavations and adjacent structures and property.
b. Submit signed and sealed Shop Drawings with design calculations and assumptions to support plan.

C. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

D. Qualifications Statement: Submit qualifications for licensed professional.

1.4 QUALIFICATIONS

A. Contractor shall evaluate required shoring system and provide shoring design by a Professional Engineer registered in the State of Washington. Contractor to maintain dewatering per Section 312319.

1.5 DEFINITIONS

A. Typical Excavation
   1. This classification shall include all soils and loose, broken and laminated rock or stones and boulders which can be reasonably ripped, broken, and removed with skillfully operated, power-driven excavating equipment of the capacities of a hydraulic excavator with a minimum power rating of 120 fly wheel HP with a minimum bucket curling force of 25,000 pounds and a minimum stick-crowd force of 18,700 pounds, while equipped with a short tip radius rock bucket or equivalent.

B. Rock Excavation
   1. This classification shall include all rock masses which cannot be excavated as specified under “Typical Excavation” and isolated boulders exceeding 1 cubic yard in size.

C. Unsuitable Material
   1. Native material that is deemed unsuitable for reuse in trench backfill or as subbase as defined by Section 023200 – Geotechnical Engineering Evaluation
   2. Native material that is deemed contaminated soil, impacted soil, or dangerous/ hazardous waste as defined by Section 026100 – Soil and Groundwater Management Plan.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:
   1. Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31, 2025
   2. Section 026100 – Soil and Groundwater Management Plan from GeoEngineers dated March 12, 2026
   3. The Washington State Department of Transportation Standard Specifications.

PART 3 - EXECUTION

3.1 PREPARATION

A. Utility Service Locator:
   1. The Contractor is responsible for knowing and avoiding the location of all utilities. For Washington Utility Notification Center call toll free 1-800 (424)-5555 at least two (2) working days before beginning construction.
   2. Request underground utilities to be located and marked within and surrounding construction areas.

3. Identify required lines, levels, contours, and data.

B. Existing Utilities:

1. Notify appropriate utility company if utilities need to be removed or relocated.
2. Protect from damage utilities indicated to remain.

C. Protect plant life, lawns, and other features designated to remain as portion of final landscaping.

D. Protect benchmarks, survey control points existing structures, fences, and sidewalks from excavating equipment and vehicular traffic.

E. Do not close or obstruct roadways, sidewalks, or hydrants without permits.

F. Erect and maintain temporary barriers and security devices as required for Work including warning signs, warning lights, and similar measures, for protection of public, Owner, and existing improvements indicated to remain.

3.2 EXCAVATION

A. Underpin adjacent structures which may be damaged by excavation Work.

B. Excavate subsoil to accommodate building foundations, slabs on grade, paving, Site structures, and construction operations.

C. Compact disturbed load-bearing soil in direct contact with foundations to original bearing capacity, as specified in Section 312323 "Fill" and Section 312316.13 "Trenching".

D. Slope banks with machine to angle of repose or less until shored. Excavations shall be dug in accordance with OSHA Safety and Health Standards for Construction (29CFR1926). If excavations cannot be sloped back use proper shoring or piles.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation.

F. Trim excavation and remove loose matter.

G. Notify Engineer of unexpected subsurface conditions.

H. Correct over-excavated areas as specified in the Project documents.

I. Stockpile excavated material in area designated on Site as specified in Section 310513 "Soils for Earthwork." and 310516 "Aggregates for Earthwork."
1. Stockpile excavated native material and test in in accordance with Section 026100 – Soil and Groundwater Management Plan.

J. Repair or replace items indicated to remain that have been damaged by excavation.

K. Contractor to place a minimum of 2 feet of structural fill under all structures unless otherwise specified. If contractors' operations cause pumping of the subgrade, contractor is responsible to repair subgrade and provide necessary subgrade improvements to support contractor activity.

L. Contractor must stop and notify Engineer immediately upon discovery of possible Rock Excavation and shall not proceed until Engineer and Contractor have agreed upon extents and quantity of rock excavation. The Contractor shall demonstrate to the satisfaction of the Engineer, that the rock excavation he expects to be paid for, conforms to the definition within this Specification. The demonstration may be waived, if in the opinion of the Engineer, that the rock location and consistency is well defined. Should the Engineer and the Contractor disagree as to the rock quantities and/or location, it shall be the Contractor's responsibility to demonstrate to the satisfaction of the Engineer, that the rock conforms to these Specifications.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Tests and Inspections:

1. Request visual inspection of bearing surfaces by Engineer before installing subsequent Work.

3.4 PROTECTION

A. Prevent displacement or loose soil from falling into excavation, and maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

C. Protect structures, utilities, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards that may be created by earth operations.

END OF SECTION 312316.00

SECTION 312316.13 - TRENCHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Excavating trenches for utilities from outside buildings and structures to end of utility location.
2. Excavating trenches for interconnecting buried process piping.
3. Compacted fill from top of pipe bedding to subgrade elevations.
4. Backfilling and compaction.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:
1. AASHTO T 11: Materials Finer than No. 200 Sieve in Mineral Aggregated by washing
2. AASHTO T 27: Sieve Analysis of Fine and Coarse Aggregates.
3. AASHTO T 99: Moisture-Density Relations of Soils Using a 5.5-pound rammer and a 12-inch drop.
4. AASHTO T 176: Plastic Fines in Graded Aggregates and Soils by Use of the Sand Equivalent Test.
5. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.
6. AASHTO T 310: In-Place Density and Moisture Content of Soil and Soil Aggregate by Nuclear Methods.

B. ASTM International:

1. ASTM D698 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3).
2. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D 2487: Classification of Soils for Engineering Purposes.
6. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
7. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Excavation Protection Plan: Describe sheeting, shoring, and bracing materials and installation required to protect excavations and adjacent structures and property; include structural calculations to support plan.

1.5 QUALITY ASSURANCE

A. Perform Work according to Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31, 2025.

B. Perform Work according to Section 026100 Soil and Groundwater Management Plan from GeoEngineers dated March 12, 2026.

C. Perform Work in accordance with Washington State Department of Transportation Standard Specifications.

D. Maintain (1) copy of each standard affecting work of this Section on Site.

1.6 QUALIFICATIONS

A. Contractor shall evaluate required shoring system and provide shoring designed by a Professional Engineer registered in the State of Washington.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 COORDINATION

A. Section 013000 - Administrative Requirements: Coordination and project conditions.

B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Native Trench Backfill
   1. Excavated material free of cinders, ashes, refuse, organic and frozen material, cobbles or boulders with a greatest dimension exceeding 8 inches, or other unsuitable material.
   2. Material with excessive or defective moisture content will not be considered as unsuitable if the moisture content can be adjusted to a level allowed to obtain compaction.
   3. If suitable native material, as determined by the Engineer, is not used for backfilling, import suitable backfill material at no additional cost to the Owner.

B. Imported Trench Backfill
   1. Aggregate for gravel base conforming to Section 310516.

PART 3 - EXECUTION

3.1 LINES AND GRADES

A. Lay pipes to lines and grades indicated on Drawings.

   1. Engineer reserves right to make changes in lines, grades, and depths of utilities when changes are required for Project conditions.

B. Use laser-beam instrument with qualified operator to establish lines and grades.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. The Contractor is responsible for knowing and avoiding the location of all utilities. For Washington Utility Notification Center call toll free 1-800 (424)-5555 at least two (2) working days before beginning construction.

   1. Request underground utilities to be located and marked within and surrounding construction areas.

C. Identify required lines, levels, contours, and datum locations.

D. Protect plant life, lawns, and other features remaining as portion of final landscaping.

E. Protect benchmarks, survey control points existing structures, fences, and sidewalks from excavating equipment and vehicular traffic.

F. Maintain and protect above and below grade utilities indicated to remain.

G. Establish temporary traffic control when trenching is performed in public right-of-way. Relocate controls as required during progress of Work.

3.3 TRENCHING

A. Excavate all subsurface materials required for utilities to the lines, grades, and elevations indicated and necessary to complete the Work.

B. Remove lumped subsoil, boulders, and rock as specified in Section 312323 “Fill”.

C. Perform excavation in vicinity of existing utility service in accordance with utility's requirements.

D. Do not advance open trench more than allowed on the approved Phasing Plan ahead of installed pipe.

E. Cut trenches to width required to complete the Work indicated on the Construction Drawings. Remove water or materials that interfere with Work. Contractor shall limit trench size to extents possible.

F. Excavate trenches to depth required to complete the Work indicated on the Construction Drawings. Contractor shall limit trench size to extents possible.

G. Provide uniform and continuous bearing and support for bedding material and pipe.

H. Do not interfere with 45-degree bearing splay of foundations.

I. When Project conditions permit, slope side walls of excavation at a 1 to 1 back slope starting 5 feet from bottom of trench. When side walls cannot be sloped, provide sheeting and shoring to protect excavation as specified in this section.

J. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Engineer until suitable material is encountered.

K. Contact the Engineer upon discovery of soft, unsuitable, or unstable material that will not uniformly support the pipe or when excavation is beyond the neat line excavation limits. The Engineer will determine the limits of unsuitable soils.

L. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.

M. Correct areas over excavated areas with compacted backfill as specified for authorized excavation or replace with fill concrete as directed by Engineer.

N. Stockpile excavated material in area designated on site in accordance with Section 310513 Soils for Earthwork and 310516 Aggregates for Earthwork.

3.4 SHEETING AND SHORING

A. Sheet, shore, and brace excavations to prevent danger to persons, structures, and adjacent properties and to prevent caving, erosion, and loss of surrounding subsoil. Sheet and shore in accordance with OSHA Safety and Health Standards for Construction (29CFR1926).

B. Support trenches more than 5 feet deep excavated through unstable, loose, or soft material. Provide sheeting, shoring, bracing, or other protection to maintain stability of excavation.

C. Design sheeting and shoring to be removed at completion of excavation work.

D. Repair damage caused by failure of the sheeting, shoring, or bracing and for settlement of filled excavations or adjacent soil.

E. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring, or bracing.

3.5 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.

B. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.

C. Place fill material in continuous layers and compact in accordance with testing and compaction section below.

D. Employ placement method that does not disturb or damage utilities in trench.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Do not leave more than 50 feet of trench open at end of working day.

G. Protect open trench to prevent danger to Owner.

3.6 TOLERANCES

A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1 inch from required elevations.

B. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.7 FIELD QUALITY CONTROL

A. Perform laboratory material tests in accordance with ASTM D698. .

B. Perform in place compaction tests in accordance with the following:

1. Density Tests: AASHTO T 310
2. Moisture Tests: AASHTO T 180.

C. When tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest.

3.8 PROTECTION

A. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.9 TESTING & COMPACTION

A. Trench Backfill
1. Compaction Requirements – see Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31,2025.

2. Frequency of Density Testing.

MATERIAL	**FREQUENCY**
TRENCH BACKFILL ≥ 4’ BELOW SUBGRADE	1 test per 100 LF per lift (8” max lift)
TRENCH BACKFILL < 4’ BELOW SUBGRADE	1 test per 100 LF per lift (8” max lift)
SUB GRADE (UNDER PAVEMENT)	1 test per 300 LF at design subgrade
SUB GRADE (NON-PAVEMENT)	1 test per 10,000 SQFT at finish grade
SUB-BASE	1 test per 300 LF per lift (6” max lift)
BASE COURSE	1 test per 300 LF per lift (6” max lift)
GRAVEL	1 test per 1,000 LF per lift

3. Frequency of Field Sampling

MATERIAL	**FREQUENCY**
TRENCH BACKFILL	2 tests at random
SUB-BASE	1 test per 650 Cubic Yards
BASE COURSE	1 test per 650 Cubic Yards

4. Wetting: Wet to optimum moisture content ±3%.

5. Compaction Method: Mechanical.

6. Aggregate & pipe bedding shall meet Section 310516.

7. If densities fail to meet minimum requirements, provide necessary additional compactive effort until backfill densities meet specified requirements at no additional cost to Contract.

END OF SECTION 312316.13

SECTION 312319 - DEWATERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Temporary Dewatering system.
2. Surface water control system.
3. Monitoring wells.
4. System operation and maintenance.
5. Water disposal.

B. RELATED REQUIREMENTS
1. Section 023200 Geotechnical Engineering Evaluation
2. Section 026100 Soil and Groundwater Management Plan

C. No portion of the Owners dewatering system may be used as the Contractor’s dewatering system. Contractor shall submit engineered dewatering plans per the Contract Document.

1.2 DEFINITIONS

A. Dewatering:

1. Lowering of ground water table and intercepting horizontal water seepage to prevent ground water from entering excavations and trenches.
2. Reducing piezometric pressure within strata to prevent failure or heaving of excavations and trenches.
3. Disposing of removed water.

B. Piezometer: A tube inserted into a vessel or pipe to indicate the height (pressure) that a liquid can rise in the tube.

C. Surface Water Control: The removal of surface water within open excavations.

1.3 REFERENCE STANDARDS

A. Washington State Department of Transportation Standard Specifications 6-20.3(5)A and 8-01.3(1)C1

B. Stormwater Management Manual for Eastern Washington.

1.4 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section to permit following construction operations to be completed on dry and stable substrate:

1. Excavation for structures as specified in Section 312316.00 - Excavation.
2. Trenching for utilities as specified in Section 312316.13 - Trenching.

1.5 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Contractor shall have a dewatering plan available to discuss during the Preconstruction Conference.
1. Verify availability of Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review condition of site to be dewatered including coordination with temporary erosion-control measures and temporary controls and protections.
3. Review Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers
4. Review Section 026100 Soil and Groundwater Management Plan from GeoEngineers
5. Review proposed site clearing and excavations.
6. Review existing utilities and subsurface conditions.
7. Review observation and monitoring of dewatering system.

1.6 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Sequence Work of this Section to obtain required permits before start of dewatering operations.

C. Sequence Work of this Section to install and test monitoring systems minimum seven (7) days before testing and operating dewatering systems.

D. Sequence Work of this Section to install and test dewatering and surface water control systems minimum seven (7) days before starting excavation and trenching.

1.7 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Dewatering Plan
1. Dewatering plan to be prepared by or under the supervision of a Qualified Professional Engineer.
2. Contractor shall have a dewatering plan. The Dewatering Plan shall include all provisions and precautions to be taken by the Contractor regarding the handling of ground water. The Plan must be specific and complete, including items such as schedule, intake and discharge locations, capacities of equipment, elevations, and all other incidental items necessary and/or required to insure proper protection.

3. The Contractor shall be fully responsible to ensure the success of the dewatering program. Including standby backup along with any and all provisions necessary for successful dewatering pumping.
4. Include sampling, containment, treatment, discharge, and contingency measures. Include analytical testing plan for groundwater characterization.in accordance with Section 026100 Soil and Groundwater Management Plan (SGMP).

C. Reports:

1. Initial Installation Report:

a. Installation and development reports for well points and pumps.
b. Installation and baseline reports for monitoring of wells and piezometers.
c. Test reports of well water analysis.
d. Initial dewatering flow rates.

2. Weekly Monitoring Reports:

a. Dewatering flow rates.
b. Piezometer readings.
c. Test reports of discharge water analysis.
d. Maintenance records for dewatering and surface water control systems.

D. Qualifications Statements:

1. Submit qualifications for manufacturer, installer, and licensed professional.

1.8 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations and depths of capped wells and piping abandoned in place.

1.9 QUALITY ASSURANCE

A. Comply with authorities having jurisdiction for following:

1. Drilling and abandoning of wells used for dewatering systems.
2. Water discharge and disposal from pumping operations.

B. Obtain permit from EPA under National Pollutant Discharge Elimination System (NPDES) for stormwater discharge from Site.

C. Perform Work according to Washington State Department of Transportation Standard Specifications.

D. Maintain one (1) copy of each standard affecting Work of this Section on Site.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Furnish Performance: Design, furnish, install, test, operate, monitor, and maintain a temporary dewatering system. The temporary dewatering system shall be of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
   1. Design dewatering system, including comprehensive engineering analysis by a qualified professional engineer.
   2. Provide a complete dewatering system capable of controlling groundwater and preventing inflow into excavations while ensuring compliant handling of contaminated groundwater.
   3. Continuously monitor and maintain dewatering operations to ensure erosion control, stability of excavations and constructed slopes, prevention of flooding in excavation, and prevention of damage to subgrades and permanent structures.
   4. Prevent surface water from entering excavations by grading, dikes, or other means.
   5. Accomplish dewatering without damaging existing buildings, structures, and site improvements adjacent to excavation.
   6. Remove dewatering system when no longer required for construction.
   7. System shall include containment, storage tanks or frac tanks, sediment controls, and treatment systems as necessary.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Conduct additional borings and investigations to supplement subsurface investigations identified in Document 003100 - Available Project Information, as required to complete dewatering system design.

C. Utility Service Locator:
   1. The Contractor is responsible for knowing and avoiding the location of all utilities. For Washington Utility Notification Center call toll free 1-800 (424)-5555 at least two (2) working days before beginning construction.
   2. Request that underground utilities be located and marked within and immediately surrounding construction areas.
   3. Identify required lines, levels, contours, and data.

3.2 PREPARATION

A. Protect existing adjacent buildings, structures, and improvements from damage that may be caused by dewatering operations.

3.3 OPERATION

A. Operate dewatering system continuously until sewers and structures have been constructed and backfilling is complete.

B. Install dewatering system with provisions for groundwater capture, containment, and sampling prior to discharge.

C. Groundwater Handling and Sampling:
   1. Collect groundwater into contained systems for sampling.
   2. Analyze for TPH (NWTPH), BTEX (EPA 8260D), and metals including lead (EPA 6020B).
   3. Sampling shall be performed by an environmental professional.

D. Operate system to lower and control ground water to permit excavation, construction of structures, and placement of fill materials on dry subgrades. Drain water-bearing strata above and below bottom of foundations, drains, sewers, and other excavations.
   1. Do not permit open-sump pumping that leads to loss of fines, soil piping, subgrade softening, and slope instability.
   2. Reduce hydrostatic head in water-bearing strata below subgrade elevations of foundations, drains, sewers, and other excavations.

E. System Failure:

   1. If dewatering system cannot control water within excavation, notify Engineer and stop excavation Work.
   2. Supplement or modify dewatering system and provide other remedial measures to control water within excavation.
   3. Demonstrate that dewatering system operation complies with performance requirements before resuming excavation operations.

F. Modify dewatering and surface water control systems if operation causes or threatens to cause damage to new construction, existing Site improvements, adjacent property, or adjacent water wells.

G. Correct unanticipated pressure conditions affecting dewatering system performance.

H. Do not discontinue dewatering operations without approval of Engineer.

3.4 WATER DISPOSAL

1. Discharge water according to Washington State Department of Transportation Standard Specifications, Stormwater Management Manual for Eastern Washington, and Section 026100 Soil and Groundwater Management Plan. To manage turbid dewatering water encountered onsite, it must pass through BMPs to reduce sedimentation prior to discharging to a sediment trap or sediment pond. Turbid dewatering water disposal options may include sheet flow dispersion and infiltration within vegetation onsite, transport in a vehicle for off-site legal disposal, WA Ecology- approved on-site chemical treatment, sanitary or combined sewer discharge with local sewer district approval, or use of a sedimentation bag that discharges to a ditch or swale for small volumes of localized

dewatering. Highly turbid or contaminated dewatering water must be handled separately from stormwater.

2. Clean and non-turbid dewatering water may be discharged to systems tributary to or directly into surface waters of the state provided it does not cause erosion or flooding of receiving waters, in accordance with the CSWGP and water quality standards in WAC 173-201A.

3.5 SYSTEM REMOVAL

A. Remove dewatering and surface water control systems after dewatering operations are discontinued.

B. Remove piezometers and monitoring wells.

C. Wells shall be abandoned in accordance with Washington Department of Ecology's standards.

D. Repair damage caused by dewatering and surface water control systems or resulting from failure of systems to protect property.

3.6 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Testing:

1. After dewatering system is installed, perform pumping test to determine at what point selected pumping rate lowers water level in well below pump intake.
2. Adjust pump speed, discharge volume, or both to ensure proper operation of each pump.

C. Monitoring and Recording:

1. Daily:

    a. Note average discharge flow rate for each deep well, eductor header, well point, and ground water elevation.
    b. Continue monitoring daily until steady state conditions occur, then monitor and record conditions weekly.
    c. Maintain records of sampling results, disposal manifests, discharge logs, and permits in accordance with SGMP Section 6.

2. Sand Content:

    a. Monitor ground water discharge for sand content.
    b. Sample and test water from each well weekly for sand content.
    c. Maximum Permitted Sand Content: 5 ppm.

3. Contaminates:

    a. Monitor ground water discharge for contamination while performing pumping in vicinity of potentially contaminated sites.

b. Sample and test water weekly for contaminates.

4. Existing Adjacent Buildings, Structures, and Improvements:

a. Survey weekly during dewatering to detect movement in comparison to original elevations.
b. Notify Engineer immediately of measured movement.

3.7 PROTECTION

A. Protect monitoring well standpipes from damage by construction operations.

END OF SECTION 312319

SECTION 312323 - FILL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Backfilling building perimeter to subgrade elevations.
2. Backfilling site structures to subgrade elevations.
3. Fill under slabs on grade.
4. Fill under paving.
5. Fill for over-excavation.

B. See Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31, 2025 for project specific guidance on fill and general earthwork requirements.

C. See Section 026100 – Soil and Groundwater Management Plan from GeoEngineers dated March 12, 2026 for project specific guidance on soil and groundwater handling requirements.

1.2 REFERENCE STANDARDS

A. American Association of State Highway and Transportation Officials:

1. AASHTO T 180 - Standard Method of Test for Moisture-Density Relations of Soils Using a 10-lb Rammer and a 18-in. Drop.

B. ASTM International:

1. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3).
2. ASTM D1556/D1556M - Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method.
3. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3).
4. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.
5. ASTM D6031/D6031M - Standard Test Method for Logging In Situ Moisture Content and Density of Soil and Rock by the Nuclear Method in Horizontal, Slanted, and Vertical Access Tubes.
6. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer information for geotextile fabric, indicating fabric and construction.

C. Samples: Submit, in airtight containers, one (1) 45 lb. sample of each type of fill to testing laboratory.

D. Materials Source: Submit name of imported materials suppliers.

E. Submit gradations and proctors prior to placement.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 QUALITY ASSURANCE

A. Perform Work according to Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31,2025 and Washington State Department of Transportation Standard Specifications.

B. Maintain one (1) copy of each standard affecting Work of this Section on Site.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Topsoil Fill: Type S1 as specified in Section 310513 - Soils for Earthwork.

B. Subsoil Fill: Type S2, S3, S4, S5 as specified in Section 310513 - Soils for Earthwork.

C. Granular Fill: Type A1 as specified in Section 310516 - Aggregates for Earthwork.

D. Structural Fill: Type A2, A2a as specified in Section 310516 - Aggregates for Earthwork.

E. Pipe Zone Bedding and Gravel Backfill: Type A3 as specified in Section 310516 - Aggregates for Earthwork.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that subdrainage, dampproofing, and waterproofing installations have been inspected.

C. Verify that underground tanks are anchored to their own foundations to avoid flotation after backfilling.

D. Verify structural integrity of unsupported walls to support loads imposed by fill.

3.2 PREPARATION OF UNDERLYING COURSE

A. The underlying subgrade and/or subbase course shall be checked by the Contractor and accepted by the Owner before placing and spreading operations begin. Any ruts or soft, yielding places due to improper drainage conditions, hauling, or any other cause, shall be corrected and compacted to the required density before the base course is placed thereon. To ensure proper drainage, the spreading of the base shall begin along the centerline of the pavement on a crowned section or on the high side of the pavement with a one-way slope. Compact subgrade to specified density requirements for subsequent backfill materials.

3.3 PLACING

A. The aggregate shall be placed on the prepared underlying subgrade and/or subbase and compacted in lifts to the thickness shown on the plans. See Attachment A for the maximum lift for each material type. Work shall progress without interruption. The material shall be deposited and spread in lanes in a uniform layer without segregation to such loose depth that, when compacted, the layer shall have the specified thickness. The aggregate base course shall be constructed in layers of uniform thickness of not less than 3 inches nor more than 6 inches of compacted thickness. The aggregate as spread shall be of uniform grading with no pockets of fine or coarse materials. The aggregate, unless otherwise permitted by the Engineer, shall not be spread more than 2,000 square yards in advance of the rolling. Any necessary sprinkling shall be kept within these limits. Care shall be taken to prevent cutting into the underlying layer during spreading. No material shall be placed in snow or on a soft, muddy, or frozen course. The aggregate base material shall be spread by spreader boxes or other approved devices. This equipment shall have positive thickness controls that spread the aggregate in the required amount to avoid or minimize the need for hand manipulation. Dumping from vehicles that require re-handling shall not be permitted. Hauling over the uncompacted base course shall not be permitted.

When more than one layer is required, the construction procedure described herein shall apply similarly to each layer.

B. Place fill material in continuous layers and compact according to testing and compaction at the end of this section.

C. Use placement method that does not disturb or damage existing structures, associated drainage areas, and base foundations.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Structures:

1. Backfill against supported foundation walls.

2. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
3. Slope grade away from structures as indicated on Construction Drawings.

F. Make gradual grade changes and blend slope into level areas.

G. Leave fill material stockpile areas free of excess fill materials.

3.4 THICKNESS CONTROL

A. The thickness of the aggregate course shall be within 1/2 inch of the specified thickness, as determined by depth tests taken by the Contractor in the presence of the Engineer. Two tests shall be taken for each sublot. Sampling locations will be determined by the Engineer per ASTM D3665.

B. Alternatively, thickness acceptance may be determined by survey before and after placement. The finished grade of each sublot will be determined by running levels at finish grade points shown on the Plans. If finished spot elevations are not shown on the Plans, then levels shall be run at intervals of 50 feet or less longitudinally and all breaks in grade transversely (not to exceed 50 feet) to determine the elevation of the completed section. The Contractor shall pay the cost of surveying of the level runs. Results shall be provided in either a plan view or spreadsheet format, noting the point number, design and as-built elevation of the finished course, elevation of the subbase, and calculated thickness. The documentation, stamped and signed by a licensed surveyor, shall be provided by the Contractor to the Engineer, prior to placing any bituminous surface course.

C. Where the thickness is deficient by more than 1/2 inch, the Contractor shall correct such areas at no additional cost by scarifying to a depth of at least 3 inches, adding new material of proper gradation, and the material shall be blended and recompacted to grade. Additional test holes may be required to identify the limits of deficient areas. The Contractor shall replace, at its expense, base material where depth tests have been taken.

3.5 TOLERANCES

A. Smoothness. The finished surface shall not vary more than ½-inch when tested with a 10-foot straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 10-foot straightedge for the full length of each line on a 50-foot grid.

B. Accuracy:
1. Top Surface of Backfilling within structure areas: Plus or minus 1/4 inch from required elevations.
2. Top Surface of Backfilling under Paved Areas: Plus or minus 1/4 inch from required elevations.
3. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

C. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches, reshaped and recompacted to grade until the required

smoothness and accuracy are obtained and approved by the Engineer. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

3.6 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Inspecting: Request visual inspection of bearing surfaces by Engineer before installing subsequent Work.

C. Testing:

1. Laboratory Material Testing: Comply with ASTM D698.
2. In-Place Compaction Testing:

    a. Density Tests: Comply with AASHTO T 310.
    b. Moisture Tests: Comply with AASHTO T 180.

3. If tests indicate that Work does not meet specified requirements, remove Work, replace, compact, and retest.
4. Proof-roll compacted fill surfaces under slabs on grade and paving.

3.7 PROTECTION

Perform construction when the atmospheric temperature is above 35°F. When the temperature falls below 35°F, protect all completed areas by approved methods against detrimental effects of freezing. Correct completed areas damaged by freezing, rainfall, or other weather conditions to meet specified requirements. When the aggregates contain frozen materials or when the underlying course is frozen or wet, the construction shall be stopped. Hauling equipment may be routed over completed portions of the base course, provided no damage results. Equipment shall be routed over the full width of the base course to avoid rutting or uneven compaction. The Engineer will stop all hauling over completed or partially completed base course when, in the Engineer's opinion, such hauling is causing damage. Any damage to the base course shall be repaired by the Contractor at the Contractor's expense.

3.8 MAINTENANCE

A. The Contractor shall maintain the base course in a satisfactory condition until the full pavement section is completed and accepted by the Engineer. The surface shall be kept clean and free from foreign material and properly drained at all times. Maintenance shall include immediate repairs to any defects and shall be repeated as often as necessary to keep the area intact. Any base course that is not paved over prior to the onset of winter shall be retested to verify that it still complies with the requirements of this specification following winter and prior to paving. Any area of base course that is damaged shall be reworked or replaced as necessary to comply with this specification.

B. Equipment used in the construction of an adjoining section may be routed over completed base course, if no damage results and the equipment is routed over the full width of the base course to avoid rutting or uneven compaction.

C. The Contractor shall remove all survey and grade hubs from the aggregate prior to placing any bituminous surface course.

3.9 TESTING AND COMPACTION

A. Immediately after completion of the spreading operations, compact each layer of crushed surfacing as specified with approved compaction equipment. The number, type, and weight of rollers shall be sufficient to compact the material to the required density within the same day that the aggregate is placed on the subgrade. The moisture content of the material during placing operations shall be within ±2 percentage points of the optimum moisture content as determined by ASTM D6938.

B. If the specified density is not attained, the entire lot shall be reworked and/or recompacted and two additional random tests made at the Contractor's expense. This procedure shall be followed until the specified density is reached.

C. Trench Backfill to follow Section 312616.13

D. Topsoil and Subsoil to follow Section 310513

E. Fill not specified in the referenced Sections.
1. Compaction Requirements – See Section 023200 – Geotechnical Engineering Evaluation from GeoEngineers dated December 31,2025.

2. Frequency of Density Testing

MATERIAL	**FREQUENCY**
BACKFILL ≥ 4' BELOW SUBGRADE	1 test per 100 LF per lift (8" max lift)
BACKFILL < 4' BELOW SUBGRADE	1 test per 100 LF per lift (8" max lift)
SUB GRADE (UNDER PAVEMENT)	1 test per 300 LF at design subgrade
SUB GRADE (NON-PAVEMENT)	1 test per 10,000 SQFT at finish grade
SUB-BASE	1 test per 300 LF per lift (6" max lift)
SUB-BASE (UNDER STRUCTURE)	5 tests per foundation area per lift
BASE COURSE	1 test per 300 LF per lift (6" max lift)
BASE COURSE (UNDER STRUCTURE)	5 tests per foundation area per lift
GRAVEL	1 test per 1,000 LF per lift
GENERAL FINISHED GRADE	1 test per 10,000 SQFT at finish grade

3. Frequency of Field Sampling

MATERIAL	**FREQUENCY**
SUB-BASE	1 test per 650 Cubic Yards
BASE COURSE	1 test per 650 Cubic Yards

END OF SECTION 312323

SECTION 312500 - EROSION AND SEDIMENT CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stormwater Management.

1.2 REFERENCE STANDARDS

A. Stormwater Management Manual for Easter Washington

B. Section 023200 Geotechnical Engineering Evaluation

C. Section 026100 Soil and Groundwater Management Plan

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit a Construction Storm Water Pollution Prevention Plan (SWPPP) for materials and methods to be installed or furnished under this section.

C. Submit manufacturer’s certification that construction site management materials meet or exceed specified requirements.

D. Submit manufacturers’ installation instructions and maintain copy at the jobsite.

E. Obtain a Construction Stormwater General Permit (CSWGP) from Washington State Department of Ecology prior to construction when construction will disturb more than one acre OR when site stormwater discharges to Washington Waters of the State.
1. Contractor is responsible for creating and submitting Construction SWPPP, approved SWPPP must be submitted to Engineer and in place prior to construction. Contractor shall pay all fees associated with CSWGP and SWPPP preparation.

F. Product Data for any products used in conformance with this section.

G. Test Reports: Indicate certified tests results for precast concrete at manufacturing facility.

H. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with requirements of Section 310513, Section 310516, Section 312316, Section 312323.

B. Perform Work according to Washington State Department of Transportation Standard Specifications.

C. Maintain one (1) copy of each standard affecting Work of this Section on Site.

PART 2 - PRODUCTS

2.1 TEMPORARY EROSION CONTROL

A. Silt Fence: Furnish according to Washington State Department of Transportation Standard Specifications 9-14.6(9).

B. Compost Socks: Furnish according to Washington State Department of Transportation Standard Specifications 9-14.6(6).

2.2 AGGREGATE, AND SOIL MATERIALS

A. Coarse Aggregate: Type A1 A2 A3, as specified in Section 310516.

B. Soil Backfill: Subsoil Type S2, S3, S4, S5 as specified in Section 310513.

2.3 PLANTING MATERIALS

A. Seeding: as specified in Section 329219.

2.4 SOURCE QUALITY CONTROL

A. Allow witnessing of inspections and test at manufacturer's test facility. Notify Engineer at least seven days before inspections and tests are scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify gradients and elevations of base or foundation for other Work are correct.

3.2 SILT FENCING

A. Silt fence shall be installed at locations shown in the SWPPP and Project Documents. The geotextile shall be securely attached to the posts and support system. Post spacing and attachments shall be as shown in the Washington State Department of Transportation Standard Plans Sheet I-30.10-02.

B. Geotextile material shall be sewn together at the point of manufacture, or at a location approved by the Engineer, to form geotextile lengths as required. All sewn seams and overlaps shall be located at a support post.

C. Posts shall be either wood or steel. Wood posts shall have minimum dimensions of 1¼ by 1¼ inches by the minimum length shown in the Plans.

D. When sediment deposits reach approximately ⅓ the height of the silt fence, the deposits shall be removed and stabilized in accordance with Washington State Department of Transportation Standard Specifications Section 8-01.3(15).

E. If trenching is not feasible due to rocky soils or not advisable due to proximity to a downslope sensitive area, a different sediment control device that does not require trenching shall be used in place of silt fence.

3.3 COMPOST SOCKS

A. Wattles shall be installed as soon as construction will allow.

B. Compost sock installation and trenching shall begin from the base of the slope and work uphill prior to any topsoil or compost placement. Excavated material from trenching shall be spread evenly along the uphill slope and be compacted using hand tamping or other method approved by the Engineer. On gradually sloped or clay-type soils trenches shall be 2 to 3 inches deep. On loose soils, in high rainfall areas, or on steep slopes, trenches shall be 3 to 5 inches deep, or half the thickness of the compost sock, whichever is greater.

C. Compost socks shall be laid out, spaced, and staked in accordance with the Washington State Department of Transportation Standard Plans Sheet I-30.40-02. Live stakes can be used in addition to, but not as a replacement for, wooden stakes.

D. The Contractor shall exercise care when installing compost socks to ensure the method of installation minimizes the disturbance of waterways and prevents sediment or pollutant discharge into water bodies.

3.4 SITE STABILIZATION

A. Incorporate erosion control devices indicated in the SWPPP into the Project at the earliest practicable time.

B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.

C. Stockpile and waste pile heights shall not exceed 35 feet. Slope stockpile sides at 2: 1 or flatter.

D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 days.

1. During non-germinating periods, apply mulch at recommended rates.

E. Stabilize diversion channels, sediment traps, and stockpiles immediately.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.

C. Compaction Testing: As specified in Section 312340.

3.6 CLEANING

A. Section 017000 - Execution and Closeout Requirements: Requirements for cleaning.

B. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.

C. Do not damage structure or device during cleaning operations.

D. Do not permit sediment to erode into construction or site areas or natural waterways.

E. Clean channels when depth of sediment reaches approximately one half channel depth.

3.7 PROTECTION

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

END OF SECTION 312500

SECTION 320190.33 - TREE AND SHRUB PRESERVATION

PART 1 - GENERAL

1.1 DESCRIPTION

The scope of work includes all labor, materials, tools, equipment, facilities, transportation, and services necessary for, and incidental to performing all operations in connection with protection of existing trees and other plants as shown on the drawings and as specified herein.

1.2 SUMMARY

A. This Section includes the following:
   1. General
   2. Products
   3. Execution
   4. Final Inspection and Acceptance
   5. Measurement and Payment

1.3 RELATED DOCUMENTS AND REFERENCES

A. Related Documents:
   1. Related drawings, and general provisions of the contract including general and supplementary conditions and specifications.

B. References: The following specifications, standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event that the requirements of any of the following referenced standards and these specifications conflict with each other the more stringent requirement shall prevail.
   1. ANSI A 300 (Part 5) – Standard Practices for Tree, Shrub and other Woody Plant Maintenance, most current editions.
   2. Pruning practices shall conform with recommendations “Structural Pruning: A Guide For The Green Industry”; Published by Urban Tree Foundation, Visalia, California; most current edition.
   3. Glossary of Arboricultural Terms, International Society of Arboriculture, Champaign Il, most current edition.

1.4 VERIFICATION

A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities. Immediately inform the Owner’s Representative of any discrepancies between the information on the drawings and the actual conditions and refrain from doing any work in effected areas until given approval to do so by the Owner’s Representative.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for any necessary permits related to this section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner’s Representative in writing including a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply.

C. In case of conflict among any regulations or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to his/her actions.

1.7 DEFINITIONS

All terms in this specification shall be as defined in the "Glossary of Arboricultural Terms" or as modified below.

A. Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.

B. Reasonable and reasonably: When used in this specification is intended to mean that the conditions cited will not affect the establishment or long term stability, health or growth of the plant. This specification recognizes that plants are not free of defects, and that plant conditions change with time. This specification also recognizes that some decisions cannot be totally based on measured findings and that professional judgment is required. In cases of differing opinion, the Owner's Representative shall determine when conditions within the plant are judged as reasonable.

C. Tree and Plant Protection Area: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and defined by a circle centered on the trunk with each tree with a radius equal to the clown dripline unless otherwise indicated by the Owner's Representative.

D. Shrub: Woody plants with mature height approximately less than 25 feet.

E. Tree: Single and multi-stemmed plants, including evergreens with anticipated mature height approximately greater than 25 feet or any plant identified on the plans as a tree.

1.8 SUBMITTALS

A. PRODUCT DATA: Submit manufacturer product data and literature describing any necessary products required by this section to the Owner's Representative for approval. Provide submittal two weeks before the start of any work at the site.

1.9 QUALITY ASSURANCE

A. The Owner's Representative may inspect the work at any time.

B. Contractor Qualifications: A qualified Landscape Contractor whose work has resulted in the successful establishment of exterior plants for a minimum of 3 (three) years.

1.10 WARRANTY

A. Plant material that has received protection services shall have a guarantee period of one year. All plants that die or have more than 50% of their structure die during the guarantee period must be

replaced with plant material of similar species. The Owner's Representative shall approve the size and quality of the replacement plant.

PART 2 – PRODUCTS

2.1 MULCH

A. Mulch shall be coarse, ground, from tree and woody brush sources.

B. The size shall be medium chip.

2.2 TREE PROTECTION FENCING:

A. Fencing shall be minimum four (4) foot high temporary chainlink fencing that is placed as designated below in Part 3. Material shall be continuous chainlink fencing with posts set at a maximum of ten (10) feet on center. Fence posts shall be installed used pier block or other approved base material only. Avoid driving post or stakes into the existing roots or hardscape material. Fence signage shall be as detailed on plans and must be posted, at minimum, every ten ten (10) feet along the outward facing fenceline. Owner's Representative may request, at any time, additional post, deeper post depths and or additional fabric attachments if the fabric begins to sag, lean or otherwise not present a sufficient barrier to access.

2.3 MATTING

A. Matting for vehicle and work protection shall be heavy duty matting designed for vehicle loading over tree roots or ¾" plywood.

B. Submit supplier's product data that product meets the requirements for approval.

2.4 GEOGRID

A. Geogrid shall be woven polyester fabric with 200 lb minimum tensile strength, resistant to ultraviolet deterioration, rotting, biological degradation, and is inert to common soil chemicals.

B. Submit supplier's product data that product meets the requirements for approval.

2.5 FILTER FABRIC

A. Filter Fabric shall be nonwoven polypropylene fibers, inert to biological degradation and resistant of naturally occurring chemicals, alkaline and acids.

B. Submit supplier's product data that product meets the requirements for approval.

PART 3 – EXECUTION

3.1 SITE EXAMINATION

A. Examine the site, tree, plant and soil conditions. Notify the Owner's Representative in writing of any conditions that may impact the successful Tree and Plant Protections that is the intent of this section.

3.2 COORDINATION WITH PROJECT WORK

A. The Contractor shall coordinate with all other work that may impact the completion of the work.

3.3 TREE AND PLANT PROTECTION AREA

A. The Tree and Plant Protection Area is defined by areas indicated on the tree protection or demolition plan. Fence shall completely encircle plant material to be protected or otherwise be laid out to in a manner to completely block off access to the protected areas. Modifications to

the tree protection area as indicated on plans shall be approved by architect prior to installation.

B. Where no Tree and Plant Protection area is defined on the drawings, the protection area shall begin as follows:
   1. Trees: 18" past the drip line (outer edge of the branch crown) of each tree that is to be protected.
   2. Shrubs: 18" past the outer edge of the branches of each group to be protected.
   3. Lawn: protection area shall be begin at the extents of grading and/or limits of disturbance and extend beyond.

3.4 PREPARATION

A. Identify on appropriate plans any trees and shrubs to be protected and flag by wrapping white (or other) plastic ribbon tied around the trunk of each tree and/or on a prominent branch.

B. Prior to any construction activity at the site including utility work, grading, storage of materials, or installation of temporary construction facilities, install the appropriate level of protective measures (tree protection fencing, filter fabric, silt fence, tree protection signs, geogrid, mulch) to the Tree and Plant Protection Area(s).

3.5 PROTECTIVE MEASURES

A. Protect the Tree and Plant Protection Area at all times from compaction of the soil; damage of any kind to trunks, bark, branches, leaves and roots of all plants; and contamination of the soil, bark or leaves with construction materials, debris, silt, fuels, oils, and any chemicals substance. Notify the Owner's Representative of any spills, compaction or damage and take corrective action immediately using methods approved by the Owner's Representative.

B. Construction activity shall not occur within the Tree and Plant Protection Area. Prohibited activities include, but is not limited to:
   1. Dumping of construction waste
   2. Storage of materials
   3. Storage of equipment
   4. Trenching or digging
   5. Changing of soil grade
   6. Compacting soil with vehicle traffic
   7. Installing hardscape of any kind

C. Provide and implement the following levels of protection measures to the Tree and Plant Protection Area on a plant by plant basis as determined by the Contractor on site.
   1. All trees identified to be protected shall receive tree protection fencing.
   2. All lawn and existing shrub beds to be protected shall receive tree protection fencing.
   3. Areas where foot traffic or storage of lightweight materials is anticipated to be unavoidable inside the tree protection fencing area Contractor, shall provide a layer of Filter Fabric under the 5 inches of Mulch.

4. Areas where occasional light vehicle traffic is anticipated to be unavoidable inside the tree protection fencing area, Contractor shall provide a layer of Geogrids under 8 inches of Mulch.

5. Areas where heavy vehicle traffic is unavoidable inside the tree protection fencing area, Contractor shall provide a layer of Geogrids under 8 - 12 inches of Mulch and a layer of Matting over the Mulch.

6. Any work done within the Tree and Plant Protection Area shall be accomplished by hand operated equipment, or when it is not feasible to be done by hand, shall be done with the smallest mechanized equipment necessary.

3.6 SUPPLEMENTAL IRRIGATION

A. If construction activities are conducted during the months of May through September and automatic irrigation is suspended to the Project Site, supplemental irrigation, which could be in the form or hand watering or another regular water source shall be provided. The plant material inside any fenced Tree and Plant Protection Area shall be irrigated with at least 1 inch of water applied once a week directly to the root system.

B. The plant material inside any fenced Tree and Plant Protection Area shall be monitored throughout construction for signs of drought stress.

C. If signs of stress persist or worsen after providing regular irrigation, promptly notify the Owner's Representative.

3.7 WEED REMOVAL

A. During the construction period, hand (non-herbicide) control any unwanted plants that germinate inside the fenced Tree and Plant Protection Area.

3.8 INSECT AND DISEASE CONTROL

A. Monitor all plants to remain for disease and insect infestations during the entire construction period. Provide all disease and insect control required to keep the plants in a healthy state using the principles of Integrated Plant Management (IPM). All pesticides shall be applied by a certified pesticide applicator.

3.9 CLEAN-UP

A. During tree and plant protection work, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove trash and debris in containers from the site no less than once a week.

B. At the end of the construction period or when requested by the Owner's Representative remove all Fencing, Mulch, Geogrids and Filter Fabric, Trunk Protection and any or all other Tree and Plant Protection material and fill the holes left by vertical posts of fencing with suitable soil.

3.10 DAMAGE OR LOSS TO EXISTING PLANTS TO REMAIN

A. Any trees or plants designated to remain that are damaged to the point where they will no longer be expected to survive or they are severely disfigured to the point that their natural structure is permanently altered shall be replaced at the cost of the Contractor, with a tree of similar species and of equal size at the direction and opinion of the Owner's Representative. Shrubs shall be replaced with a plant of similar species and equal size. The Owner's Representative shall approve the size and quality of the replacement plant.

3.11 FINAL INSPECTION AND ACCEPTANCE

A. When landscape work is completed the Owner's Representative, upon request, will make a Final Inspection to determine acceptability.

B. Conditions governing Final Acceptance of the landscaped areas are that, in the opinion of the Owner's Representative, all plant material is in a live, uniform, and sound and healthy and flourishing conditions; free of disease, insect infestation, and physical damage. All planter beds shall be free of weeds, rubbish, and construction debris.

C. If the Owner's Representative does not accept the conditions of the landscaped areas, the Contractor shall correct all deficiencies until acceptance is given by Owner's Representative. All costs associated with correcting the deficiencies shall be paid by the Contractor at no additional cost to the Owner. All required corrections shall be made within thirty (30) days after initial Final Acceptance Inspection, unless the calendar date requires corrections to occur in the succeeding planting season.

END OF SECTION 320190.33

SECTION 321218 - HOT MIX ASPHALT (HMA) PAVEMENT

PART 1 - GENERAL

1.1 DESCRIPTION

Work included under this Section shall consist of placing and testing new hot mix asphalt (HMA) bituminous pavement.

1.2 REFERENCE STANDARDS

A. Washington State Department of Transportation Standard Specifications.

PART 2 - MATERIALS

2.1 JOB MIX FORMULA (JMF)

A. Hot mix asphalt pavement shall comply with Washington State Department of Transportation Standard Spec Section 5-04, HMA Class 3/8-inch, PG 64-28 asphalt binder.

B. No asphalt mix for payment shall be produced until a JMF has been approved in writing by the Engineer.

C. The Contractor may include up to 20% recycled asphalt pavement (RAP).

D. To expedite review and approval, the Contractor may submit a JMF that has been previously approved in the past year by the Chelan County, or Washington State Department of Transportation. Submit this information 14 days prior to use.

E. New job mix formulas shall be submitted at least 30 days prior to use. The JMF shall be designed using procedures contained in Asphalt Institute MS-2 Mix Design Manual, 7th Edition. The JMF shall be prepared by an ASTM D3666 accredited laboratory, stamped and sealed by the professional Engineer of the laboratory, and shall include the following items at a minimum:

1. Percent passing each sieve size for total combined gradation, individual gradation of all aggregate stockpiles, and percent by weight of each stockpile used in the JMF.
2. Specific Gravity and absorption of each aggregate.
3. Percent natural sand.
4. Percent fractured faces.
5. Percent by weight of flat particles, elongated particles, and flat and elongated particles (and criteria).
6. Percent of asphalt.
7. Asphalt binder performance, grade, and type of modifier if used.
    - Certificate of compliance from the manufacturer indicating compliance with ASTM D6373.
    - For plant modified asphalt binder, certified test report indicating grade certification of modified asphalt binder.
8. Number of blows or gyrations.
9. Laboratory mixing temperature.
10. Laboratory compaction temperature.

11. Supplier recommended mixing and compaction temperatures.
12. Plot of the combined gradation on the 0.45 power gradation curve.
13. Graphical plots of air voids, voids in the mineral aggregate, and unit weight versus asphalt content.
14. Tensile Strength Ratio (TSR).
15. Type and amount of Anti-strip agent when used.
16. Date the JMF was developed.
17. Percentage and properties (asphalt content, asphalt binder properties, and aggregate properties) of reclaimed asphalt pavement (RAP), if RAP is used.

2.2 HERBICIDE

Soil residual herbicide shall meet the requirements of Washington State Department of Transportation Standard Spec 5-04.3(4)B, paragraph 2.

PART 3 - EXECUTION

3.1 EQUIPMENT

The Contractor shall provide all equipment, in good operating condition, and small tools necessary to complete the work as specified or directed. Equipment shall be serviced away from all bituminous surfaces.

3.2 PREPARATION

A. One week prior to the anticipated paving date, the Contractor shall complete and submit a Hot Mix Asphalt Paving Plan.

B. The surface upon which the HMA is to be placed shall be stable and firm and free of dirt, water and other undesirable materials.

C. Herbicide shall be applied to the surface of the prepared subgrade or aggregate course prior to the application of the prime coat or pavement base course. The application shall be in accordance with Washington State Department of Transportation Standard Spec 8-02.3(3)B.

D. The Contractor shall ensure that only an area scheduled for surfacing in any one day is treated with herbicide. In no case shall treated grade be left overnight.

3.3 EXECUTION

A. Construct pavements to the line, grade, and section shown on the Plans.

B. Base Course / Crushed Surfacing: shall be in accordance with Section 310516.

C. Bituminous Tack Coat: per Washington State Department of Transportation Standard Specification 5-04.3(4). A tack coat shall be applied to all contact edges surrounding the pavement prior to placing new asphalt unless otherwise directed by the Engineer. If the work to be performed requires two or more layers or lifts, a tack coat shall be placed.

D. Paving. The quantity of hot mix material placed should be sufficient to ensure that, after compaction, the finished surface will meet and match the adjacent pavement and conform to the elevations and grades shown on the Plans.

Maximum depth of a compacted layer shall be per Washington State Department of Transportation Standard Specification 5-04.3(7).

In multi-lift construction, material shall be placed in approximately equal-depth layers. A string line and/or a straightedge shall be used to produce a smooth riding surface. In compacting the top lift, the first pass and return of the roller or vibratory compactor should overlap not more than 6 inches onto the patch material at one edge. This should then be repeated on the opposite side to compact the material into the edge joints. Compaction should then proceed from the low side to the high side, with each pass and return lapping an additional few inches onto the patch. The finished surface of the patch shall be at the same grade as the surrounding pavement.

When a roller is compacting HMA adjacent to a longitudinal joint, the goal is to confine the material and densify the material at the joint. The recommended sequence is for the first pass of the roller that is adjacent to the joint be approximately 6 inches from the joint on the "hot" side. This roller pass compacts and provides confinement for the HMA at the joint. This is followed with a roller pass that overlaps to the "cold" side of the pavement, and the 6-inch strip of HMA is densified in the joint area.

3.4 QUALITY CONTROL AND MATERIAL ACCEPTANCE

Quality Control: The Contractor shall perform quality control sampling, testing, and inspection during all phases of the work; at a rate sufficient to ensure that the work conforms to the contract requirements. The Contractor's testing laboratory conducting quality control testing shall be certified to meet the requirements of ASTM D3666.

Quality Control and Material Acceptance shall be per WSDOT Standard Specification Sections 5-04.3(9) thru 5-04.3(13), modified as follows:

5-04.3(9)B3 Replace the second paragraph with the following:

The Contractor's laboratory will test the mixture sample from each lot for the properties shown in the Table below:

Testing Required for each HMA Mixture Lot

Test	Procedure	Performed by
Asphalt Binder Content	AASHTO T 308	Contractor
Gradation: percent Passing 1½", 1", ¾", ½", ⅜", No. 4, No. 8, No. 200	AASHTO T 27 / T11	Contractor

5-04.3(9)B5 Replace the last sentence of the second paragraph with the following:

Unless otherwise specified, the maximum CPF for HMA mixture shall be 1.00.

5-04.3(9)B7 Replace the fifth sentence of the first paragraph with the following:

The sample will be tested for a complete gradation analysis, asphalt binder content, and the results of the retest will be used for the acceptance of the HMA mixture in place of the original mixture lot sample test results.

5-04.3(9)E Mixture Acceptance – Notification of Acceptance Test Results

Delete the first paragraph, and the first sentence of the second paragraph, and Replace with the following:
The Contractor shall provide written notification of test results within 24 hours of sampling.

5-04.3(10) Replace the second sentence with the following:

The Contracting Agency will evaluate the Contractor's test results for compaction compliance using the statistical evaluation method.

5-04.3(10)C1 Replace the second paragraph with the following:

A compaction lot is represented by randomly selected samples of the same mix design placed during a single day of production that will be tested for acceptance, with 10 compaction sublots per lot.

5-04.3(10)C2 Delete the contents of this Section and replace with the following:

Comply with Washington State Department of Transportation Standard Specification Section 1-06.2(1).

The location of HMA compaction acceptance tests will be randomly selected by the Engineer from within each sublot, with one test per sublot. The Engineer will determine the random sample location using Washington State Department of Transportation (WSDOT) Test Method T 716.

HMA Compaction Acceptance Testing Procedures shall be as follows:

Basis for test:	Nuclear density gauge
In-place density determined by:	Contractor, using WSDOT FOP for AASHTO T 355
Theoretical maximum density determined by:	Contractor, using FOP for AASHTO T 209
Rolling average of theoretical max density by:	Contractor, using WSDOT SOP 729
Percent compaction in each sublot determined by:	Contractor, using WSDOT FOP for AASHTO T 355

When cores are required for correlation with nuclear density results, coring and testing will be per Washington State Department of Transportation Standard Specification 5-04.3(10)C4.

5-04.3(11)B Supplement this Section with the following:

Rejected material shall become the property of the Contractor and no additional payment will be made for removal and disposal of rejected material.

5-04.3(12)A2 Delete the second sentence and replace with the following:

Locate all longitudinal joints constructed in the wearing course at a ridge line or at an edge line in the travelled way.

3.5 PAVEMENT THICKNESS

Thickness of each lift shall be evaluated by the Engineer for compliance to the requirements shown on the Plans. The maximum allowable deficiency shall be within +1/2-inch and minus 1/4-inch of the specified thickness.

Pavement thickness acceptance will be based on survey results provided by the Contractor. The finished grade will be determined by running levels at finish grade points shown on the Plans. If finished spot elevations are not shown on the Plans, then levels shall be run at intervals of 50 feet or less longitudinally and all breaks in grade transversely (not to exceed 50 feet) to determine the elevation of the completed pavement. The Contractor shall pay the cost of surveying of the level runs. Results shall be provided in either a plan view or spreadsheet format, noting the point number, design and as-built elevation of the finished course, elevation of the base course underneath, and calculated thickness. The documentation, stamped and signed by a licensed surveyor, shall be provided by the Contractor to the Engineer within 1 week of placement of each lot.

Where thickness tolerances are not met, the lot or sublot shall be corrected by the Contractor at its expense by removing the deficient area and replacing with new pavement. The Contractor, at its expense, may take cores as approved by the Engineer to circumscribe the deficient area.

3.6 SURFACE SMOOTHNESS

Surface smoothness shall be per Washington State Department of Transportation Standard Specification Section 5-04.3(13), except delete the second and third sentences, and replace with the following:

The completed surface of the wearing course shall not vary more than ½-inch from the lower edge of a 10-ft straightedge placed on the surface. Straightedge testing shall be conducted by a 3-person crew to transport the straightedge, measure for deviations, and record the results. The Contractor shall supply the 10-ft straightedge and provide 2 workers to assist the Engineer.

3.7 GRADE (ELEVATION)

The finished surface of the pavement shall be within 3/8 inch of the specified grade (elevation), based on survey results provided by the Contractor as described in paragraph 3.5 above.

The lot size shall be the same size as the compaction lot, as described above. When more than 15% of all the measurements within a lot are outside the specified tolerance, or if any one shot within the lot deviates 3/4 inch or more from planned grade, the Contractor shall remove the deficient area to the depth of the final course of pavement and replace with new material. Skin patching will not be permitted. Isolated high points may be ground off providing the course thickness complies with the thickness specified on the plans.

High point grinding will be limited to 15 square yards. The surface of the ground pavement shall have a texture consisting of grooves between 0.09 and 0.13 inches wide. The peaks and ridges shall be approximately 1/32 inch higher than the bottom of the grooves. The pavement shall be left in a clean condition. The removal of all of the slurry resulting from the grinding operation shall be continuous. The grinding operation should be controlled so the residue from the operation does not flow across other lanes of pavement. Areas in excess of 15 square yards will require removal and replacement of the pavement in accordance with the limitations noted above. Contractor shall apply a bituminous surface treatment to all areas that have been subject to grinding.

3.8 CLEANUP

The Contractor shall remove and dispose of all excess loose material upon completion of the work. The Owner shall approve of the Contractor's cleanup prior to the placement of a subsequent surface treatment or layer.

3.9 TESTING REQUIREMENTS

A. AASHTO T 11 - Test for Materials Finer Than 75-um (No. 200) Sieve in Mineral Aggregates by Washing

B. AASHTO T 27 - Sieve Analysis of Fine and Coarse Aggregates

C. AASHTO T 209 - Test for Theoretical Maximum Specific Gravity (Gmm) and Density of Hot Mix Asphalt (HMA)

D. AASHTO T 308 - Determining the Asphalt Binder Content of Hot Mix Asphalt (HMA) by the Ignition Method.

E. AASHTO T 355 - Test for In-Place Density of Asphalt Mixtures by Nuclear Methods

F. ASTM C 136 - Sieve or Screen Analysis of Fine and Coarse Aggregate

G. ASTM D 2950 - Density of Bituminous Concrete in Place by Nuclear Method

H. ASTM D 3666 - Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials

I. ASTM D 6373 - Performance Graded Asphalt Binder

END OF SECTION

SECTION 321313 – CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 and Division 31 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Driveways.
2. Curbs, gutters, landscape edging and mow strips.
3. Curb Ramps.
4. Sidewalks.

B. Work and materials shall comply with the requirements and standards of the City of Spokane. If a standard is not provided, work and materials shall comply with the most current edition of the Standard Specifications for Road, Bridge, and Municipal Construction as jointly promulgated by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association.

C. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for general building applications of concrete.
2. Division 31 Section "Excavation" for subgrade preparation, grading, and base course.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

B. WSDOT: Washington State Department of Transportation.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated. Include technical data and tested physical and performance properties.

B. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance with the specified requirements.

C. Field quality-control test reports, from a qualified testing agency.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.6 PROJECT CONDITIONS

A. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature in conformance with WSDOT Standard Specifications 8-22.

B. Traffic Control: Maintain access for vehicular and pedestrian traffic as required.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius of 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Joint Dowel Bars: Comply with WSDOT Standard Specification 9-07.5.

B. Tie Bars: Comply with WSDOT Standard Specification 9-07.6.

C. Epoxy-Coated Steel Reinforcing Bars: Comply with WSDOT Standard Specification 9-07.3

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type I. Comply with WSDOT Standard Specification 9-01. Supplement with the following:

    a. Fly Ash: AASHTO M295, Class C or F. Comply with WSDOT Standard Specification 9-23.9.
    b. Ground Granulated Blast-Furnace Slag: AASHTO M 302, Grade 100 or 120. Comply with WSDOT Standard Specification 9-23.10.

B. Normal-Weight Aggregates: ASTM C 33, coarse aggregate, uniformly graded. Provide aggregates from a single source. Comply with WSDOT Standard Specification 9-03.

1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.

2. Fine Aggregate: Comply with WSDOT Standard Specification 9-03.1(2).
3. Coarse Aggregate: Comply with WSDOT Standard Specification 9-03.1(4).

C. Water: Potable.

D. Air-Entraining Admixture: ASTM C 260.

1. Comply with WSDOT Standard Specification 9-23.6(1).

E. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material. Comply with WSDOT Standard Specification 9-23.6.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

2.4 CURING MATERIALS

A. Curing Materials: Comply with WSDOT Standard Specification 9-23.

B. Absorptive Cover: AASHTO M 182, Class 4, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry. Comply with WSDOT Standard Specification 9-23.5.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet. Comply with WSDOT Standard Specification 9-23.1.

D. Water: Potable.

E. Liquid Membrane –Forming Curing Compounds: Comply with WSDOT Standard Specification 9-23.2.

2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: Comply with WSDOT Standard Specification 9-04.1.

2.6 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 211.1 for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
2. Comply with WSDOT Standard Specifications 5-05.3(1).

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 3000 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

1. Air Content: 4-1/2 percent plus or minus 1.5 percent for 1-1/2-inch nominal maximum aggregate size.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Comply with WSDOT Standard Specification 9-23.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Comply with WSDOT Standard Specification 6-02.3(4). Furnish batch certificates for each batch discharged and used in the Work.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Comply with WSDOT Standard Specification 6-02.3(4) B.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and base surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll subgrade below concrete pavements to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Geotechnical Testing Agency, and replace with compacted backfill or fill as directed.

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.2 PREPARATION

A. Remove loose material from compacted base surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated. Comply with WSDOT Standard Specification 5-05.3(8).

1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints. Comply with WSDOT Standard Specification 5-05.3(8) C.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated. Comply with WSDOT Standard Specification 5-05.3(8) D.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Comply with WSDOT Standard Specification 5-05.3(8) A. Comply with WSDOT Standard Specification 5-05.3(8) B for sealing sawed contraction joints.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a radius in accordance with WSDOT Standard Plans. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

F. Tie Bars and Dowel Bars: Comply with WSDOT Standard Specification 5-05.3(10).

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from base surface before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten base to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with WSDDOT Standard Specification 5-05 and ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

F. Consolidate concrete according to WSDOT Standard Specification 5-05 and ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

G. Screed pavement surfaces with a straightedge and strike off.

H. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

I. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

J. Cold-Weather Placement: Comply with WSDOT Standard Specification 5-05.3(14), ACI 306.1, and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. Do not use frozen materials or materials containing ice or snow.
2. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mix designs.

K. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

L. Fog-spray forms and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.

1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with WSDOT Standard Specification 5-05.3(14) and ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:

1. Moist Curing: Comply with WSDOT Standard Specification 5-05.3(13) C.
2. Moisture-Retaining-Cover Curing: Comply with WSDOT Standard Specification 5-05.3(13) B.
3. Curing Compound: Comply with WSDOT Standard Specification 5-05.3(13) A.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of WSDOT Standard Specification 5-05, ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8-inch, minus 1/4 inch.
3. Surface: Gap below 10-foot-long, unleveled straightedge not to exceed 1/8 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage and pay for a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field quality control, testing, and inspections shall comply with WSDOT Standard Specifications.

C. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Obtain at least 1 composite sample for each 100-cu. yd. or fraction thereof of each concrete mix placed each day.
2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing.

E. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate requirements have not been met.

F. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

3.11 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION 32 13 13

SECTION 323300 – SITE FURNISHINGS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:
1. Bike Racks
2. Trash / Recycle Receptacles
3. Benches
4. Skate Stoppers
5. Interpretive Signage
6. Embedded Architectural Silicon Bronze Letters

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Samples: For each exposed finish.
C. Material Certificates: For site furnishings, signed by manufacturers.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Anchors, Fasteners, Fittings, and Hardware: Standard, corrosion-resistant-coated.

B. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged.

C. Erosion-Resistant Anchoring Cement.

D. Galvanizing: Hot-dip or zinc-coated tubing.

2.2 BICYCLE RACKS

A. Basis-of-Design Product: DuMor, Inc Model #292.

B. Construction: Cast aluminum; Black Powder Coat finish; 2 spaces per rack.

C. Quantity: Two racks total.

2.3 TRASH RECEPTACLES

A. Basis-of-Design: Double Cassidy Receptacles. Black Onyx Powder Coat finish. Rain Bonnet Lid

B. Quantity: Six (Three (3) Single-Stream Recycling & Three (3) Waste).

2.5 BENCHES

Type 1

A. Basis-of-Design Product: Cassidy Steel Slat Arched Back Bench

B. Construction: Black Onyx Powder Coat finish; 6’ Length

C. Quantity: Five (9) total.

2.6 SKATE STOPPERS

A. Basis-of-Design: Seton Skateboard Prevention Devices for Chamfered Edges Style No: L9270-20 or approved equal.

B. Material: Aluminum

C. Dimensions: 2” W

D. Hardware: Tamper Proof Security Screws

E. Spacing: 24" from end of the wall and 36” +/- 6” Centers. Verify layout of skate deterrents with architect prior to installation.

2.7 INTERPRETIVE SIGNAGE

Type 1

A. Basis-of-Design Product: 36”x48” Upright Exhibit Stand For Interpretive Signage. Gopher Sign Company - Model UP2B-F w/ Upright Textured Black Post Base Pad Mount.

B. Construction: Extruded Aluminum Frame

C. Quantity: Three Total

Type 2

A. Basis-of-Design Product: 24”x24” Pedestal Display Stand For Interpretive Signage. Gopher Sign Company – ImageLoc unframed Pedestal. Textured Black Post Base Pad Mount. Single Sided Print.

B. Construction: Extruded Aluminum Frame

C. Quantity: Two Total

2.8 EMBEDDED ARCHITECTURAL SILICON BRONZE LETTERS

A. Basis-of-Design Product: ¼” FCO Bronze Letters with Brushed Finish. 4” Studs on back.

B. Material: Brushed Bronze Letters

C. Dimensions: ~11” tall

D. Quantity: 15 letters. 4 numeral. ‘CITY OF CHELAN EST 1902’

E. Submit Shop Drawing for layout and approval before installation.

2.16 FABRICATION

A. Metal Components: Form to required shapes and sizes with true, consistent curves, lines, and angles. Separate metals from dissimilar materials to prevent electrolytic action.

B. Welded Connections: At exposed connections, finish surfaces smooth and blended so no roughness or unevenness shows after finishing and welded surface matches contours of adjoining surfaces.

C. Pipes and Tubes: Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross section of member throughout entire bent portion without bulging, wrinkling, cracking, or otherwise deforming exposed surfaces of handrail and railing components.

D. Exposed Surfaces: Polished, sanded, or otherwise finished; all surfaces smooth, free of burrs, barbs, splinters, and sharpness; all edges and ends rolled, rounded, or capped.

E. Factory Assembly: Assemble components in the factory to greatest extent possible to minimize field assembly. Clearly mark units for assembly in the field.

PART 3 – EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer’s written installation instructions unless more stringent requirements are indicated. Complete field assembly of site furnishings where required.

B. Post Setting: Set cast-in support posts in concrete footing plumb or at correct angle and aligned and at correct height and spacing.

C. Posts Set into Voids in Concrete: Form or core-drill holes for installing posts in concrete to depth recommended in writing by manufacturer of site furnishings. After posts have been inserted into holes, fill annular space between post and anchoring cement, nonmetallic grout, or anchoring cement, mixed and placed to comply with anchoring material manufacturer’s written instructions.

D. Pipe Sleeves: Use steel pipe sleeves preset and anchored into concrete for installing posts. After posts have been inserted into sleeves, fill annular space between post and sleeve with mixed and placed anchoring material complying with anchoring material manufacturer’s written instructions.

END OF SECTION 323300

SECTION 328400 - IRRIGATION SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

Irrigation system required for this work includes but is not limited to the furnishings of all labor, tools, materials, appliances, tests, permits, taxes, etc necessary for the installation of a landscape irrigation systems herein specified and shown on the associated drawings, and the removal of all extra debris from the site.

1.2 SUMMARY

A. This Section includes the following:
   1. General
   2. Products
   3. Execution
   4. Final Inspection and Acceptance
   5. Measurement and Payment

1.3 RELATED DOCUMENTS AND REFERENCES:

A. Related Documents:
   1. Related drawings and general provisions of contract including general and supplementary conditions and specifications.

B. References: The following specifications and standards of the organizations and documents listed in this paragraph form a part of the specification to the extent required by the references thereto. In the event that the requirements of any of the following referenced standards and specifications conflict with each other, the more stringent requirement shall prevail.
   1. American Society of Testing Materials (ASTM): cited by section numbers
   2. National Sanitation Foundation (NSF): rating system
   3. Irrigation Association: Turf and Landscape Irrigation Best Management Practices

1.4 VERIFICATION

A. Irrigation piping and related equipment are drawn diagrammatically. Scaled dimensions are approximate only. Before proceeding with work, carefully check and verify dimensions and immediately notify Owner’s Representative of discrepancies between the drawings or specifications and the actual conditions. Although sizes and locations of plants and / or irrigation equipment are drawn to scale whenever possible, it is not the scope of the drawings to show all necessary offsets, obstructions, or site conditions. The Contractor shall be responsible to install the work in such a manner that it will be in conformance to current site conditions, complete, and good working order.

B. Piping and equipment to be located within the designated planting areas wherever possible unless specifically defined or dimensioned otherwise.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for all permits related to the section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between the permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner’s Representative in writing a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be

performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply.

C. In case of conflict among any regulations or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall protect the work, adjacent property, the public, and shall be responsible for any damages or injury due to his/her actions.

1.7 CHANGES IN THE WORK

A. The Owner's Representative may order changes in work, and the contract sum being adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications, and Contractor's request for information (RFI) shall conform to the contract general condition requirements.

1.8 CORRECTION OF WORK

A. The Contractor shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest possible time that can be coordinated with other work, and seasonal weather demands, but not more than 90 (ninety) days after notification.

1.9 DEFINITIONS

A. Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.

B. Substantial Completion Acceptance: The date at the end of the irrigation installation where the Owner's Representative accepts that all work in the sections is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project.

C. Final Acceptance: The date when the Owner's Representative accepts that the work in the section meets all the requirements of the specifications.

1.10 SUBMITTALS

A. Product Data

1. Submit a complete list / packet of all irrigation equipment to be used including manufacturer's brochures within 30 days after the notice to proceed.
    a) Samples of the equipment may be required at the request of the Owner's Representative if the equipment is other than that specified.
2. Testing data
    a) Submit all data from required pressure testing.
3. Backflow prevention device certification (if installed):
    a) Submit certification from the installer that the backflow prevention device has been installed correctly according to manufacturer requirements.

B. Other Data

1. After installation, Contractor shall submit shop drawings of installed system including, at minimum, the location of: backflow assembly, controller, valves and supply lines. Sizing shall be included for all valves and supply lines.

2. After installation, Contractor shall submit to Owner complete controller chart of numbered valves with suggested operation timing, and written winterization procedures.

1.11 QUALITY ASSURANCE

A. Design Requirements:

1. Minimum water coverage:

a) Lawn / Turf: 100%, double coverage

b) Planter beds: Drip / Micro irrigation coverage to each plant

2. It is the intention of this specification to accomplish the work of installing an underground, automatic irrigation system, which will operate in an efficient and satisfactory manner. The irrigation system shall be installed and made operational according to the workman standards established for landscape and sprinkler installation operation set in the most recent Best Management Practices of the Irrigation Association.

3. The specification can only indicate the intent of the work to be performed rather than a detailed description of the performance of the work. It shall be the responsibility of the Contractor to install said materials and equipment in such a manner that they shall operate efficiently and evenly and support optimum plant health.

4. In the event of any discrepancies between the drawings and the specifications, the final decision as to which shall be followed shall be made by the Owner's Representative. The Contractor shall immediately bring these discrepancies to the Owner's Representative.

5. In the event that installation is contradictory to the direction of the Owner's Representative or these specifications, the installation shall be rectified by the Contractor at no additional cost to the Owner.

6. Irrigation spray shall not direct water onto building exterior surfaces, foundations or exterior paved surfaces. Nor shall the system generate excessive runoff.

7. Zoning shall be designed for optimum use of available pressure and efficient distribution for the types of plantings and shapes of planting beds and lawn / turf areas.

8. Contractor shall provide and install an approved fixed tee or other device for air blow method winterization. Location shall be on the main supply downstream from main shut off valve.

B. Contractor shall make inspection of the Project Site where the work is to be performed and become aware of the existing system, if applicable, and identify any obstacles which may be encountered and all other relevant matters in connection with the work prior to beginning installation.

1. Any obstacles identified shall be brought to the attention of the Project Contractor and Owner's Representative for necessary adjustments to be made for a successful working system.

C. Contractor shall carefully examine the civil and survey drawings to become familiar with the existing underground conditions before digging.

D. Installer Qualifications: The installing Contractor shall have at least three (3) years of successful experience in a scope similar to that required for the work.

1. Installer Field Supervision: During times of installation, the Contractor shall maintain on site an experienced full time supervisor.

E. Contractor shall proceed with installation only when forecasted weather conditions permit for successful installation. Do not proceed with installation in periods of, heavy rain, or other detrimental weather conditions.

F. All equipment and components installed as a part of this irrigation system shall be purchased

new from a reputable certified dealer.

1.12 REFERENCE STANDARDS

A. ASTM B32 - Standard Specification for Solder Metal; 2008 (Reapproved 2014).

B. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes; 2015a.

C. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2016.

D. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings; 2004 (Reapproved 2016).

E. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2015.

F. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2012 (Reapproved 2018).

G. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2014.

1.13 PRE-CONSTRUCTION CONFERENCE

A. It is recommended that the Contractor schedule a pre-construction meeting with the Owner's Representative at least seven (7) days before beginning work to review any questions regarding the work or project schedule.

1.14 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory applied end caps or other original packaging material. Maintain said material through shipping, storage, and handling to prevent pipe damage and to prevent the entrance of dirt, debris, and moisture.

B. Store piping and other equipment where it is protected from direct sunlight.

C. Store piping so it is supported from bending and sagging.

D. Contractor shall be entirely responsible for damages or loss by weather or other cause.

1.15 PROTECTION

A. The Contractor shall maintain sufficient safeguards such as railings, lights, etc against the occurrence of accidents, injuries or damages to any person or property resulting from their work and shall alone be responsible for the same if such occurs.

B. The Contractor shall continuously maintain adequate protection of all their work from damage, destruction, or loss, and shall protect the Owner's property from damage arising in connection with this contract. Contractor shall make good any such damage, destruction, loss of injury. Contractor shall adequately protect adjacent property from above said damage.

C. All existing paving, structures, plant material, utilities, equipment, or adjacent property shall be protected from Contractor's work at all times. The Contractor shall take necessary steps to ensure the protection of above items during installation. All damages shall be repaired or replaced at the Contractor's expense. Repair or replacement shall be to the satisfaction of the Owner's Representative.

1. The Contractor is responsible for knowing and avoiding the location of all utilities. For dig-a-line service call toll free 1-800-422-4133 at least two working days before beginning construction.

1.16 POINT OF CONNECTION

A. The Point of Connection of the irrigation system to the electrical power source(s) shall be provided by irrigation or general contractor. All connections to the controller shall be made per governing codes at the location shown on the drawings.

B. Any Point of Connection of the irrigation system to a potable water source shall include a backflow prevention assembly provided and installed by the irrigation contractor.

1.17 CUTTING, PATCHING, TRENCHING, AND DIGGING

A. Contractor shall do all cutting, fitting, trenching, or patching of their work that may be required to make its several parts come together as shown upon, or implied by, the drawings for the completed project.

1.18 WARRANTY

A. Contractor shall warranty system for one year from install in addition to manufacturer warranty coverage.

PART 2- PRODUCTS

2.1 RECLAIMED WATER SYSTEM DESIGNATION

A. Where irrigation systems use reclaimed water, all products, including valve boxes, supply lines, etc, where applicable and / or required by local code shall have reclaimed purple water color designation.

2.2 PIPING MATERIAL

A. Individual types of pipe and fittings supplied are to be of compatible manufacturers unless otherwise approved.

B. Plastic Pipe:

1. All pipe shall be free of blisters, internal striations, cracks, or any other defects or imperfections. The pipe shall be continuously and permanently marked with the following information: manufacturer's name or trade mark, size, class and type of pipe pressure rating, quality control identifications, date of extrusion, and National Sanitation Foundation (NSF) rating.

2. Pressure main line for piping upstream of remote control valves and quick coupling valves:
    a) Pipe smaller than 2 inch diameter shall be plastic pipe for use with solvent weld or threaded fittings. Shall be manufactured rigid virgin polyvinyl chloride (PVC), conform to applicable and current ASTM standards, designated as Schedule 40.
    b) Pipe 2 - 3 inch diameter shall be manufactured rigid virgin PVC, conform to applicable and current ASTM standards, designated as Class 200.
    c) Pipe larger than 3 inch diameter shall be manufactured rigid virgin PVC, conform to applicable and current ASTM standards, designated as Class 200.

3. Non-pressure lateral line for piping downstream of remote control valves: plastic pipe for use with solvent weld or threaded fittings. Shall be manufactured rigid virgin PVC designated as Class 200, and conform to applicable and current ASTM standards.
    a) 3/4″ minimum size.

C. Galvanized pipe shall be used for above ground connections to backflow prevention device assemblies, hose bibs, and booster pumps and/or as shown on the plans and details.

1. Pipe shall be hot dip galvanized continuous welded, seamless, Schedule 40 conforming to applicable and current ASTM standards.

D. Drip Line:

1. All drip line shall feature pressure compensation with check valve, flow indication stripes, and be UV resistant.

E. Sleeving / Conduit

1. All sleeving at paved surfaces shall be rigid virgin PVC designated as Schedule 80.

a) 4 inch minimum size or double the size of the largest working pipe, whichever is larger.

2.3 FITTINGS AND CONNECTIONS

A. Polyvinyl chloride pipe fittings and connections: Type II, Grade 1, Schedule 40, high impact molded fittings, manufactured from virgin compounds as specified for piping tapered socket or molded thread type, suitable for either solvent weld or screwed connections. Machine threaded fittings and plastic saddle and flange fittings are not acceptable. Furnish fittings permanently marked with following information: nominal pipe size, type and schedule of material, and National Sanitation Foundation (NSF) seal of approval. PVC fittings shall conform to applicable and current ASTM standards.

B. Brass pipe fittings, unions and connections: standard 125 pound class 85% red brass fittings and connections, IPS threaded.

C. PVC Schedule 80 threaded risers and nipples: Type I, grade 1, Schedule 80, high impact molded, manufactured from virgin compounds as specified for piping and conforming to applicable and current ASTM standards. Threaded ends shall be molded threads only. Machined threads are not acceptable.

D. Galvanized pipe fittings shall be galvanized malleable iron ground joint Schedule 40 conforming to applicable current ASTM standards.

E. Drip Line: all fittings shall feature thread lock connections and be compatible with any nominal 16/17/18 tubing and dripline.

2.4 SOLVENT CEMENTS AND THREAD LUBRICANT

A. Solvent cements shall comply with current and applicable ASTM standards. Socket joints shall be made per recommended procedures for joining PVC plastic pipe and fittings with PVC solvent cement and primer by the pipe and fitting manufacturer and procedures outlined in the appendix of ASTM D2564.

B. Thread lubricant shall be Teflon ribbon-type, or approved equal, suitable for threaded installations as per manufacturer's recommendations.

C. Pipe Joint Compound shall be used on all galvanized threaded connections. Pipe Joint Compound is a white colored, non-separating thread sealant compound designed to seal threaded connections against leakage due to internal pressure.

2.5 BACKFLOW PREVENTION DEVICE (IF NECESSARY)

A. The backflow prevention device shall be certified for use according to local and state plumbing codes.

B. The main body and access covers shall be low lead bronze (ASTM B 584)

C. Make and model number shall be listed on “List for Approved Devices for the State of Washington.”

D. Location shall be as indicated on the drawings.

2.6 PRESSURE REGULATOR (IF NECESSARY)

A. Pressure regulator shall be certified to NSF/ANSI 372, consisting of low lead bronze body bell housing, a separate access cap shall be threaded to the body and shall not require the use of ferrous screws.

B. The main valve body shall be cast bronze (ASTM B 584).

C. The access covers shall be bronze (ASTM B 584 or Brass ASTM B 16)

D. The assembly shall be of the balanced piston design and shall reduce the pressure in both flow and no flow conditions.

2.7 BACKFLOW PREVENTER CAGE (IF NECESSARY)

A. A heavy-duty steel mesh cage with rust proof finish. The caging shall be sized to allow space for the entire piping assembly associated with the Backflow Prevention Assembly unit, and all associated equipment.

B. The cage shall include a manufacturer installed, tamper proof locking mechanism.

C. Provide a concrete base as required by manufacturer.

D. Color shall be green or black, or other approved color.

2.8 ISOLATION VALVES

1. Valves 3 inch and larger shall be gate design and shall be iron body, brass or otherwise rated for direct burial and shall be able to withstand a continuous working pressure of 150 PSI. Valve shall be equipped with a square-operating nut.

2. Valves 2 1/2 inch and smaller shall be ball design and shall be iron body, brass or otherwise rated for direct burial and shall be able to withstand a continuous working pressure of 150 PSI.

3. Anti-drain valves shall be of heavy-duty virgin PVC construction with female iron pipe thread inlet and outlet. Internal parts shall be stainless steel and neoprene. Anti-drain valves shall be field adjustable against draw out from 5 to 40 feet of head.

2.9 REMOTE CONTROL VALVES

A. Remote control valves shall be electrically operated, single seat, normally closed configuration, equipped with flow control adjustment and capability for manual operation.

B. Remote control valves shall rated for commercial or other high intensity use by the manufacturer.

C. Remote control valves shall be capable of operating at the GPM shown on the drawings.

2.10 REMOTE CONTROL DRIP KITS

A. Drip kits shall be an all in one kit with filter and pressure regulator, electrically operated, and commercially rated.

B. Drip kits shall be capable of operating at the GPM shown on the drawings.

2.11 MASTER CONTROL VALVES

A. Master Control Valve shall be compatible with the irrigation controller.

2.12 QUICK COUPLER VALVES

A. Quick coupler valves shall be a one or two piece, heavy-duty brass construction with a working pressure of 150 PSI with a built in flow control and a self-closing valve.

B. Quick coupler shall be equipped with locking red brass cap covered with durable yellow thermo-plastic rubber cover. Key size shall be compatible with quick coupler and of same manufacturer.

2.13 SPRINKLER BODIES

A. All sprinkler heads shall have check valves installed, as necessary to limit flow runoff.

B. Chosen nozzle pattern and body type (pop up spray or rotor) shall be appropriate for area to be irrigated.

C. All nozzles and sprinkler bodies shall be of same manufacturer.

D. All sprinkler heads shall be as indicated on the drawings.

2.14 AUTOMATIC CONTROLLER (IF NECESSARY)

A. Controller shall be approved for commercial or industrial use and be housed in a sturdy, locking, weather-resistant case, furnished for maximum exterior protection.

B. Controller shall be equipped with evapo-transpiration (ET) sensor, or other weather sensor, which adjusts the controller programming based on local climatic conditions. The sensor shall also have a rain sensing shut-off switch, wind sensing shut off switch, and freeze sensing shut-off of switch.

1. If a moisture sensor is used in lieu of an evapo-transpiration sensor an additional sensor, which has a rain-sensing shut-off switch, wind sensing shut-off switch, and freeze sensing shut-off switch shall be provided.

C. If applicable, controller shall be capable of running a 2-wire system.

D. Automatic controller shall be as indicated on the drawings.

2.15 CONTROLLER DECODERS (2 WIRE SYSTEMS ONLY)

A. All decoders shall be per the controller manufacturer’s specifications.

2.16 ELECTRICAL CONTROL WIRING

A. Low voltage

1. The electrical control wire shall be direct burial type UF, no. 14 AWG, solid, single conductor, copper wire UL approved or larger, if required to operate system as designed.

2. For 2-Wire controllers all irrigation wire for the controller, flow sensor, master valve, hydrometer, remote control valves and moisture sensors shall be per the controller manufacturer’s specifications and recommendations.

3. Color code wires to each valve. Common wire shall be white.

4. If multiple controllers are being utilized, and wire paths of different controllers cross each other, both common and control wires from each controller to be of different colors.

5. Control wire splices: Splices are when required shall be placed in splice boxes.

6. Wire connections shall be per the controller manufacturer’s specifications and recommendations.

2.17 VALVE BOXES AND MATERIALS

A. Valve boxes: valve boxes shall be constructed of ABS (acrylonitrile butadiene styrene) plastic, green in color, with rigid base and sides and shall be supplied with bolt lock cover secured with stainless steel bolts. Provide box extensions as required.

B. Master valves, flow sensors, remote control irrigation valves, gate valves, and ball valves 3 inch or less in size shall use a 14 inch x 19 inch x 12 inch rectangular box, or approved other.

C. Quick coupler valves, wire splices, and grounding rods shall use a 10 inch circular, or approved other.

2.18 EQUIPMENT TO BE FURNISHED TO OWNER

A. Two (2) sets of keys for each automatic controller.

B. Two (2) 48 inch tee wrenches for operating the gate valves.

C. Three (3) sets of special tools required for removing, disassembling and adjusting each type of sprinkler and valve supplied on this project.

D. Five (5) Extra sprinkler heads, nozzles, shrub adapters, nozzle filter screens, for each type used on the project.

E. Two (2) quick coupler keys to match manufacturer type of quick coupler.

2.19 TRACER TAPE

A. 3 - inch wide plastic detectable locator tape.

2.20 MAIN LINE AND LATERAL LINE BEDDING SAND

A. Sand shall consist of natural or manufactured granular material, free of organic material, mica, loam, clay or other substances not suitable for the intended purpose.

2.21 INCIDENTAL MATERIALS AND EQUIPMENT

A. Furnish all materials and equipment not specified above, but which are necessary for completion of the work as intended.

PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Code requirements shall be those of state and municipal codes and regulations locally governing this work, providing that any requirements of the drawings and specifications, not conflicting therewith, but exceeding the code requirements, shall govern unless written permission to the contrary is granted by the Owner’s Representative.

B. Extreme care shall be exercised at all times by the Contractor in excavating and working in the project area due to existing utilities and irrigation systems to remain. Contractor shall be fully responsible for expenses incurred in the repair of damages caused by their operation.

1. The Contractor is responsible for identifying and maintaining existing irrigation main lines that supply water to areas on the site as noted on the drawings and / or outside of the proposed limit of work. The Contractor shall repair or replace existing irrigation piping if disruption of irrigation to existing plant material occurs due to construction activity. Contractor shall provide a continuous supply of water to all effected plant material until irrigation repairs have been completed.

a) Providing continuous water supply shall include hand watering and or the use of watering trucks, or approved other, to provide adequate water.

2. Plan locations of backflow preventers, valves, controllers, irrigation lines, sleeves, spray heads and other equipment are diagrammatic and indicate the spacing and relative locations of all installations. Final site conditions and existing and proposed plantings shall determine final locations and adjusted as necessary and as directed to meet existing and proposed conditions and obtain complete water coverage. Minor changes in locations of the above from locations shown shall be made as necessary to avoid existing and proposed trees, piping,

utilities, structures, etc. at the Contractor's expense or when directed by the Owner's Representative.

C. If requested by Owner's Representative, prior to any work the Contractor shall stake out locations of all pipe, valves, equipment and irrigation heads and emitters using an approved staking method in accordance with the drawings and any required modifications.

D. Do not exceed recommended head spacing shown on drawings for any given area. If any modified spacing made at the decision of the Contractor demands additional material than shown on the drawings, it shall be at no cost to the Owner.

E. Stub out main line at all end runs. Stub out wires for future connection as necessary.

F. Point of connection shall be approximately as shown on drawings. Connect new underground piping and valves and provide all flanges, adapters or other necessary fittings for connection.

G. Permission to shut off any existing in-use irrigation line must be obtained 48 hours in advance, in writing from the Owner's Representative. The Contractor shall receive confirmation from the Owner's Representative as to the exact allowable length of time of each shut-off.

H. No fittings shall be installed on pipe underneath pavement or walls.

I. Contractor shall install system components to permit adequate drainage and protection against freeze damage including blow out / winterization connections.

J. Prior to starting any work, Contractor shall obtain a reading of existing static water pressure (no flow condition) at the designated point of connection and immediately submit any concerns about adequate system pressure to the Owner's Representative.

3.2 TRENCHING AND SLEEVING

A. Perform all trenching, directional boring, sleeving and excavations as required for the installation of the work included under this section, including shoring of earth banks to prevent cave-ins.

B. Make trenches for mains, laterals and control wiring straight and true to grade and free of protruding stones, roots or other material that would prevent proper bedding of pipe or wire.

C. Excavate trenches wide enough to allow a minimum of 4 - inch between parallel pipelines and 8 - inch from lines of other trades. Maintain 3 - inch vertical clearance between irrigation lines. Minimum transverse angle is 45 degrees. All pipes shall be able to be serviced or replaced without disturbing the other pipes.

D. Trenches for pipelines shall be made of sufficient depth to provide the minimum cover from finished grade as follows:

1. Pressure main line: 24 inches below finish grade

a) Mainline depths shall vary based on geography and climate conditions. For colder climates, depths may be deeper. Contractors shall verify local and or state requirements.

2. Reclaimed water constant pressure main lines shall cross at least twelve (12) inches below potable water lines.

a) If a constant pressure reclaimed water main line must be installed above a potable water line or less than twelve (12) inches below a potable water line, then reclaimed water line shall be installed within an approved protective sleeve. The sleeve shall extend ten (10) feet from each side of the center of the potable line, for a total of twenty (20) feet. The sleeve shall be color-coded (purple) for use with reclaimed water.

3. Lateral lines: 12 inches below finish grade

    a) Lateral depths shall vary based on geography and climate conditions. For colder climates, depths may be deeper. Contractors shall verify local and or state requirements.

4. Control wiring: to the side of pressure main line

E. On new on-site systems (post-meter), the required horizontal separation between potable water lines, reclaimed water constant pressure main lines and sewer lines shall be a minimum of four (4) feet apart as directed by the project engineer and/ or regulatory agency. Measurements shall be between facing surfaces, not pipe centerlines.

F. When trenching through areas of imported or modified soil, deposit imported or modified soils on one side of trench and subsoil on opposite side.

G. Backfill the trench per the requirements in paragraphs “Backfilling and Compacting” below.

3.3 PIPE INSTALLATION

A. General Pipe Installation

1. Exercise caution in handling, loading and storing, of plastic pipe and fittings to avoid damage.
    a) The pipe and fittings shall be stored under cover until using, and shall be transported in a vehicle with a bed long enough to allow the length of pipe to lay flat so as not to be subjected to undue bending or concentrated external load at any point.
    b) All pipe that has been dented or damaged shall be discarded unless such dent or damaged section is cut out and pipe rejoined with a coupling.
2. Trench depth shall be as specified above from the finish grade to the top of the pipe.

B. Sleeving Installation

1. All sleeving shall occur in bundles of two (2) unless otherwise approved.
2. All sleeves shall include detectable tracer tape.
3. All sleeves shall be encased in concrete when installed underneath vehicular drive aisles.
4. All sleeves shall extend a min. of 12 inches beyond all hardscape edges.

C. PVC Installation

1. Under no circumstance is pipe to rest on concrete, rock, wood blocks, construction debris or similar items.
2. No water shall be permitted in the pipe until a period of at least 24 hours has elapsed for solvent weld setting and curing.
3. Install assemblies and pipe to conform to respective details and where shown diagrammatically on drawings, using standard practices. All fittings that are necessary for proper connections such as swing joints, offsets, and reducing bushings that are not shown on details shall be installed as necessary and directed as part of the work.
4. Dielectric bushings shall be used in any connections of dissimilar metals.
5. Gasketed plastic pipe: pipe-to-pipe joints or pipe to fittings shall be made in accordance

with manufacturer's specifications.

6. Solvent weld or threaded plastic pipe:
    a) Installation of all pipe and fittings shall be in strict accordance with manufacturer's specifications.
    b) Pipe shall be cut using approved PVC pipe cutters only. Sawed joints are disallowed. All field cuts shall be beveled to remove burrs and excess before gluing.
    c) Welded joints shall be given a minimum of 15 minutes to set before moving or handling. Excess solvent on the exterior of the joint shall be wiped clean immediately after assembly.
    d) Plastic to metal connections shall be made with plastic adapters and if necessary, short (not close) brass threaded-nipples. Connection shall be made with two (2) wraps of Teflon tape and hand tightened plus one turn with a strap wrench.
    e) Snake pipe horizontally in trench to allow one (1) foot of expansion and contraction per 100 feet of straight run.
    f) Threaded pipe joints shall be made using Teflon tape. Solvent shall not be used with threaded joints. Pipe shall be protected from tool damage during assembly. All damaged pipe shall be removed and replaced. Take up threaded joints with light wrench pressure.
    g) No close nipples or risers are allowed. Cross connections in piping is disallowed.
    h) Center load pipe at 10 feet on center intervals with small amount of backfill to prevent arching and slipping under pressure. Other than this preliminary backfill all pipe joints, fittings and connections are to remain uncovered until successful completion of hydrostatic testing and written approval of the testing report.
    i) Concrete thrust blocks shall be constructed behind all pipe fittings 1-1/2 inch diameter and larger at all changes of direction of 45 degrees or more.

D. Galvanized Pipe Installation

1. All joints shall be threaded with pipe joint compound used on all threads.
2. Dielectric bushings shall be used in any connections of dissimilar metals.

3.4 FLUSHING

A. Openings in piping system during installation are to be capped or plugged to prevent dirt and debris from entering pipe and equipment. Remove plugs when necessary to flush or complete system.

B. After completion and prior to the installation of any terminal fittings, the entire pipeline system shall be thoroughly flushed to remove dirt, debris or other material.

3.5 HYDROSTATIC PRESSURE TESTING

A. After flushing, and the installation of valves the following tests shall be conducted in the sequence listed below. The Contractor shall furnish all equipment; materials and labor necessary to perform the tests and all tests shall be conducted in the presence of the Owner's Representative, if requested.

B. Water pressure tests shall be performed on all pressure main lines before any couplings, fittings, valves and the like are concealed.

C. Immediately prior to testing, all irrigation lines shall be purged of all entrapped air or debris by adjusting control valves and installing temporary caps forcing water and debris to be discharged

from a single outlet.

D. Test all pressure main line at 150 PSI for a minimum of two (2) hours with an allowable loss of 5 PSI. Pressure and gauges shall be read in PSI, and calibrated such that accurate determination of potential pressure loss can be ascertained.

E. Re-test as required until the system meets the requirements. Any leaks, which occur during test period, will be repaired immediately following the test. All pipe shall be re-tested until final written acceptance.

F. The Contractor is responsible for providing documentation stating the weather conditions, date, the start time and initial water pressure readings, the finish time and final water pressure readings and the type of equipment used to perform the test.

G. Submit a written report of the pressure testing results with the other above required information to the Owner's Representative for approval.

3.6 BACKFLOW PREVENTOR TESTING

A. The backflow prevention assembly shall be tested according to procedures and results per the requirements of the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California or American Water Works Association whichever is more stringent.

B. Testing shall be performed by a Backflow Prevention Assembly Tester with a current certification from the American Backflow Preventer Association.

3.7 BACKFILLING AND COMPACTING

A. Irrigation trenches shall be carefully backfilled with material approved for backfilling and free of rocks and debris one (1) inch in diameter and larger. When back filling trenches in areas of imported or modified planting soil, replace any excavated subsoil at the bottom and the imported soil or modified planting soil at the top of the trench.

B. Backfill shall be compacted only with approved equipment.

C. Finish grade of all trenches shall conform to adjacent grades without dips or other irregularities. Dispose of excess soil or debris off site at Contractor's expense.

D. Any settling of backfill material during the maintenance or warranty period shall be repaired at the Contractor's expense, including any replacement or repair of soil, lawn, and plant material or paving surface.

3.8 RESURFACING PAVING OVER TRENCHES

A. Restore all surfaces and repair existing underground installations damaged or cut as a result of excavation to their original condition, and satisfactory to the Owner's Representative.

B. Trenches through paved areas shall be resurfaced with same materials quality and thickness as existing material. Paving restoration shall be performed by the project paving Sub-contractor or an approved Contractor skilled in paving work.

C. The cost of all paving restoration work shall be the responsibility of the irrigation Contractor unless the trenching through paving was, by previous agreement, part of the general project related construction.

3.9 INSTALLATION OF EQUIPMENT

A. GENERAL

1. All equipment shall be installed to meet all installation requirements of the product manufacturer. In the event that the manufacturers requirements cannot be implemented due

to particular condition at the site or with other parts of the design, obtain the Owner's Representative's written authorization and approval for any modifications.

2. Install all equipment at the approximately at the location(s) and as designated and detailed on the drawings. Verify all locations with the Owner's Representative.
3. Install all valves within a valve box of sufficient size to accommodate the installation and servicing of the equipment. Group valves together where practical and locate in shrub planting areas.
4. All sprinkler irrigation systems that are using water from potable water systems shall require backflow prevention. All backflow prevention devices shall meet and be installed in accordance with requirements set forth by local codes and the health department.

B. PRESSURE REGULATOR (IF NECESSARY):

1. Set regulator for required PSI per manufacturer's specifications.

C. CHECK VALVE:

1. Install check valve(s) approximately at locations necessary to prevent low head run off.

D. ISOLATION CONTROL VALVE:

1. Install valve(s) on main line, approximate equal spacing, intervals of approximately 500 ft.
2. Also locate prior to all hardscape crossings or as shown on appropriate plans.

E. REMOTE CONTROL AND DRIP KIT VALVES:

1. Install no more than 2 drip kit valves per valve box.
2. Install no more than 2 remote control valves per standard valve box and 3 per jumbo valve box
3. Remote control valve manifolds and quick coupler valves shall be separate allowing use of a quick coupler with all remote control valves shut off.
4. Install valve boxes parallel to each other when practical.
5. Allow 12 inches clearance between adjacent valve boxes.

F. QUICK COUPLER VALVE:

1. Install each quick coupler valve in its own valve box.
2. Install thrust blocks on quick couplers.
3. Install on main line with approximate equal spacing at intervals of 200 ft.
4. Locate adjacent to paved surfaces, where practical.

G. SPRINKLER HEADS:

1. All main lines and lateral lines, including risers, shall be flushed and pressure tested before installing sprinkler heads.
2. Install specified sprinkler heads as shown in details at locations shown on the drawings. Adjust layout for full coverage, spacing of heads shall not exceed the maximum spacing recommended by the manufacturer.
3. All sprinkler heads shall be set perpendicular to finish grade unless otherwise designated on the drawings or details.

H. IRRIGATION CONTROLER:

1. Remote control valves shall be connected to controller in an intuitive numerical sequence.

2. Controller shall be tested with complete electrical connections. The Contractor shall be responsible for temporary power to the controller for operation and testing purposes.

3. Connections to control wiring shall be made within the pedestal of the controller, when applicable. All wire shall follow the pressure main insofar as possible.

I. WIRING:

1. Low Voltage
   a) Control wiring between controller and electrical valves shall be installed in the same trench as the main line where practical. The wire shall be bundled and secured to the lower quadrant of the trench at 10 foot intervals with plastic electrical tape.
   b) When the control wiring cannot be installed in the same main line trench it shall be installed a minimum of 18 inches below finish grade and a bright colored plastic ribbon with suitable markings shall be installed in the trench 6 inches below grade directly over the wire.
   c) An expansion loop shall be provided every 500 feet in a box and inside each valve box. Expansion loop shall be formed by wrapping wire at least eight (8) times around a ¾ inch pipe and withdrawing pipe.
   d) Provide one control wire to service each valve in system.

J. TRACER WIRE:

1. Tracer wire shall be installed with non-metallic plastic irrigation main lines where controller wires are not buried in the same trench as the main line.

2. The tracer wire shall be placed on the bottom of the trench under the vertical projection of the pipe with spliced joints soldered and covered with insulation type tape.

3. Tracer wire shall be of a color not used for valve wiring. Terminate wire in a valve box. Provide enough length of wire to make a loop and attach wire marker with the designation "tracer wire".

K. DRIP INSTALLATION:

1. Clamp fittings with Oetiker clamps or approved equal when operating pressure exceeds specific drip tubing fitting requirements.

2. When installing drip tubing, install soil staples at a minimum of one staple every 3 feet and at change of direction.

3. Cap or plug all openings as soon as lines have been installed to prevent the intrusion of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.

4. Thoroughly flush all water lines before installing valves and other hydrants.

5. Install in approved patterns depicted in irrigation details of the drawings.

L. ADJUSTMENT AND COVERAGE TEST

1. Adjustment:
   a) The Contractor shall flush and adjust all sprinkler heads, valves and all other equipment to ascertain that they function according to the manufacturer's data.
   b) Adjust all sprinkler heads not to overspray onto walks, roadways and buildings when under maximum operating pressure and during times of normal prevailing winds.

2. Coverage test:

a) The Contractor shall perform the coverage test in the presence of the Owner's Representative after all sprinkler heads have been installed, flushed and adjusted. If Owner's Representative is not present, Contractor shall provide written documentation that coverage meets specification here within. Each section is tested to demonstrate uniform and adequate coverage of the planting areas serviced.

b) Any systems that require adjustments for full and even coverage shall be done by the Contractor prior to final acceptance at the direction of the Owner's Representative at no additional cost. Adjustments may also include realignment of pipes, addition of extra heads, and changes in nozzle type or size.

c) The Contractor at no additional cost shall immediately correct all unauthorized changes or improper installation practices.

d) The entire irrigation system shall be operating properly with written approval of the installation by the Owner's representative prior to beginning any planting operations.

3.10 CLEAN-UP

A. During installation, keep the site free of trash, pavements reasonably clean and work areas in an orderly condition. Remove trash and debris as necessary to keep an orderly appearance of project site and / or neighboring right of ways and property.

B. Once installation is complete, clean all soil from pavements and the structures.

1. Remove and dispose of packaging, excess soil, and other materials brought to site by contractor.

3.11 GENERAL MAINTENANCE AND MAINTENANCE PERIOD

A. General maintenance shall begin immediately after installation of the irrigation system. The period shall include the following:
   1. On a weekly basis the Contractor shall keep the irrigation system in good running order and make observations on the system for proper coverage and operation. Repair and clean to keep system fully operational.
   2. Record recommended controller schedule and turn over to Owner's Representative at time of Final Acceptance.
   3. During the last week of maintenance period, provide instruction of the system operations to personnel who will assume responsibility for running system.
B. Maintenance period shall coincide with maintainence period of plant material. See appropriate Section.

3.12 REPAIR OF PLANTING SOIL

A. Any areas of planting soil including imported or existing soils or modified planting soil which become compacted or disturbed or degraded as a result of the installation of the irrigation system shall be restored to the specified quality and compaction prior to beginning planting operations at no additional expense to the Owner. Restoration methods and depth of compaction remediation shall be approved by the Owner's Representative.

3.13 FINAL INSPECTION AND ACCEPTANCE

Do not allow or cause any work of this Section to be covered up, enclosed, or locked until it has been inspected and tested.

A. Final Inspection

1. Clean, adjust and balance all systems. Verify that:

   a. Remote control valves are properly working.

   b. Heads are properly adjusted for radius and arc of coverage.

   c. The installed system, in its entirety, is workable, clean, and efficient.

B. Start Up Service

1. Contractor shall be responsible for initial startup of the system the first spring growing season after installation. Verify that:

   a. Remote control valves are properly working.

   b. Heads are properly adjusted for radius and arc of coverage.

   c. Replace system components as necessary so the installed system, in its entirety, is workable and clean.

END OF SECTION 328423

SECTION 329200 - PLANTING

PART 1 - GENERAL

1.1 DESCRIPTION

This Section consists of providing all the products, plant material, executions, and final operations for the preparation and installation exterior landscape and planting materials. This work shall be accomplished in accordance with these specifications and the applicable drawings.

1.2 SUMMARY

A. This Section includes the following:
1. General
2. Products
3. Execution
4. Final Inspection and Acceptance
5. Measurement and Payment

1.3 RELATED DOCUMENTS AND REFERNCES:

A. Related Documents:

1. Related drawings and general provisions of contract including general and supplementary conditions and specifications.

B. References: The following specifications and standards of the organizations and documents listed in this paragraph from a part of the specification to the extent required by the references thereto. If the requirements of any of the following referenced standards and specifications conflict with each other, the more stringent requirement shall prevail.

1. ANSI Z60.1 - American Standard for Nursery Stock, most current edition.

2. ANSI A 300 – Standard Practices for Tree, Shrub, and other Woody Plant Maintenance, most current edition and parts.

3. Pruning practices shall conform to recommendations “Structural Pruning: A Guide For The Green Industry” most current edition; published by Urban Tree Foundation, Visalia, California

1.4 VERIFICATION

A. All scaled dimensions on the drawings are approximate. Before proceeding with any work, the Contractor shall carefully check and verify all dimensions and quantities, and shall immediately inform the Owner’s Representative of any discrepancies between the information on the drawings and the actual conditions. Contractor shall refrain from doing any work in said areas until given approval to do so by the Owner’s Representative.

B. In any case of discrepancy in the plant quantities between the plan drawings and the plant call outs/list/schedule, the number of plants actually drawn on the plan drawings shall be deemed correct and prevail.

1.5 PERMITS AND REGULATIONS

A. The Contractor shall obtain and pay for all permits related to the section of the work unless previously excluded under provision of the contract or general conditions. The Contractor shall comply with all laws and ordinances bearing on the operation or conduct of the work as drawn and specified. If the Contractor observes that a conflict exists between the permit requirements and the work outlined in the contract documents, the Contractor shall promptly notify the Owner's Representative in writing a description of any necessary changes and changes to the contract price resulting from changes in the work.

B. Wherever references are made to standards or codes in accordance with which work is to be performed or tested, the edition or revision of the standards and codes current on the effective date of this contract shall apply.

C. In case of conflict among any regulations or codes or between any referenced standards and codes and the specifications, the more restrictive standard shall apply or Owner's Representative shall determine which shall govern.

1.6 PROTECTION OF WORK, PROPERTY AND PERSON

A. The Contractor shall protect the work, adjacent property, and the public, and shall be responsible for any damages or injury due to his/her actions.

1.7 CHANGES IN THE WORK

A. The Owner's Representative may order changes in work, and the contract sum being adjusted accordingly. All such orders and adjustments plus claims by the Contractor for extra compensation must be made and approved in writing before executing the work involved.

B. All changes in the work, notifications, and Contractor's request for information (RFI) shall conform to the contract general condition requirements.

1.8 CORRECTION OF WORK

A. The Contractor shall re-execute any work that fails to conform to the requirements of the contract and shall remedy defects due to faulty materials or workmanship upon written notice from the Owner's Representative, at the soonest possible time that can be coordinated with other work, and seasonal weather demands, but not more than 90 (ninety) days after notification.

1.9 DEFINITIONS

A. Owner's Representative: The person appointed by the Owner to represent their interest in the review and approval of the work and to serve as the contracting authority with the Contractor. The Owner's Representative may appoint other persons to review and approve any aspects of the work.

B. Substantial Completion Acceptance: The date at the end of the installation where the Owner's Representative accepts that all work in the section is complete and the Warranty period has begun. This date may be different than the date of substantial completion for the other sections of the project.

C. Final Acceptance: The date when the Owner's Representative accepts that work in this section meets all the requirements of the specification.

D. Backfill: The earth used to replace or the act of replacing earth in an excavation.

E. Container-Grown Stock: Healthy, vigorous, well-rooted exterior landscape plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to the American Standard for Nursery Stock (ANSI Z60.1.) for kind, type, and size of exterior plant required.

F. Balled and Burlapped Stock: Exterior plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum laced as recommended by ANSI Z60.1.

G. Finish Grade: Elevation of finished surface of topsoil.

H. Manufactured Topsoil: soil produced off site by homogenously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil / planting soil.

I. Plants / Plant Material: These terms refer to vegetation in general, including but not limited to: deciduous trees, evergreen trees, deciduous shrubs, evergreen shrubs, ornamental grasses, perennials, and lawn.

J. Topsoil: existing, native surface topsoil; imported topsoil, or manufactured topsoil that is modified with soil amendments and perhaps fertilizer to produce a soil mixture optimal for plant growth.

K. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing topsoil.

L. Healthy: Plants are that growing in a condition that expresses leaf size, crown density typical of the cultivar's horticultural description.

1.10 SUBMITTALS

A. Samples for Verification shall be submitted to Architect / Owner's Representative for each of the following:

1. Mulch - 1-2 lbs. mulch for each color and type required, in plastic bags labeled with color, size, and supplier information. Submit for review a minimum of one week prior to full quantity delivery and installation.

2. Weed Control Barrier: manufacturer cutsheet

3. Root Barrier: manufacturer cutsheet

4. Edging Materials: manufacturer cutsheet

B. Plant List: Provide list of plant material sourced for use in the Project. Indicate species, size, and quantity available. Indicate use of substitutions, if necessary. All suggested substitutions must be in writing and approved by Owner's Representative. Submit to Owner's Representative a minimum of two weeks prior to full quantity delivery and installation.

C. Planting Schedule: Indicating anticipated planting dates for plant material. Submit to Owner's Representative a minimum of one week prior to installation. Once approved, dates may only be revised in writing, and shall include documentation of reasons for delays.

D. In accordance with Section 361414-Topsoiling, it is recommended that an analysis be conducted on any topsoil that is intended to be used on the Project. Contractor shall coordinate with Owner's Representative for soil analysis of topsoil obtained on project site by a qualified soil-laboratory.

1.11 QUALITY ASSURANCE

A. Contractor Qualifications: The installing Contractor firm shall have at least three (3) years of successful experience of similar scope of work for the successful establishment of exterior plants.

1. Field Supervision: When planting is in progress, Contractor shall maintain an experienced full-time foreman on the Project Site.

B. Contractor Quality Assurance Responsibilities: Contractor is solely responsible for quality control of the work.

C. Install only specified plants. Plant substitutes must be approved by Owner's Representative. Unapproved plant substitutes may be subject to replacement at Contractor's expense.

D. In the event of any discrepancies between the drawings and the specifications, the final decision as to which shall be followed shall be made by the Owner's Representative. The Contractor shall immediately bring these discrepancies to the Owner's Representative.

E. The Owner's Representative may review all plants subject to approval of size, health, quality, character, etc. Review or approval of any plant during the process of selection, delivery, installation and establishment period shall not prevent that plant from later rejection in the event that plant changes or existing defects become apparent that were not earlier observed.

1. The Contractor shall bear all costs related to plant corrections due to failure of the review process.

2. All plants rejected shall be immediately removed from the site and acceptable plants should be provided in a timely fashion that does not interfere with Project scheduling.

1.12 DELIVERY, STORAGE, AND HANDLING.

A. Do not prune trees and shrubs before delivery, except as approved by Owner's Representative. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plant material during delivery. Take necessary steps to avoid dropping plant material during delivery. Handle all container grown and/or balled and burlapped stock by the root ball.

B. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name of manufacturer.

C. Bulk Materials:

1. Do not dump or store bulk materials near structures, utilities, walkways and pavements or on existing turf areas or plants.

2. Provide erosion control measures to prevent erosion or displacement of bulk materials, discharge of soil bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.

D. Deliver all fertilizer in waterproof containers showing weight, chemical analysis, and name of manufacturer.

E. Contractor is responsible for keeping project site clean and disposing of delivery / packaging materials on an as needed basis to keep an orderly appearance.

F. Deliver all plant material after preparations for planting have been completed and install immediately. If planting is delayed more than 6 hours after delivery, set plants in a location protected from sun, wind, and mechanical damage. Keep all plant material well-watered during the storage period.

1. Do not remove container-grown stock from containers before time of plantings.

2. Cover balled and burlapped stock with soil, peat moss or other acceptable materials to keep from drying out.

3. Water root systems of all plant material stored on-site with a fine mist spray. Water as often as necessary to maintain root system in a moist condition.

1.13 PROJECT CONDITIONS

A. Contractor shall verify actual grade elevations, service and utility locations, irrigation system components, and location of any other construction elements adjacent to location of new plantings prior to proceeding with planting work.

1. Contractor shall carefully examine the associated civil and survey drawings to become familiar with the existing underground conditions before digging.

2. Contractor is responsible for knowing and avoiding the location of all utilities. For dig-a-line services call toll free 1-800-422-4133 or the State's local number, at least two working days before installation begins.

3. Contractor is responsible for knowing the location and avoiding utilities not covered by utility locating services.

B. Do not interrupt services or utilities to facilities occupied by Owner unless permitted by the following conditions and then only after providing temporary services or utilities:

1. Notify Owner's Representative no fewer than two days in advance of proposed interruption of each service or utility.

2. Do not proceed with interruption without written approval from Owner's Representative.

C. Planting shall only be performed during periods when weather and soil conditions are suitable and in accordance with locally accepted horticultural practices.

1. Do not install plants into saturated or frozen soils. Or during periods of inclement weather, such as rain or snow, or during extremely hot, cold, or windy conditions.

D. Contractor shall coordinate with all other Trades that may impact the installation of plant materials.

E. This specification requires that irrigation connections (if applicable) and majority of components be installed and in full working order prior to the installation of any plant material.

F. Root balls should not be altered to fit around existing utilities.

G. Any berming and grading shown on plans shall have gradual transitions to existing or engineer proposed grades. Grading shall not change flow direction of surface drainage swales as shown on civil plans.

H. Fine grading elevations set by civil plans shall have positive drainage away from structures. Surface water drainage is to be contained within the site unless allowed otherwise by approved engineering plans.

I. Coordination with Lawn / Turf Areas: Plant material shall be installed after finish grades are established and before planting seed or installing sod, unless otherwise approved by Owner's Representative.

1. If it is unavoidable to install plant material after planting seed or installing sod, the beforementioned must be protected through standard industry practices and promptly repaired if any damage was caused by planting activities.

1.14 WARRANTY

A. Special Warranty: Warrant the following plant material for the warranty period indicated, against defects, including death and unsatisfactory growth, except for defects resulting from inadequate maintenance, neglect or abuse by Owner, or incidents that are beyond the Contractor's control.

1. Warranty Period for Trees and Shrubs: 12 months from date of Substantial Completion.

2. Warranty Period for Ornamental Grasses / Perennials: 12 months from date of Substantial Completion.

3. The following remedial actions are minimums:

a) Remove dead plant material immediately upon discovery. Replace immediately with same species, genus, variety, unless the calendar date requires replacement planting to occur in the succeeding planting season.

4. Any plant material that is more than 50% dead at the end of the Warranty Period shall be replaced.

5. Replacement shall be limited to one (1) replacement of each plant except for losses or replacements due to failure to comply with requirements.

6. One (1) year warranty walk through to review status of plants shall be conducted by Owner's Representative or other appointed representative.

1.15 MAINTENANCE SERVICE

A. Initial Maintenance Service for Trees and Shrubs: provide maintenance by skilled employees of the installer. Maintain as required in Part 3. Begin maintenance after plants are installed and continue until plantings are healthy and well established but not for less than the period below:

1. Maintenance Period: One (1) month after date of Substantial Completion

B. All stakes shall be removed at or immediately after one (1) year warranty walk through.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL.

A. General: Furnish nursery-grown plant material complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.

B. Provide plants of sizes, grades and ball or container size complying with ANSI Z60.1 for type of plant material specified.

C. Trees shall be single stem (unless otherwise noted on plans) with straight trunk, well balanced crown and intact leaser.

D. Plant material shall be disease and insect free upon delivery to Project Site.

E. Trees and shrubs of a larger size may be used if acceptable to Owner's Representative, with a proportionate increase in root ball size in accordance with ANSI Z60.1.

1. The use of larger plants shall not increase the contract price.

F. If a range of size is given, no plant shall be less than the minimum size and no less than 50 percent of the plants shall be the maximum size specified.

G. If work is in the spring, between the months March to May, then apply pre-emergent to planting beds prior to planting.

1. Do not apply to beds that are to receive seed or bulbs of any kind.

H. Ensure a minimum of 50% of each variety of plant material is labeled securely with an attached, waterproof tag bearing legible designation of botanical and common name. Remove tags after installation.

I. If formal arrangements or consecutive order of plant material is shown on appropriate plans, plant material shall be selected to have uniform height and spread, to assure symmetry in planting.

J. Any areas of existing landscaping and/ or trees noted "To Remain" shall be protected and retained per Tree Protection Specifications.

K. All plant material shall be acclimated to local outdoor growing conditions for a period of no less than one week prior to delivery to Project Site.

L. Prepare all areas to receive plant material by grubbing and removing weeds. If necessary and with prior written approval by Owner's Representative, apply a non-selective herbicide with a certified applicator. Apply per manufacturer's recommendations and follow suggested wait period before installing plant material.

2.2 FERTILIZER

A. Furnish commercially manufactured slow release fertilizer for plant material in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots. Consisting of the following composition:

1. Product: Agriform 20-10-5 or approved equal

2. Furnish enough quantity to fulfill the manufacturer recommended application.

2.3 WEED BARRIER

A. Furnish Composite Fabric: Woven, needle punched polypropylene substrate bonded to a nonwoven polypropylene fabric, 4.8 oz. / sq. yd. Use manufacturer recommended pins for holding seams and edges.

2.4 MULCH

A. Furnish Mulch that is free from deleterious materials and suitable as a top dressing for plant material, consisting of the following;

1. Type 1: Organic, Soil Pep' Fine Bark Mulch, Natural Color

2. Type 2: Mineral, 3/8-1/4" Crusher Fines / Chat Rock.

3. Type 3: Mineral, 3"-10" Streambed Cobble. Large River Rock.

2.5 EDGING MATERIALS

A. Furnish flexible steel lawn edging that complies with ASTM A 621, hot rolled, standard flexible carbon steel, fabricated in sections with stake pockets stamped and punched along sections approximately 36 inches apart.

1. Type: Steel

2. Size: 4" wide by 10' or 16' length

3. Color: Brown/Green/Black

B. Furnish materials for installation of extruded concrete curbing.

2.6 TREE STABILIATION MATERIALS

A. Necessity of staking shall be verified by Owner's Representative prior to install.

B. Furnish Wood Stakes: 2"x2"x10' new, treated Lodgepole or Cedar poles: free of knots, cross grain and other defects. Stakes shall be pointed at one end.

C. Furnish nonabrasive tree guying material that is flat, woven, polypropylene material, 3/4" wide and 900 lb. break strength. Color: green.

2.7 PESTICIDES

A. General: Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction over Project Site, and of type recommended by manufacturer for each specific problem.

B. Pre-Emergent Herbicide: effective for controlling the germination or growth of weeds at the soil level directly below the mulch layer.

C. Post Emergent Herbicide: effective for selectively and non-selectively controlling unwanted plant material after germination.

2.8 MISCELLANEOUS

A. Antidesiccant: water insoluble emulsion permeable moisture retarder for trees and shrubs. Deliver in original, sealed, and fully labeled containers and mix according to manufacturer recommendations.

PART 3 - EXECUTION

3.1 GENERAL EXAMINATION AND PREPARATION

A. Examine all areas to receive plant material for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after any unsatisfactory conditions have been corrected.

1. Verify that no foreign or deleterious material, such as paint, paint washout, concrete slurry, concrete chunks, plaster, oil, gasoline or other fuel, paint thinner, tar, turpentine, roofing compound, or acid has been deposited in soil within a planting area.

2. Do not mix or place soils in froze, wet or muddy conditions.

3. Suspend grading or tiling operations during periods of excessive soil moisture until the moisture content reaches acceptable level to attain positive results.

4. Uniformly moisten excessively dry soil that is not workable or too dusty.

B. If contamination by foreign or deleterious material existing in a planting area, remove the contamination and replace with new soil.

C. Protect structures, utilities, sidewalks, pavements, other facilities, and existing plant material from damage caused by planting operations.

D. Protect plant material at all times during operations & water as necessary.

E. When practicable, plant trees before other plants are installed.

F. It is understood that plants are not precise objects and that minor adjustments need to be made in the layout as the planting plan is constructed. These adjustments may not be apparent until some or all of the plant material is installed. Contractor shall make adjustments if requested by Owner’s Representative including relocating previously installed plants.

G. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne due to adjacent properties and sidewalks.

H. Layout individual tree and shrub locations prior to planting by placing plants in their containers above the surface in the specified planting location or place a labeled stake at the planting location. Layout bedlines with paint per plan. Adjust locations when requested, and obtain Owner’s Representative’s acceptance of layout before planting.

I. Clear vision triangles as presented in local codes and ordinances shall be followed. Existing trees within in clear vision triangles shall be trimmed above height designated in local code. Shrubs planted within clear vision triangles shall not exceed height designated in local code. Trees shall not be planted within the clear vision triangles.

J. No trees shall be planted within 50’ of stop sign.

3.2 PLANTING BED PREPARATION

A. Loosen subgrade of planting beds to a minimum depth of 4 inches using a cult-mulcher or similar equipment. Remove stones larger than 2 inches in any dimension, sticks, roots, rubbish, and other extraneous matter. Legally dispose of material off Project Site.

B. Spread topsoil to depth as specified in Section 361414.

C. Topsoil shall meet finish grade after natural settlement.

D. If erosion or disturbance has occurred to planting bed prior to planting, rake smooth and restore finish grade before plant installation.

E. Fine grade topsoil to smooth, even surface with loose, uniform fine textures. Remove ridges and fill depressions, as needed, to meet finish grades.

F. Topsoil shall be placed during dry weather. Topsoil shall not be placed while prepared planting areas are in frozen or muddy condition.

G. Apply weed barrier according to manufacturer recommendations.

3.3 EDGING INSTALLATION

A. Install flexible steel landscape edging to separate planting areas from turf areas per manufacturer recommendations,

B. Install extruded concrete curbing to separate planting areas from turf areas to the following specifications:

1. 6” wide x 4”deep, flat top

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Excavation of Pits: Excavate pits with sides 45 degree sloped inward. Subgrade under root ball shall be kept undisturbed to reduce settling. Scarify sides of pit that may have been smoothed or smeared.

1. Excavate two times as wide as root ball diameter.

2. Do not excavate deeper then height of root ball when measured from root flare to the bottom of root ball.

3. Do not excavate subgrades of adjacent paving, structures, hardscape or other new or existing improvements.

4. Keep excavations safely covered or otherwise protected after working hours or when unattended by installer’s personnel.

5. If hardpan or other unexpected rock obstructions detrimental to tree or shrub health are encountered , notify Owner's Representative prior to proceeding.

    a) Hardpan layer: Drill 6 inch diameter holes, 24" apart, into the free draining strata or to a depth of 10 feet, whichever is less and backfill with free draining material.

6. If subsoil conditions exhibit evidence of unexpected water seepage or retention, notify Owner's Representative prior to proceeding.

3.5 TREE AND SHRUB PLANTING

1. Prior to plantings, verify that root flare is visible at top of root ball according to ANSI Z60.1, If not visible, remove excess soil in a level manner from the root ball to where the top most root emerges from the trunk.

2. Set balled and burlapped stock plumb and in center of the planting hole. Root flare should be level with or up to one (1) inch above adjacent finish grade.

    a) Use topsoil for backfill.

    b) After placing some backfill around root ball for stability, carefully cut and remove all twine, rope, wire, nails, ties and burlap from the top 1/3 of root ball but do not remove from under root balls.

    c) Backfill around root ball. When root ball is approximately one half filled, settle soil around root ball base with water prior to adding upper level.

    d) Apply tablet fertilizer according to manufacturer recommendations.

    e) Continue backfill process. Water again after placing final layer of soil.

    f) Root flare must be visible. Do not cover the top of root ball with soil.

    g) Water thoroughly within 4 hours of installation.

3. Carefully remove container grown stock from container without damaging root ball or plant. Set stock plumb and in center of the planting hole. Root flare should be level with or up to one (1) inch above adjacent finish grade.

    a) Use topsoil for backfill.

    b) Backfill around root ball. When root ball is approximately one half filled, settle soil around root ball base with water prior to adding upper level.

    c) Apply tablet fertilizer according to manufacturer recommendations.

    d) Continue backfill process. Water again after placing final layer of soil.

    e) Root flare must be visible. Do not cover the top of root ball with soil.

    f) Water thoroughly within 4 hours of installation.

4. Remove all tags/flagging/and other noon biodegradable materials from tree immediately after installation.

5. Trees planted within seeded or lawn areas shall be planted within a 5’ diameter min. mulch ring.

6. At time of planting prune only dead, dying, or broken branches.

7. Trees buried too deep or otherwise found not to be in compliance with these guidelines will be rejected and shall replanted at the direction of the Owner’s Representative.

3.6 GROUND COVER AND PERENNIAL PLANTING

A. Set out and space ground cover and any plants other than trees and shrubs as indicted on drawings in even rows with triangular spacing.

B. Use topsoil for backfill.

C. Dig holes large enough to allow spreading of roots.

D. For rooted cutting plants supplied in flats, plant each in a manner that will minimally disturb the root system but to a depth not less than two nodes.

E. Work soil around roots to eliminate air pockets and leave a slight indentation around plants to hold water.

F. Water thoroughly after planting.

G. Protect as necessary from transplant shock.

3.7 TREE STABILIZATION

A. If approved or requested by Owner’s Representative, staking shall occur as follows:

1. Use 2 stakes per tree in conditions under normal wind (below 100 mph). Space stakes evenly around tree.

2. Use 3 stakes per tree in conditions under high wind (above 100 mph). Space stakes evenly around tree.

3. Contractor to determine if project site experiences winds high enough to require 3 stake option.

4. Prior to staking, Contractor shall verify location of existing utility and / or irrigation lines.

5. Drive stakes a minimum 18” into subgrade and extend upward to at least the bottom of first branches.

6. Set stakes to avoid penetrating root balls / root masses.

7. Stake placement shall not interfere with natural branching pattern.

8. Support trees with flexible ties at contact points of tree trunk..

9. Allow enough slake to avoid rigid restraint of the tree.

10. Wire shall not touch or rub trunk or branches.

11. Staking is not recommended in high pedestrian areas.

3.8 PLANTING AREA MULCHING

A. After planting, smooth out all grades between plants before applying mulch.

B. Tree in turf areas: Apply specified mulch ring to an average depth of 3 inches with 60” radius around trunk. Do not place mulch within 2 inches of trunk.

C. Mulch in planting areas: Apply specified mulch to an average depth of 3 inches over whole surface of planting area. Do not place within 2 inches of trunks or stems.

3.9 PESTICIDE APPLICATION

A. Apply pesticides and other chemicals and biological control agents in accordance with authorities having jurisdiction over Project Site and only to manufacturer written recommendations. Coordinate with Owner’s Representative and other trades to notify of proximity of work. Notify Owner’s Representative in writing prior to each application.

1. Pre Emergent Herbicide: apply to tree, shrub, and groundcover areas in accordance with manufacturer's recommendations. Do not apply to seeded or bulb areas.

2. Post Emergent Herbicide: apply only as necessary to treat already germinated weeds. Apply in accordance with manufacturer’s recommendations.

3.10 PRUNING AND MAINTENANCE

A. Maintain plantings by pruning, watering, weeding, fertilizing, mulching, restoring planting saucers, repairing tree stabilization devices, resetting proper vertical position and other operations as necessary to establish healthy, viable plantings. Spray or treat as necessary to keep plant material free of pest and disease. Use integrated pest management when possible to minimize use of pesticides.

B. Begin maintenance immediately after each area is planted and continue until stated Maintenance Period has expired.

3.11 WATERING

A. The Contractor shall be fully responsible to ensure that adequate water is provided to all plants from the point of installation until the date of Final Acceptance. The Contractor shall adjust the automatic irrigation system, if available, to increase or reduce provided water.

B. The Contractor shall be fully responsible to add supplement, temporary watering techniques, such as hoses, sprinklers, watering bags, etc. to assure the plant material has adequate water for healthy growth until the date of Final Acceptance.

3.12 CLEAN UP AND PROTECTION

A. During installation of plant material, keep adjacent hardscape and construction area clean and always work in an orderly condition.

B. Protect existing and newly installed plant material from damage due to landscape operations, operations by other contractors and trades, and all other activities. Maintain protection during installation and maintenance periods. Treat, repair or replace damaged plant material.

C. Dispose of surplus soil and waste material, including but not limited to excess subsoil, trash, debris, and legally dispose of them off Project Site.

3.13 FINAL INSPECTION AND ACCEPTANCE

A. When landscape work is completed, including any necessary maintenance, Owner's Representative will, upon request, make a Final Inspection to determine acceptability.

1. Landscape work may be inspected for acceptance in portions as agreeable to Owner's Representative, provided each portion of work offered for inspection is complete, including maintenance plan in place.

B. Conditions governing Final Acceptance of the landscaped areas are that, in the opinion of the Owner's Representative, all plant material is in a live, uniform, and sound and healthy and flourishing conditions; free of disease, insect infestation, and physical damage. All planter beds shall be free of weeds, rubbish, and construction debris.

C. If Owner's Representative, does not accept the conditions of the landscaped areas, the Contractor shall correct all deficiencies until acceptance is received by Owner's Representative. All costs associated with correcting the deficiencies shall be paid by the Contractor at no additional cost to the Owner. All require corrections shall be made within thirty (30) days after initial Final Acceptance Inspection, unless the calendar date requires corrections to occur in the succeeding planting season.

END OF SECTION 329000

SECTION 330110.58 - DISINFECTION OF POTABLE WATER PIPING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Disinfection of potable water distribution and transmission system.
2. Testing and reporting of results.

1.2 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA B300 - Hypochlorites.
2. AWWA B301 – Liquid Chlorine
3. AWWA B302 - Ammonium Sulfate.
4. AWWA B303 - Sodium Chlorite.
5. ANSI/AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
6. ANSI/AWWA C110 – Ductile Iron and Grey-Iron Fittings, 3 inch through 24 inches for Water and Other Liquids
7. ANSI/AWWA C111 – Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
8. ANSI/AWWA C115 – Flanged Ductile Iron Pipe with Ductile-Iron or Grey-Iron Threaded Flanges.
9. ANSI/AWWA C151 – Ductile-Iron Pipe, Centrifugally Cast
10. ANSI/AWWA C550 – Protective Interior Coatings for Valves and Hydrants.
11. ANSI/AWWA C600 – Installation of Ductile-Iron Mains and Their Appurtenances
12. AWWA C651 - Disinfecting Water Mains.
13. ASTM E1003 – Standard Practice for Hydrostatic Leak Testing
14. NSF/ANSI 61 – Drinking Water System Components – Health Effects.

1.3 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Disinfection Procedure:

1. Submit description of procedure, including type of disinfectant and calculations indicating quantities of disinfectants required to produce specified chlorine concentration.

C. Product Data: Submit manufacturer information for proposed chemicals and treatment doses.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Certify that final water complies with disinfectant quality standards of Washington State Department of Transportation (WSDOT) Standard Specifications Section 7-09.3(24).

F. Test and Evaluation Reports: Indicate testing results comparative to specified requirements.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Disinfection Report:

1. Type and form of disinfectant used.
2. Date and time of disinfectant injection start and completion.
3. Test locations.
4. Name of person collecting samples.
5. Initial and 24-hour disinfectant residuals in treated water in ppm for each outlet tested.
6. Date and time of flushing start and completion.
7. Disinfectant residual after flushing in ppm for each outlet tested.

1.5 QUALITY ASSURANCE

A. Perform Work according to AWWA C651.

B. Maintain at least one copy of each standard affecting Work of this Section on Site.

1.6 QUALIFICATIONS

A. Manufacturers: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Applicators: Company specializing in performing Work of this Section with minimum three years' documented experience.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:
1. Perform Work according to Washington State Department of Transportation Standard Specifications.
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.

2.2 DISINFECTION CHEMICALS

A. Chemicals:

1. Hypochlorite: Comply with AWWA B300.

2. Liquid Chlorine: Comply with AWWA B301.
3. Ammonium Sulfate: Comply with AWWA B302.
4. Sodium Chlorite: Comply with AWWA B303.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Verify that piping system has been cleaned, inspected, and pressure tested.

D. Verify that access fittings have been installed under Section 331416 "Water Distribution Piping."

E. Perform scheduling and disinfecting activity with startup, water pressure testing, adjusting and balancing, and demonstration procedures, including coordination with related systems.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF DISINFECTION CHEMICALS

A. Provide required equipment to perform Work of this Section.

B. Ensure Hydrostatic Testing has been performed prior to disinfecting.

C. Introduce disinfectant into piping system.

D. Maintain disinfectant in system for 24 hours.

E. Flush, circulate, and clean until required disinfectant quality standard has been achieved using domestic water.

F. Replace permanent system devices that were removed for disinfection.

3.3 FLUSHING AND DISINFECTION

A. Flushing Prior to Disinfection.
   1. Before chlorination, flush the mains thoroughly after the pressure and leakage test are completed.
   2. Use a minimum flushing velocity in the main of 2.5 feet/second.
   3. If no hydrant is installed at the end of the main, provide a tap of the size sufficient to produce a velocity in the main of at least 2.5 feet/second.

4. Table 1 shows the rates of flow required to produce a velocity of 2.5 feet/second in various size pipes.

	Flow Required to Produce 2.5 fps (approx.)	Size of Tap (inch) (1) (1-1/2) (2)			Hydrant Outlets	
Pipe Dia. (inch)	Velocity in Main (Gpm)	Number of taps on pipe (2)			Number	Size (inch)
4	100	1			1	2-1/2
6	220		1		1	2-1/2
8	400		2	1	1	2-1/2
10	600		3	2	1	2-1/2
12	900			2	2	2-1/2
16	1600			4	2	2-1/2
1)	With a 40 psi pressure in the main with the hydrant flowing to atmosphere, a 2-1/2 inch hydrant outlet will discharge approximately 1,000 gpm and a 4-1/2 inch hydrant nozzle will discharge approximately 2500 gpm					
2)	Number of taps on pipe based on discharge through 5 feet of galvanized iron (GI) pipe with one 90° elbow.					

5. Exercise extreme care and conduct a thorough inspection during the water main laying to prevent and detect small stones, pieces of concrete, particles of material, or other foreign material that may have entered the mains.
6. Clean large material by flushing and inspecting all hydrants on the lines to ensure that the entire valve operating mechanism of each hydrant is in good condition.

B. Disinfection of Water Pipes
   1. General.
      a. Comply with ANSI/AWWA C 651: Disinfecting Water Mains, these specifications, and Engineer's direction.
      b. Keep the interior of all pipe, fittings and appurtenances free from dirt, heavy and foreign particles.
      c. Disinfect all water pipes and appurtenances prior to placing in service.

C. Method of chlorination used to be pre-approved by Engineer prior to disinfection.
   1. Tablet or Granule Method.
      a. Solution Strength: 25 mh/L minimum
      b. Use: Only if the pipes and appurtenances are kept clean and dry during construction. Do not use on solvent welded plastic or screwed joint steel pipe.
      c. Placement When Using Granules: During construction, place calcium hypochlorite granules at the upstream end of the first section of pipe, at the upstream end of each branch main, and at 500-foot intervals.
      d. Granular Quantity: refer to Table 2

Table 2
OUNCES OF GRANULES

Pipe Diameter (Inches)	Amount (Ounces)
4	1.7
6	3.8
8	6.7
10	10.5
12	15.1
16	26.8
18	34.0
20	41.9
24	60.4

e. Placement When Using Tablets: During construction, place 5g calcium hypochlorite tablets in each section of pipe and also place one tablet in each hydrant, hydrant branch and other appurtenance. Attach tablets to the inside of the pipe using an adhesive such as Permatex No. 2 or approved substitution. Assure no adhesive is on the tablet except on the broad side attached to the surface of the pipe. Attach all the tablets at the inside tip of the main, with approximately equal numbers of tablets at each end of a given pipe length. If the tablets are attached before the pipe section is placed in the trench, mark their position on the section so it can be readily determined that the pipe is installed with the tablets at the top.

f. Tablet Quantity: Refer to Table 3

Table 3
OUNCES OF TABLETS (a)

Pipe Diameter (Inches)	Number of 5g Tablets (b)
4	1
6	1
8	2
10	3
12	4
16	6
18	7
20	9
24	13

a) Adjust for pipe length other than 18 feet
b) Based on 3.25g available chlorine per tablet.

g. Filling Procedure: When granule or tablet installation has been completed, fill the main with clean water at a velocity not exceeding 1 fps. Take precautions to assure that air pockets are eliminated. Leave this water in the pipe for at least 24 hours. If the water temperature is less than 41°F, leave the water in the pipe for at least 48 hours. Position valve so that the chlorine solution in the main being treated will not flow into water mains in active service.

2. Continuous Feed Method

a. Solution Strength: Dose at 25 mg/L for 4 hours.
b. Residual: 10 mg/L at 24 hours.
c. Dosing Methods:
1) Liquid Chlorine: Solution feed vacuum-operated chlorinator in combination with a booster pump.
2) Direct Feed: Not allowed.
3) Hypochlorite Solution: Chemical feed pump designed for feeding chlorine solutions.
4) Calcium Hypochlorite Granules: Refer to previous section.
5) Filling Procedure: Use approved source to flow clean water at a constant, measured rate into the newly laid water main. Fill at a point not more than 10 feet downstream from the beginning of the new main. Measure the chlorine concentration at regular intervals and ensure a 25 mg/L dose. Position valves so that the chlorine solution in the main being treated does not flow into water mains in active service. Do not stop chlorine application until the entire main is filled with chlorinated water. Retain the chlorinated water in the main for at least 4 hours, operating all valves and hydrants in the section treated. At the end of the 24-hour period, verify the treated water in all portions of the main has a residual of 10 mg/L free chlorine.

3. Slug Method.
a. Solution Strength: 100 mg/L.
b. Dosing Methods: Per Engineer's direction.
c. Filling Procedure: Use approved source to flow clean water at a constant, measured rate into the newly laid water main. Fill at a point not more than 10 feet downstream from the beginning of the new main. Measure concentration at regular intervals to ensure 100 mg/L dose. Apply the chlorine continuously and for the time required to develop a solid column or "slug" of chlorinated water that will, as it moves through the main, expose all interior surfaces to a 100 mg/L for at least 3 hours. Measure the chlorine residual in the slug as it moves through the main. If at any time it drops below 50 mg/L, stop flow and relocate chlorination equipment at the head of the slug, and as flow is resumed, add chlorine to restore the free chlorine in the slug to not less than 100 mg/L. As the chlorinated water flows past fittings and valves, operate valves and hydrants to disinfect appurtenances and pipe branches.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Final Flushing
a. After the retention period, legally dispose of the chlorinated water from the main until chlorine measurements show that the concentration in the water leaving the main is 0 mg/L.

C. Bacteriological Tests:

1. After final flushing and before the water main is placed in service, test samples collected from the main(s) for coliform bacteria. Take 2 samples from each location at least 24 hours apart.

2. Unless otherwise directed by the Engineer, collect samples from each 1,200 feet of the new main and one from each branch.

D. Redisinfection
1. If the initial disinfection fails to produce approved bacteriological samples, reflush and resample the main.
2. If check samples show bacterial contamination, re-chlorinate the main until approved results are obtained.

E. Swabbing
1. If valves or connections are not disinfected along with the newly installed main, swab or spray the interior of all pipe and fittings used in making the connections with a 1% hypochlorite solution before installation.

END OF SECTION 330110.58

SECTION 330500 - COMMON WORK RESULTS FOR UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment, tools, and incidentals to install utility materials as shown on the Drawings and specified herein.

B. This Section includes the following utility materials and methods to complement other Division 33 Sections:

1. Piping materials and installation instructions common to most piping systems.
2. Concrete base construction requirements.
3. Utility piping demolition.
4. Cutting and patching.

C. Pipe and pipe fitting materials are specified in Division 33 piping Sections.

1.2 DEFINITIONS

A. Exposed Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions.

B. Concealed Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

C. The following are industry abbreviations for plastic materials:

1. PVC: Polyvinyl chloride.
2. PE: Polyethylene.
3. HDPE: High-density polyethylene.
4. CMP: Corrugated Metal Pipe.

1.3 DELIVERY, STORAGE AND HANDLING

A. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

B. Protect flanges, fittings and piping specialties from moisture and dirt.

C. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.4 SEQUENCING AND SCHEDULING

A. Coordinate equipment installation with other components.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Sequence, coordinate and integrate installations of materials and equipment for efficient flow of the Work.

D. Coordinate connection of piping systems with other exterior underground and overhead utilities and services. Comply with requirements of authorities having jurisdiction, franchised service companies, and controlling agencies.

E. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces.

PART 2 - PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. Refer to individual Division 33 Sections for pipe and fitting materials and joining methods.

2.2 JOINING MATERIALS

A. Refer to individual Division 33 piping Sections for special joining materials not listed below.

B. Solvent Cements: Manufacturer's standard solvent cements for the following:

1. PVC Plastic Piping: ASTM D2564. Include primer according to ASTM F656.

C. Plastic Pipe Seals: ASTM F477, elastomeric gasket.

2.3 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C1107, Grade B.

1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout; nonstaining; noncorrosive; nongaseous; and recommended for interior and exterior applications.
2. Design Mix: 5,000 psig, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.
4. Manufacturer
   a. BASF Building Systems (Masterflow 928),
   b. Or approved equal.
      1) Substitutions: Specified in Section 016000 – Product Requirements

2.4 LOCATING WIRE

A. Type: (No. 12 AWG) copper with insulation.

B. Splicing: Epoxy splice kits.

2.5 PIPE MARKERS

A. Marking tape material: 3 inch 4 mil polyethylene.
   1. Sewer: Green labeled "Caution – Sewer Line Below"
   2. Water: Blue labeled “Caution – Water Line Below”

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - GENERAL REQUIREMENTS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual Division 33 piping Sections specify unique piping installation requirements.

B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on by Engineer.

C. Install piping at indicated slopes.

D. Install components with pressure rating equal to or greater than system operating pressure.

E. Install piping free of sags and bends.

F. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

G. Install fittings for changes in direction and branch connections.

H. Install couplings according to manufacturer's written instructions.

I. Sleeves are not required for core drilled holes.

J. Verify final equipment locations for roughing-in.

K. Refer to equipment specifications in other Division 33 Sections for roughing-in requirements.

L. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping Sections:

   1. Ream ends of pipes and tubes and remove burrs.
   2. Remove scale, slag, dirt, and debris from inside and outside pipe and fittings before assembly.

3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following:

   a. Comply with ASTM F402 for safe-handling practice of cleaners, primers, and solvent cements.
   b. PVC Plastic, Pressure Piping: ASTM D2672.
   c. PVC Plastic, Nonpressure Piping: ASTM D2855.

3.2 GROUTING

A. Install nonmetallic, nonshrink grout for equipment-support bearing surfaces, pump and other equipment support plates, and anchors. Mix grout according to manufacturer's written instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placing of grout.

E. Place grout on concrete bases to provide smooth bearing surface for equipment.

F. Place grout around anchors.

G. Cure placed grout according to manufacturer's written instructions.

END OF SECTION

SECTION 330505.20 - GRAVITY SEWER INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, equipment, material, tools and incidentals required to install the various piping, manholes, accessories for gravity sewer as shown on the Drawings and specified herein.

1.2 SUBMITTALS

A. Submit in accordance with Section 013300 – Submittal Procedures.

B. Product Data:

1. Manufacturer’s literature for the various types of pipe, manholes and related materials.

C. Shop Drawings:

1. Manufacturer’s Drawings and catalog cuts for all pipe, manholes and related materials showing details and materials of construction, including dimensions.

D. Manufacturer’s Certificates:

1. Furnish affidavit that the pipe, fittings and lining furnished comply with all applicable provisions of the ANSI and/or AWWA Standards.

E. Record Drawings:

1. Submit in accordance with the requirements of Section 001330 – Submittal Procedures and Section 017700 – Closeout Procedures.

F. Test Reports:

1. Submit reports on pressure and leakage tests for all pipelines.
2. Submit reports for testing manholes.

1.3 JOB CONDITIONS

A. Minimize interruptions to utility services. Submit plans and schedules to the Engineer for approval by the proper authority before any shutdown or any interruption in service takes place.

PART 2 - PRODUCTS

A. Provide all new piping materials. Used materials are not acceptable.

PART 3 - EXECUTION

3.1 INSPECTION

A. The Engineer or Owner reserves the right to inspect all pipe at the factory. Provide a production schedule in sufficient time so plans can be made for in-plant inspection of the pipe or fittings during production, should it be required.

B. Ensure that applicable pipe is plainly marked with special markings indicating the weight, proper location of the pipe or fitting in the line by reference to layout drawings and schedules, class of pipe, casting period, manufacturer's mark and year pipe was produced.

C. Examine all piping materials for compliance with the requirements for installation tolerances and other conditions that may affect performance.

3.2 INSTALLATION OF UNDERGROUND PIPING

A. Perform excavation, trenching and backfilling for the installation of underground piping system as specified in Section 312316.13 - Trenching**.** Smooth out irregularities in the trench or fill in with sand and tamp. Install pipe in bedding course as shown on the Drawings. Scoop out holes for bells, leaving the entire barrel of the pipe bearing on the pipe bed. Install the pipe to the lines and grades as shown on the Drawings.

B. Begin installation of the pipe immediately after the excavation is started, and keep pipe operation laying close behind the trenching. Install pipe in accordance with the manufacturer's instructions and recommendations. Remove damaged or unsound pipe and replace at no additional cost to the Owner. Before jointing of the pipe, remove all lumps, blisters, excess coating material or oil from the bell and spigot ends of the pipe.

C. Where there is no adequate natural foundation upon which to construct a pipe bed, install the pipe on an additional prepared stabilized subgrade or rock bedding as defined in ASTM D2774, section 9. Replace or stabilize unsuitable subgrade materials as described in Section 312316 - Excavation. Payment for additional graded stone used for pipe bedding, when ordered in writing, will be according to the bid item for such material. Where dewatering is required, use Class I materials as described in ASTM D2774.

D. Place pipe along the route of construction with the spigot ends pointing downgrade. Handle pipe with mechanical equipment. Before it is lowered into the trench, swab or brush out the pipe to ensure that no dirt or foreign material gets into the finished line. Provide a test plug to close the pipe and to keep out trench water whenever work is not in progress. Provide the means of dewatering the trench, the cost of which is included in the price of installing the pipe.

E. Ensure that all joints are watertight and immediately repair any leaks or defects discovered to the satisfaction of the Engineer. Remove, clean and properly relay any pipe that has been disturbed after being installed. Flush or remove any superfluous material inside the pipe by means of an approved follower or scraper after joints are made. Install fittings and pipe joints in accordance with the manufacturer's recommendations.

F. Use a laser instrument to insure that the pipe is installed on the proper grade. On short runs of pipe, batter boards may be used in lieu of the laser. Where the laser is used, check the instrument setting for each 100 feet of pipe laid to verify that the grade and line agrees with the design grade and alignment. Where batter boards are used, set them over the ditch at intervals not to exceed 25 feet or closer if, in the opinion of the Engineer, conditions should warrant. Offsets may be used where approved by the Engineer. Insure that no less than three (3) batter boards are in position at all times on any one grade line, set to correct alignment and grade during the actual laying of pipe.

G. Dewater and clean all installed sewers prior to inspection.

H. Protect open ends of pipe with appropriate cover until connections are installed.

3.3 MISCELLANEOUS INSTALLATION CONDITIONS

A. Sewer and Water Main Crossing:
   a. See Section 330519.40 – Ductile Iron Pipe – Plant Yard Piping.

B. Minimum Cover:

1. All sewers shall be constructed with a minimum of 60 inches of cover. Install according to the sectional dimensions shown on the Drawings and to the length as shown, or as directed by the Engineer.

3.4 INSPECTION, PRESSURE, AND LEAKAGE TESTS

A. Watertight Construction:

1. Build all gravity sewers, manholes and service connections practically watertight and adhere rigidly to the Specifications for material and workmanship. Give special care and attention to securing watertight construction.

B. Testing:

1. Low pressure air test all gravity sewer lines in accordance with Section 330505.41 – Air Testing. Include the expense of the above tests in the unit prices bid per foot of sewer line under each respective size and depth category.
2. Low pressure air test all manholes in accordance with Section 330505.33 – Infiltration and Exfiltration Testing.
3. The Owner may inspect any section of the sewer lines by television equipment before the Project is completed.

C. Repair:

1. Uncover and repair all leaks evident at the surface or evident by visual observation, regardless of the total leakage as indicated by the test.
2. Remove and replace all pipes and other materials found defective under the test at no additional expense to the Owner.
3. Repeat tests until leakage has been reduced below the allowable amount.

3.5 FLUSHING

A. Gravity Sewers:

After the pipelines have been installed and tested, thoroughly flush each run of pipe to remove all debris and foreign matter.

1. Perform flushing of Gravity Sewers by discharging sufficient quantities of clean flushing water into the upstream manhole on the new line. Pump the water from the downstream manhole and discharge to an approved disposal point. Do not allow silt or foreign material to be discharged into the operating wastewater system. Remove accumulated debris from manholes.

3.6 CROSS CONNECTION CONTROL

1. There shall be no physical connections between a public or private potable water supply system and a sewer or appurtenance thereto which may permit the passage of any sewage or polluted water into the potable supply. No potable water pipe shall pass through or come into contact with any part of a sewer manhole.

END OF SECTION

SECTION 330505.31 - HYDROSTATIC TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Hydrostatic testing.

1.2 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with Department of Public Works.

1.3 SCHEDULING

A. Section 013216 - Construction Progress Schedule: Requirements for scheduling.

B. Furnish Work schedule for periods of time when piping section is out of service for joint sealing.

C. Schedule Work of this Section to coincide with other applicable work sections.

1.4 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit following items prior to start of testing:

1. Testing procedures.
2. List of test equipment.
3. Testing sequence schedule.
4. Provisions for disposal of flushing and test water.
5. Certification of test gage calibration.

C. Submit specific detailed description of proposed bypass pumping system, including written description of plan addressing schedule, quantity, capacity, and location of pumping equipment.

D. Product Test Reports: For piping, for tests performed by manufacturer and witnessed by a qualified testing agency.

E. Qualifications Statement: For applicator.

1.5 QUALITY ASSURANCE

A. Applicators Qualifications: Company specializing in performing Work of this Section with minimum three years' documented experience.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The Washington State Department of Transportation Standard Specifications section 7-09.3(23).
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.
3. ASTM E1003 – Standard Practice for Hydrostatic Leak Testing standards.

2.2 HYDROSTATIC TESTING

A. Equipment: Furnished by Contractor

1. Pressure pump.
2. Pressure hose.
3. Water meter.
4. Test connections.
5. Pressure relief valve.
6. Pressure Gage: Calibrated to 0.1 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for application examination.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Verify that piping is ready for testing prior to calling out the Engineer to witness the pressure test. Contractor shall have all equipment set up completely ready for operation and shall have successfully performed the test to ensure that the pipe is in satisfactory condition.

D. Verify that trenches are backfilled.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. Thrust blocks shall be in place and time allowed for the concrete to cure before testing. Where permanent

blocking is not required, the Contractor shall furnish and install temporary blocking and remove it after testing.

E. Verify that pressure piping thrust restraints have been installed.

F. Proceed with testing only after unsatisfactory conditions have been corrected.

3.2 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Testing of Pressure Piping:

1. Test system according to AWWA C600 and following:

a. Hydrostatically test each portion of pressure piping, including valved section, at 150-psi in excess of working pressure of piping, based on elevation of lowest point in piping corrected to elevation of test gage. In no case must the test pressure be less than 225-psi.
b. Conduct hydrostatic testing for at least two hours. See WSDOT Standard Specifications for details.
c. Slowly fill with water portion of piping to be tested, expelling air from piping at high points.
d. Install corporation cocks at high points.
e. Close air vents and corporation cocks after air is expelled.
f. Raise pressure to specified test pressure.
g. Observe joints, fittings, and valves undergoing testing.
h. Remove and renew cracked pipes, joints, fittings, and valves that show visible leakage.
i. Retest when unsatisfactory conditions have been corrected.
j. Correct visible deficiencies and continue testing at same test pressure for 15 minutes to determine leakage rate.
k. Maintain pressure within plus or minus 5.0 psi of test pressure.
l. Leakage is defined as quantity of water supplied to piping necessary to maintain test pressure during period of testing. The quantity of water lost from the main shall not exceed the number of gallons per hour as determined by the maximum allowable leakage formula.
m. Compute maximum allowable leakage using following formula:

$$L = \frac{SD\sqrt{P}}{266{,}400}$$

1) L = allowable leakage, gph.
2) S = gross length of pipe tested, feet.
3) D = nominal diameter of pipe, inches.
4) P = test pressure during leakage test, psig.
5) If pipe undergoing testing contains sections of various diameters, calculate allowable leakage from sum of computed leakage for each pipe size.

2. If testing of piping indicates leakage greater than that allowed, locate source of leakage, make corrections, and retest until leakage is within acceptable limits.
3. Correct visible leaks regardless of quantity of leakage.

D. Prepare test and inspection reports.

END OF SECTION 330505.31

SECTION 330505.33 - INFILTRATION AND EXFILTRATION TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Exfiltration testing.
2. Infiltration testing.

1.2 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit the following Product Data prior to start of testing:
1. Testing procedures.
2. List of test equipment.
3. Testing sequence schedule.
4. Provisions for disposal of flushing and test water.
5. Certification of test gage calibration.

C. Product Test Reports: For manholes and piping, for tests performed by qualified testing agency.

D. Qualifications Statement:
1. Submit Applicator Qualifications: Company specializing in performing Work of this Section with minimum three years' documented experience.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The Washington State Department of Transportation Standard Specifications section 7-17.3(2).
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.

2.2 EXFILTRATION TESTING

A. Equipment:

1. Plugs.
2. Pump.

3. Measuring device.

2.3 INFILTRATION TESTING

A. Equipment: Weirs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that manholes and piping are ready for testing.

C. Verify that trenches are backfilled.

D. Proceed with testing only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for preparation.

B. Lamping:

1. Lamp gravity piping after flushing and cleaning.
2. Perform lamping operation by shining light at one end of each pipe section between manholes.
3. Observe light at other end.
4. Pipe not installed with uniform line and grade will be rejected.
5. Remove and reinstall rejected pipe sections.
6. Clean and lamp until pipe section is installed to uniform line and grade.

C. Plugs:

1. Plug outlets, wye branches, and laterals.
2. Brace plugs to resist test pressures.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Exfiltration Testing:

1. Perform exfiltration testing not exceeding 0.28 gph per inch diameter per 100 feet for each reach of piping undergoing testing.
2. Perform testing with a hydrostatic head of 6 feet above the crown at the upper end of the test section, or above the natural ground water table at the time of test, whichever is higher.
3. Where the test head is other than 6 feet, the maximum leakage shall not exceed the amount determined from the following equation:

   Maximum leakage (in gallons per hour) = $0.28 \times (\sqrt{H}/\sqrt{6}) \times D \times (L/100)$

   Where:

   D = diameter (in.)
   L = length of pipe (ft.)
   H = test head (ft.)
4. The length of pipe tested shall be limited so that the pressure at the lower end of the Section tested does not exceed 16 feet of head above the invert, and in no case shall be greater than 700 feet or the distance between manholes when greater than 700 feet.

D. Infiltration Testing:
1. Natural ground water head over the pipe is 2 feet or less above the crown of pipe at the upper end of the test section
2. Maximum Allowable Infiltration: 0.16 gallons per hour per inch of diameter per 100 feet of pipe length for reach of piping undergoing testing.
3. The length of pipe tested shall not exceed 700 feet or the distance between manholes when greater than 700 feet. Where the natural ground water head is greater than 2 feet, the maximum leakage shall not exceed the amount determined from the following equation:

   Maximum leakage (in gallons per hour) = $0.16 \times (\sqrt{H}/\sqrt{2}) \times D \times (L/100)$

   Where:

   D = diameter (in.)
   L = length of pipe (ft.)
   H = natural ground water head (ft.)

E. Manhole Allowances:
1. For either the infiltration or exfiltration test, an allowance of 0.2 gallons per hour per foot of head above invert shall be made for each manhole included in a test section.
2. Test manholes with manhole frame set in place.
3. Plug pipes in manhole.
4. Remove water from manhole.
5. Observe plugs over period of not less than two hours to ensure that there is no leakage into manhole.
6. Determine ground water level outside manhole.
7. Fill manhole with water within 4 inches of top of cover frame.
8. Prior to testing, allow manhole to soak from minimum of four hours to maximum of 72 hours.
9. After soak period, adjust water level inside manhole to within 4 inches of top of cover frame.
10. Measure water level from top of manhole frame.
11. At end of four-hour testing period, again measure water level from top of manhole frame; compute drop in water level during testing period.
12. Manhole exfiltration test is considered satisfactory when drop in water level is less than following:

a. Manhole Depth of 12 Feet (3.7 m):

1) Diameter of 4 feet (1.2 m): 0.34 inch.
2) Diameter of 5 feet (1.5 m): 0.43 inch.
3) Diameter of 6 feet (1.8 m): 0.51 inch.

F. Unsatisfactory Conditions:

1. If unsatisfactory testing results are achieved, repair piping or manhole and retest until result meets criteria.
2. Repair visible leaks regardless of quantity of leakage.

END OF SECTION 330505.33

SECTION 330505.41 - AIR TESTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Air testing for Gravity, and Pressure Sewer pipe.

1.2 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit the following Product Data prior to start of testing:

1. Air testing equipment.
2. Testing procedures.
3. List of test equipment.
4. Testing sequence schedule.
5. Provisions for disposal of flushing and test water.
6. Certification of test gage calibration.

C. Product Test Reports: For piping, for tests performed by qualified testing agency.

D. Qualifications Statement:
1. Submit Applicator Qualifications: Company specializing in performing Work of this Section with minimum three years' documented experience.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The Washington State Department of Transportation Standard Specifications section 7-17.3(2).
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.

2.2 AIR TESTING EQUIPMENT

A. Air compressor.

B. Air supply line.

C. Shutoff valves.

D. Pressure regulator.

E. Pressure relief valve.

F. Stopwatch.

G. Plugs.

H. Pressure Gage: Calibrated to 0.1 psi.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.
B. Verify that piping is ready for testing.
C. Verify that trenches are backfilled.
D. Proceed with testing only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for preparation.

B. Lamping:

1. Lamp gravity piping after flushing and cleaning.
2. Perform lamping operation by shining light at one end of each pipe section between manholes.
3. Observe light at other end.
4. Pipe not installed with uniform line and grade will be rejected.
5. Remove and reinstall rejected pipe sections.
6. Clean and lamp until pipe section is installed to uniform line and grade.

C. Plugs:

1. Plug outlets, wye branches, and laterals.
2. Brace plugs to resist test pressures.

D. Safety:

1. Plugs used to close the pipe for the air test must be securely braced to prevent the unintentional release of a plug, which can become a high velocity projectile.
2. Gauges, air piping manifold, and valves shall be located at the top of the ground.
3. No one shall be permitted to enter a manhole or catch basin where a plugged pipe is under pressure.
4. Testing apparatus shall be equipped with a pressure release device, such as a rupture disk or a pressure relief valve, designed to activate when the pressure in the pipe exceeds 2 psig above the required test pressure.

3.3 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Low-Pressure Air Testing:

1. Test each reach of gravity sewer piping between manholes.
2. Introduce air pressure slowly to approximately 4 psig.
3. Determine ground water elevation above spring line of piping.
4. For every foot of ground water above spring line of piping, increase starting air test pressure by 0.43 psi.
5. Do not increase pressure above 10 psig.
6. Allow pressure to stabilize for at least two minutes.
7. When pressure decreases to 3.5 psig (or to increased test pressure as determined above when ground water is present) the air pressure test shall begin.
8. Do not make allowance for laterals.
9. Minimum Testing Duration in Seconds as calculated below:

$K = 0.0111d^2L$
$C = 0.0003918dL$

If $C_T < 1$, then time = K_T
If $1 < C_T < 1.75$, then time = K_T/C_T
If $C_T > 1.75$, then time = $K_T/1.75$
Where:
d = Pipe diameter (inches)
L = Pipe length (feet)
K = value for each length of pipe of a specific diameter
C = value for each length of pipe of a specific diameter
K_T = sum of all K values
C_T = sum of all C values

10. Record time for drop in pressure from 3.5 psig to 2.5 psig during testing period.
11. If the time in seconds for the pressure drop is equal to or greater than the Minimum Testing Duration, piping is acceptable.
12. If 1.0-psi (6.89-kPa) air pressure drop has not occurred during the Minimum Testing Duration, piping is acceptable; discontinue testing.
13. If piping fails, test reach of piping in incremental stages until leaks are isolated, repair leaks, and retest entire reach between manholes.
14. If unsatisfactory testing results are achieved, make necessary repairs and retest until result meets criteria.
15. Repair visible leaks regardless of quantity of leakage.

D. Prepare test and inspection reports.

END OF SECTION 330505.41

SECTION 330505.51 – TESTING TANKS AND STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Furnish all labor, materials, tools, and incidentals required to test wet wells, basins, tanks, and other structures, which are designed to hold water.

1.2 REFERENCES

A. American Concrete Institute (ACI):

1. ACI 350.1 - Tightness Testing of Reinforced Engineering Concrete Structures.

1.3 SUBMITTALS

A. Quality Control Submittals:

1. Submit the results of tank testing for each structure to the Engineer for review.
2. Submit in accordance with Section 01330 – Submittal Procedures.

1.4 SEQUENCING AND SCHEDULING

A. Coordinate scheduling and procedures for tank testing with Engineer 30 days in advance of testing.

B. Testing should not be conducted when a substantial change in the average daily temperature is predicted for the test period.

PART 2 - PRODUCTS

A. Provide pumps and piping required to transport water to structure to be tested.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Thoroughly inspect structure to be tested for cracks, voids, and other potential leakage paths. Repair areas identified during inspection and potential leakage paths in accordance with the Contract Documents or as approved by Engineer.

3.2 PREPARATION

A. Water for initial testing will be provided by Owner at no cost to Contractor. Water for retesting shall be purchased from Owner.

B. Use potable water for testing tanks and structures.

C. Test structures after concrete has obtained specified compressive strength, and before backfilling.

D. Test structures that are laterally restrained or supported by cross-walls, beams or slabs after restraining or supporting construction is placed and design strength obtained.

E. Seal all pipe penetrations not required to be operational for testing, and check for leakage before testing.

F. No backfilling, floor finish, concrete or mortar fill, wall insulation, gasproofing or protective coatings shall be applied to or installed in any new containment structures until they have been subjected to loading for settlement and tested for leakage.

3.3 CLEANING

A. Clean all structures prior to testing.

B. Prior to testing, clean exposed surfaces by thoroughly hosing and removing dirt, mud, surface laitance, construction debris, and loose matter from walls and slabs. Remove wash water and debris from the structures by means other than washing through plant piping. All potential leakage points shall be identified and repaired prior to filling the tank with water for the tightness test. Methods for repairing concrete shall be as described in Section 099500.

3.4 DEMONSTRATION

A. During the test period, the excavation around the structure shall be kept dewatered by the Contractor. Dewatering shall maintain the groundwater level to below the top of the base slab. The Contractor shall temporarily seal all bottom openings and wall openings below maximum water level in the structures, furnish clean water and fill the structures to the design maximum water level. The Contractor shall make his own arrangements for handling the water for testing and its transfer from one structure to another and its final disposal.

B. Fill structure with water at a rate not exceeding 2 feet/hour to design maximum liquid level and maintain level for a period of 24 hours.

C. Check all penetrations for leakage while filling structure.

D. At the end of 24 hours begin measuring drop in liquid level over minimum 24-hour interval.

E. If water loss exceeds 0.05 gallons per day per sq. ft. of wetted area for structure being tested, leakage shall be considered excessive.

F. Examine structure at least daily during test period and mark visible leaks or damp spots.

G. During the leakage test period, the Engineer will inspect the structure for leakage or change in volume. If moist spots become visible, indicating the existence of minor leaks, or if the water level indicates hidden leakage, the Contractor shall furnish all materials and do all work necessary to locate the leaks and make the structure watertight to the complete satisfaction of the Engineer. No additional compensation will be allowed for such work.

H. If, in the opinion of the Engineer, during the course of the test weather conditions are such that it becomes difficult to accurately monitor the water level in the tank, the test shall be stopped, and started over again when weather permits, at no additional cost to the Owner.

I. The water tightness test will be considered a pass when no wet spots are observed on the exterior surfaces of the containment structure during the water tightness test period and when the measured loss is less than the maximum specified.

J. On conclusion of the test, the Contractor shall pump or drain the water from the structure and dispose of it without damage to structures or surrounding facilities.

3.5 REPAIR METHODS

A. Drain structure a minimum of 2 feet below leaks and damp spots and repair in accordance with the Contract Documents or as approved by the Engineer.

B. If leakage is excessive, refill structure and retest. Continue procedure until leakage is not excessive.

C. Repairs and retesting are the responsibility of the Contractor and shall be accomplished at no additional cost to the Owner.

END OF SECTION

SECTION 330509.33 - THRUST RESTRAINT FOR UTILITY PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Tied joint restraint systems.

1.2 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C111
2. AWWA C153
3. AWWA C600 - Installation of Ductile-Iron Water Mains and Their Appurtenances.

B. ASME International:

1. ASME B1.1 - Unified Inch Screw Threads, UN and UNR Thread Form.

C. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
4. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
5. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
6. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.
7. ASTM A588/A588M - Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance.
8. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.
9. ASTM F436 - Standard Specification for Hardened Steel Washers.
10. ASTM F1674 – Standard Test Method for Joint Restraint Products.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with installation of fittings and joints that require restraint.

1.4 PREINSTALLATION REQUIREMENTS

A. Approval of products required prior to installation.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit manufacturer catalog information for restrained joint details and installation instructions.

C. Shop Drawings:

1. Indicate restrained joint details and materials being used.
2. Submit layout drawings showing piece numbers and locations.
3. Indicate restrained joint locations.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

F. Delegated Design Submittals:

1. Submit signed and sealed Shop Drawings with design calculations and assumptions for restrained lengths.
2. Submit joint restraint details.
3. Use joint restraint devices specifically designed for applications described in manufacturer information.

G. Qualifications Statements: Submit qualifications for manufacturer, fabricator, and licensed professional.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of joint restraints.

1.7 QUALITY ASSURANCE

A. Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Fabricators Qualifications: Company specializing in fabricating products specified in this Section with minimum three years' documented experience and approved by manufacturer.

C. Licensed Professionals Qualifications: Professional engineer experienced in design of specified Work and licensed in State of Washington.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Store materials according to manufacturer instructions.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

A. Field Measurements:

1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

1.10 WARRANTY

A. Section 017000 – Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five-year manufacturer’s warranty for all equipment specified in this Document.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The Washington State Department of Transportation Standard Specifications.
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.

B. Provide pressure pipeline with restrained joints at each bend, tee, dead-end, and change in direction.

2.2 TIED JOINT RESTRAINT SYSTEMS

A. Manufacturers:

1. EBBA Iron, Inc.

2. Romac Industries, Inc.
3. Approved equal
   a. Substitutions: Specified in Section 016000 – Product Requirements

B. Description
1. Standard mechanical joint restraint gland, restraint devices for MJ fittings and appurtenances to conform to ANSI/AWWA C 111/A21.11 or ANSI/AWWA C 153/A21.53.
2. EBAA iron series 2000 PV (PVC Pipe) or EBAA Iron Series 1100 Megalug (Ductile Iron Pipe) or approved substitution, and to meet requirements of ASTM F 1674. An identification number consisting of year/day/plant/shift to be cast into each gland body from which to trace test results.

C. Tie Bolts:

1. Mechanical Joints on 2- and 3-Inch Pipe:

   a. Size:5/8 inch.
   b. Comply with ASTM A588/A588M, Grade B.
   c. Comply with ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 40,000 lb. minimum for 5/8 inch and 60,000 lb. minimum for 3/4 inch by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

2. Mechanical and Flanged Joints on 4- to 12-Inch Pipe:

   a. Size: 3/4 inch.
   b. Comply with ASTM A588/A588M, Grade B.
   c. Comply with ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 40,000 lb. minimum for 5/8 inch and 60,000 lb minimum for 3/4 inch by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

3. Mechanical Joints on 14- to 24-Inch Pipe:

   a. Size:3/4 inch.
   b. Comply with ASTM A588/A588M, Grade B and ASTM A325, Type 3.

4. Mechanical and Flanged Joints on 30-Inch and Larger Pipe:

   a. Size: 1 inch.
   b. Comply with ASTM A588/A588M, Grade B.
   c. Comply with ASTM A325, Type 3, except increase tensile strength of full-body threaded section to 100,000 lb. minimum by heat-treating (quenching and tempering) to manufacturer's reheat and hardness specifications.

D. Tie Nut:

1. Description: Hex nut for each tie bolt and tie rods.
2. Comply with ASTM A563, Grade C3.
3. Finish: Stainless Steel

E. Tiepin:

1. Bends and Hydrants: 3/4-inch round bar stock.
2. Size and Shape: 6-inch hairpin.
3. Comply with ASME B1.1 and ASTM A588/A588M.
4. Finish: galvanized.

F. Tie Coupling:

1. Description: Extension of continuous-threaded rods.
2. Provide with center stop to aid installation.
3. Comply with ASTM A588/A588M.
4. Finish: galvanized.

G. Tie Clamp:

1. Description: Retainer clamp for ductile iron, asbestos-cement, and PVC push-on pipe.
2. Location: In front of bell.
3. Comply with ASTM A36/A36M, ASTM A307, Grade A, and ASTM A563, Grade A.
4. Finish: galvanized.

H. Tie Rod:

1. Description: Continuous-threaded rod for cutting to desired lengths.
2. Comply with ASTM A588/A588M, Grade B, ASTM A325, Type 3, and ASME B1.1.
3. Finish: galvanized.

I. Tie Bar:

1. Description: Steel bar used to restrain push-in plugs.
2. Comply with ASTM A36/A36M.
3. Finish: galvanized.

J. Tie Washer:

1. Description: Round flat washers.
2. ASTM A588/A588M, ASTM F436, Type 1.
3. Finish: galvanized.

2.3 MATERIALS

A. Steel:

1. High-Strength Low-Alloy Steel: Comply with ASTM A588/A588M, heat treated.
2. Carbon Steel: Comply with ASTM A36/A36M.

2.4 FINISHES

A. Galvanizing:
1. Comply with ASTM A123.

2. Hot dip galvanize after fabrication.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Examine substrates, areas, and conditions, with applicator present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Examine roughing-in for thrust restraint for utility piping to verify actual locations of piping connections before equipment installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Clean surfaces of pipe and fittings that are to receive tied joint restraint systems.

3.3 INSTALLATION

A. According to AWWA C600.

B. Install joint restraint system such that joints are mechanically locked together to prevent joint separation.

3.4 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

END OF SECTION 330509.33

SECTION 330513.10 - MANHOLES, FRAMES AND COVERS

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment, tools, and incidentals required for complete, precast concrete utility structures as shown on the Drawings and specified herein.

B. Section includes:

1. Precast concrete manholes.
2. Precast concrete vaults.
3. Accessories.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

1. Design precast components to resist all loadings required by the building code and the Contract Documents for the project application, including but not limited to soil, surcharge, hydrostatic, vertical live load, wind, and seismic forces, as applicable.
2. Uplift:

    a. Design integral precast base sections to resist flotation, as required.
    b. Use groundwater elevation shown on the Contract Drawings for flotation calculation.

        1) If groundwater elevations are not shown on the Drawings, use either 100-year flood elevation or top of manhole/vault structure as basis for flotation calculations.
        2) Provide factor of safety against flotation of 1.1 (minimum).

3. Precast Tops:

    a. Design manholes or vaults to support AASHTO HS-20 loadings unless noted otherwise.

1.3 SUBMITTALS

A. Submit in accordance with Section 013300 – Submittal Procedures.

B. Product Data:

1. Manhole covers.
2. Component construction.
3. Features.
4. Configuration.

5. Standard dimensions.

C. Shop Drawings:

1. Fabrication and/or layout drawings including:

a. Detailed diagrams showing typical components and dimensions.
b. Itemize on separate schedule, sectional breakdown of each structure with all components and refer to Drawing identification number or notation.
c. Indicate elevations for all piping entering each structure.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Product Supplier:

a. At least five (5) years' experience in design and construction of precast concrete utility structures.

2. Professional Engineer in charge of structural design:

a. Licensed to practice engineering in the state of Washington.

1.5 DELIVERY, STORAGE AND HANDLING

A. Do not ship materials until Shop Drawings are approved by Engineer in writing.

B. Properly handle and store all materials so that no damage or deterioration will occur during shipment or prolonged delay from the time of shipment until installation is completed and ready for operation.

C. Materials damaged during shipping, storage or installation will not be accepted.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Jensen Infrastructure
2. Approved Equal
a. Substitutions: As specified in Section 016000 - Product Requirements

2.2 MANHOLES AND VAULTS

A. Manhole Sections:

1. Shaft Construction: Concentric with eccentric cone top section; lipped male/female dry joints; sleeved to receive pipe or conduit as required.
2. Shape: Cylindrical for sanitary sewer manholes; square or rectangular for storm sewer or electrical manholes.
3. Clear Inside Dimensions: As indicated.
4. Design Depth: As indicated.
5. Clear Lid Opening: 24 inches diameter or as indicated.
6. Minimum wall thickness:

    a. 5 inches or as indicated.

7. Minimum base thickness:

    a. 12 inches for cast-in-place base.
    b. 6 inches for precast base.

B. Provide the following components for each manhole structure unless noted otherwise on the Drawings:

1. Base (precast or cast-in-place).
2. Precast bottom section(s).
3. Precast barrel section(s).
4. Precast eccentric transition section.
5. Precast adjuster ring(s).
6. Precast concrete transition section.
7. Precast or cast-in-place flat top.

C. Reinforcement: ASTM C478.

2.3 SANITARY SEWER MANHOLES

A. Integral Base:

1. 6-inch minimum thickness.

B. Pipe Connection:

1. Flexible synthetic rubber boot, ASTM C923.

    a. Cast-in or pressed-on types permitted.
    b. Install cast-in type boot during pouring of manhole section.

C. Provide channels in invert to direct flows from incoming to outgoing pipe.

1. Depth of channel equal to diameter of outgoing sewer as minimum.
2. Channels shall be “U” shaped in cross-section.
3. May be factory or field installed.
4. Install channels to preclude interference with operation of flexible boot or interfere with installation of sewer pipes.

D. Joints:

1. Tongue and groove.

E. Eccentric manhole opening.

F. Steps:

1. Provide steps 12 inches on center in-line with manhole opening.
2. Center steps between incoming and outgoing pipes.

2.4 ACCESSORIES

A. Non-pressure Type Frames and Cover:

1. Cast or ductile iron frame and covers: ASTM A48, Class 30B (minimum).
2. Use only cast or ductile iron of best quality, free from imperfections and blow holes.
3. Machine all horizontal surfaces.
4. Furnish unit with solid non-ventilated lid with concealed pick holes and live load rating of HS-20.
5. Letter covers with identifying name, i.e., sewer, electric, storm drain, etc.
6. Ensure minimum clear opening of 24 inches diameter.

B. Pressure Type Frame and Cover:

1. Furnish frame and bolted cover of heavy-duty construction. Equip unit with six countersunk 3/8 inches diameter by 1-1/2 inches long bolts with brass washers.
2. Provide machined horizontal surfaces and furnish solid lid and minimum 1/8-inch-thick by 1/2-inch-wide continuous strip neoprene gasket.
3. Letter covers with identifying name, i.e., sewer, electric, storm drain, etc.
4. Ensure minimum clear opening of 24 inches diameter.

C. Manhole Steps:

1. Polypropylene plastic encased Grade 60 steel reinforcement.
2. Provide steps conforming to ASTM C478 and OSHA standards.
3. Deform embedded portion of steps. Embed a minimum of 3 3/8-inches and anchor integrally into manhole or structure walls.
4. Provide maximum distance from surface to first rung not greater than 30-inches and maximum spacing on remaining rungs is 12-inches OC. Maximum distance from final rung to structure floor not greater than 16-inches.
5. Minimum step width of 12 inches.
6. Steps not required on storm sewer catch basins.
7. Grout in steps to withstand 300 pound live loading applied vertically and 200 pound pull-out.

D. Adjusting Rings:

1. Precast concrete with sufficient steel reinforcement to prevent cracking in normal handling and use.
2. Mating Faces:

a. Smooth.
b. Parallel.
c. Free from cracks, chips, spalls or casting irregularities interfering with watertight mating to structure top or casting.
d. Provide grooves in faces to contain extrudable preformed plastic gasket material when possible.

3. Ring Thickness Range:

a. 2-inches minimum.
b. 8-inches maximum.

E. Gasket Material:

1. Flexible Boots:

a. ASTM C923.
b. Synthetic rubber resistant to sanitary sewage.
c. Cast-in or pressed-on type is acceptable. Mastic Joint Sealer:

a. Preformed butyl rubber material in flexible rope form.
b. Meet or exceed requirements of ASTM C990.
c. Manufacturers:

1) EZ-Stik by Press Seal Gasket Company.
2) Or approved equal.

F. Non Shrink Grout:

1. Non-shrink, non-metallic, non-corrosive, and non-staining.
2. Premixed with only water to be added in accordance with manufacturer's instructions at jobsite.
3. Grout to produce a positive but controlled expansion. Mass expansion shall not be created by gas liberation or by other means.
4. Minimum 28-day compressive strength: 6500 psi.
5. Manufacturers:

a. Master Builders "Special LL-713 Grout."
b. U. S. Grout "Five Star Grout."
c. L & M "Crystex."
d. Sika Corporation "Sika Grout 212."
e. Or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify that excavation is correct.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other Sections.

3.3 PLACING PRECAST STRUCTURES

A. Sanitary Sewer Manholes:

1. Excavate, backfill, and compact in accordance with Section 312316.00 – Excavation.
2. Connect pipes using flexible boots in accordance with boot manufacturer's instructions.
    a. Center pipe in boot.
    b. Ensure watertight connections.
3. Place preformed butyl rubber sealant between manhole sections.
4. Place succeeding manhole sections so steps remain in true vertical alignment.
5. Place appropriate top section, cone or flat top.
6. Place adjusting ring(s) on manhole top. Select thickness of adjusting ring to bring completed manhole to elevation shown on Drawings.
    a. Place extrudable preformed plastic gasket material between adjusting ring and manhole top, and between adjusting ring and manhole frame.
    b. Avoid use of overly thick gasket material, which will likely produce after-settlement of manhole frame due to long-term cold flow of gasket materials.
    c. For ungrooved adjusting ring, provide two rows of 1/2 inch by 1/2 inch or 3/4 inch by 3/4-inch gasket material.
    d. For grooved adjusting rings, provide size gasket material recommended by ring manufacturer. Single or multiple grooved rings permitted. Where multiple grooved rings used, place gasket material in each groove.
7. Install manhole frame and cover.
8. Pour manhole invert.
    a. Provide poured-in-place channels (if manholes not furnished with precast inverts) to direct flows from incoming pipes to outgoing pipes. Channels shall smoothly blend flows.
    b. Make channel “U” shaped. Width and depth equal to size of outlet sewer.
    c. To maintain flexibility of pipe connection boot, plug annular space between pipe and boot which falls in area where invert to be poured with extrudable preformed plastic gasket material. Plug shall prevent concrete from entering space between pipe and boot.
    d. Invert channels may be placed after manhole base section (and connecting pipes) backfilled.

B. Valve Vaults:

1. Comply with requirements for Sanitary Sewer Manholes, except as otherwise specified.
2. Poured-in-Place Base:

    a. For vaults furnished without integral base, install concrete base.
    b. Place extrudable preformed plastic gasket material around water main prior to pouring base.
    c. Form base so base concrete will fill in lower portion of "U" shaped holes and contact gasket material placed around pipe, but does not contact pipe itself.
    d. Solid concrete masonry blocks or bricks mortared in-place may be used to plug "U" shaped holes as alternate. Mortar shall contact gasket material, but not pipe.
    e. Do not backfill until poured base has cured sufficiently to withstand stress of backfilling operation without cracking or separating from vault section.
    f. After concrete base has cured (15 days minimum, 30 days maximum), seal interior of vault around pipe connection with mastic joint sealant.
    g. Joint between Vault Sections: Provide 1 or 2 rows extrudable preformed plastic gasket material between sections as necessary for watertight joint.
    h. Pipe Connection:

        1) For circular hole, make connections as described for storm manholes, catch basins, and inlets.

    i. Joint Between Precast Concrete Sections:

        1) Seal joints in accordance with requirements for storm manholes, catch basins, and inlets.

3.4 CONNECTION TO EXISTING MANHOLES

A. Core drill hole and install rubber boot for connections less than or equal to 24 inches in diameter.

B. For connections greater than 24 inches drill pattern of holes no greater than outside diameter of new pipe plus 2 inches, and break out material defined by pattern.

3.5 FIELD QUALITY CONTROL

A. Precast reinforced concrete bases, risers, tops, adjusting rings, and gray or ductile iron castings shall be subject to rejection for failure to conform to Specifications.

B. Individual sections of bases, risers, and tops may be rejected for following.

1. Fractures or cracks passing through bell, except for single end crack not exceeding joint depth.
2. Excessive patching.
3. Grouted pipe openings.
4. Defects indicating imperfect proportioning, mixing, and molding.
5. Surface defects indicating honeycombed or open texture.

6. Damaged ends, where such damage prevents making satisfactory joint.
7. Manhole steps out of line, not properly spaced or damaged.
8. Continuous crack having surface width of 0.01 inch or more and extending for length of 12 inches or more, regardless of position.

C. Installation may be rejected for following.

1. Use of individual components subject to rejection.
2. Failure to conform to installation requirements.
3. Visible infiltration.
4. Variation from true vertical alignment by more than 2 percent of depth.

3.6 TESTING MANHOLES

A. Concrete Manhole Sections: As specified in Section 330505.33 "Infiltration and Exfiltration Testing".

END OF SECTION

SECTION 330516 - PRECAST CONCRETE UTILITY STRUCTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment, tools, and incidentals required to install complete, precast concrete utility structures as shown on the Drawings and specified herein.

B. Section includes:
1. Precast concrete vaults.
2. Precast concrete lid.
3. Accessories.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
1. Design precast components to resist all loadings required by the building code and the Contract Documents for the Project application, including but not limited to soil, surcharge, hydrostatic, vertical live load, wind, and seismic forces, as applicable.
2. Uplift:
a. Integral precast base sections shall be designed by the supplier to resist flotation, as required.
b. Use groundwater elevation shown on the Contract Drawings for flotation calculation.

1) If groundwater elevations are not shown on the Drawings, use either 100-year flood elevation or top of manhole/vault structure as basis for flotation calculations.
2) Provide factor of safety against flotation of 1.1 (minimum).
3. Precast Tops:
a. Design vaults to support AASHTO HS-20 loadings unless noted otherwise.

1.3 SUBMITTALS

A. Submit in accordance with Section 013300 – Submittal Procedures.

B. Product Data:
1. Access covers.
2. Manhole Frames and Covers.
3. Aluminum Hatches.
4. Vent Piping.
5. Component construction.
6. Features.
7. Configuration.
8. Standard dimensions.

C. Shop Drawings:
1. Fabrication and/or layout drawings including:
a. Detailed diagrams showing typical components and dimensions.

b. Itemize on separate schedule, sectional breakdown of each structure with all components and refer to Drawing identification number or notation.
c. Indicate elevations for all piping entering each structure.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Product Supplier:
a. At least five (5) years' experience in design and construction of precast concrete utility structures.
2. Professional Engineer in charge of structural design:
a. Licensed to practice engineering in the state of Washington.

1.5 DELIVERY, STORAGE AND HANDLING

A. Do not fabricate materials until Shop Drawings are approved by Engineer in writing.

B. Properly handle and store all materials so that no damage or deterioration will occur during shipment or prolonged delay from the time of shipment until installation is completed and ready for operation.

C. Materials damaged during shipping, storage or installation will not be accepted.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Jensen Infrastructure
2. Approved Equal
a. Substitutions: As specified in Section 016000 - Product Requirements

2.2 VAULTS

A. Sections:
1. Construction: Lipped male/female dry joints.
2. Pipe Connections: Sleeved to receive pipe or conduit as required.
3. Shape: Rectangular or square.
4. Clear Inside Dimensions: As indicated.
5. Design Depth: As indicated.
6. Clear Opening: As indicated.
7. Minimum wall thickness:
a. 5 inches.
8. Minimum base thickness:
a. 12 inches for cast-in-place base.
b. 6 inches for precast base.

B. Provide the following components for each vault structure unless noted otherwise on the Drawings:
1. Base (precast or cast-in-place).

2. Precast riser section(s).
3. Precast or cast-in-place flat top.

C. Reinforcement: ASTM C478.

D. Pipe Connection:
1. Flexible synthetic rubber boot, ASTM C923.
a. Cast-in or pressed-on types permitted.
b. Install cast-in type boot during pouring of vault section.

E. Steps:
1. Provide steps 16 inches on center in-line with opening.
2. Center steps between incoming and outgoing pipes.

2.3 PRECAST CONCRETE LID

A. Precast Concrete Lid at Existing Wet Well:
1. Thickness:
a. Minimum thickness: 15 inches.
2. Configuration:
a. Plan shape may be square or circular, provided the lid fully covers the existing cast-in-place concrete lift station.
b. The precast concrete lid shall be designed to span the existing structure to remain.
3. Fabrication
a. The lid may be fabricated in multiple sections to facilitate transport and installation.
b. All joints between precast sections shall be watertight
4. Interface with Existing Structure
a. Provide a watertight joint between the precast concrete lid and the existing cast-in-place concrete lift station wall.
b. Provide a leveling system to ensure the lid is installed level.
5. Submittals
a. The contractor will submit shop drawings and structural calculations, which will be stamped by a Licensed Professional Engineer in the State of Washington, for review prior to fabrication.
b. Contractor shall coordinate shop drawings directly with the precast manufacturer selected for the Work. Jensen Precast may be used as an optional manufacturer.

2.4 ACCESSORIES

A. Aluminum Hatches (Traffic Rated):
1. Manufacturers:
a. EJ Group, Inc.
b. Halliday Products.
c. Or approved equal.
2. Channel frame construction with continuous anchor flange.
3. Cover leafs: ¼-inch aluminum plate with non-slip coating.
4. Load Rating: AASHTO H20
5. Locking system: Recessed non corrosive locking bar for use with Owners pad lock.

6. Safety grate: Provide fall protection.
7. Accessories:
   a. Heavy duty type 316 stainless steel hinges.
   b. Fastening hardware type 316 stainless steel.
   c. Tamper proof attaching hardware.
   d. Automatic hold open arm with aluminum latch.
   e. Drainage coupling.
   f. Odor suppression gasket.
   g. Recessed lifting handle.
8. Prime surfaces designed to be in contact with concrete.
9. Hatch Size: As shown in drawings.

B. Non-pressure Type Frames and Cover:
1. Cast or ductile iron frame and covers: ASTM A48, Class 30B (minimum).
2. Use only cast or ductile iron of best quality, free from imperfections and blow holes.
3. Machine all horizontal surfaces.
4. Furnish unit with solid non-ventilated lid with concealed pick holes and live load rating of HS-20.
5. Letter covers with identifying name, i.e., sewer, electric, storm drain, etc.
6. Ensure minimum clear opening of 24 inches diameter.

C. Pressure Type Frame and Cover:
1. Furnish frame and bolted cover of heavy-duty construction. Equip unit with six countersunk 3/8-inch diameter by 1-1/2-inch long bolts with brass washers.
2. Provide machined horizontal surfaces and furnish solid lid and minimum 1/8-inch thick by 1/2-inch wide continuous strip neoprene gasket.
3. Letter covers with identifying name, i.e., sewer, electric, storm drain, etc.
4. Ensure minimum clear opening of 24 inches diameter.

D. Manhole Steps:
1. Polypropylene plastic encased Grade 60 steel reinforcement.
2. Provide steps conforming to ASTM C478 and OSHA standards.
3. Deform embedded portion of steps. Embed a minimum of 3-3/8-inches and anchor integrally into manhole or structure walls.
4. Provide maximum distance from surface to first rung not greater than 12 inches and maximum spacing on remaining rungs 12-inches OC.
5. Minimum step width of 12 inches.
6. Steps not required on storm sewers.
7. Grout in steps shall withstand 300 pound live loading applied vertically and 200 pound pull-out.

E. Adjusting Rings:
1. Precast concrete with sufficient steel reinforcement to prevent cracking in normal handling and use.
2. Mating Faces:
   a. Smooth.
   b. Parallel.
   c. Free from cracks, chips, spalls or casting irregularities interfering with watertight mating to structure top or casting.
   d. Provide grooves in faces to contain extrudable preformed plastic gasket material when possible.

3. Thickness Range:
   a. 2 inches minimum.
   b. 8 inches maximum.

F. Gasket Material:
1. Flexible Boots:
   a. ASTM C923.
   b. Synthetic rubber resistant to sanitary sewage.
   c. Cast-in or pressed-on type is acceptable.
2. Mastic Joint Sealant
   a. Preformed butyl rubber material in flexible rope form.
   b. Meet or exceed requirements of ASTM C990.
   c. Manufacturers:

      1) EZ-Stik by Press Seal Gasket Company.
      2) Or approved equal.

G. Non-shrink Grout:
1. Non-shrink, non-metallic, non-corrosive, and non-staining.
2. Premixed with only water to be added in accordance with manufacturer's instructions at jobsite.
3. Grout to produce a positive but controlled expansion. Mass expansion shall not be created by gas liberation or by other means.
4. Minimum 28-day compressive strength: 6500 psi.
5. Manufacturers:
   a. Master Builders "Special LL-713 Grout."
   b. U. S. Grout "Five Star Grout."
   c. L & M "Crystex."
   d. Sika Corporation "Sika Grout 212."
   e. Or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that items provided by other sections of Work are properly sized and located.

B. Verify that built-in items are in proper location, and ready for roughing into Work.

C. Verify that excavation for manholes is correct.

3.2 PREPARATION

A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other Sections.

3.3 PLACING PRECAST STRUCTURES

A. Precast Utility Structures:
1. Excavate, backfill and compact in accordance with Section 312316.00 – Excavation.

2. Connect pipes using flexible boots in accordance with boot manufacturer's instructions.
   a. Center pipe in boot.
   b. Ensure watertight connections.
3. Place preformed butyl rubber sealant between precast sections.
4. Place succeeding precast sections so steps remain in true vertical alignment.
5. Place appropriate top section, cone or flat top.
6. Shop coat underground exterior portion of precast sections with bituminous coating in two coats totaling 21 mils wet and minimum 16 mils dry.
7. Install manhole frame and cover.

B. Valve Vaults:
1. Comply with requirements for Precast Utility Structures, except as otherwise specified.
2. Poured-in-Place Base:
   a. For vaults furnished without integral base, install concrete base.
   b. Place extrudable preformed plastic gasket material around water main prior to pouring base.
   c. Form base so base concrete will fill in lower portion of “U” shaped holes and contact gasket material placed around pipe, but does not contact pipe itself.
   d. Solid concrete masonry blocks or bricks mortared in-place may be used to plug “U” shaped holes as alternate. Mortar shall contact gasket material, but not pipe.
   e. Do not backfill until poured base has cured sufficiently to withstand stress of backfilling operation without cracking or separating from vault section.
   f. After concrete base has cured (15 days minimum, 30 days maximum), seal interior of vault around pipe connection with mastic joint sealant.
   g. Joint between Vault Sections: Provide one or two rows extrudable preformed plastic gasket material between sections as necessary for watertight joint.
   h. Pipe Connection:

      1) For circular hole, make connections as described for Precast Utility Structures.
   i. Joint Between Precast Concrete Sections:

      1) Seal joints in accordance with requirements for Precast Utility Structures.

3.4 CONNECTION TO EXISTING PRECAST STRUCTURES

A. Core drill hole and install rubber boot for connections less than or equal to 24 inches in diameter.

B. For connections greater than 24 inches drill pattern of holes no greater than outside diameter of new pipe plus 2 inches, and break out material defined by pattern.

3.5 FIELD QUALITY CONTROL

A. Precast reinforced concrete bases, risers, tops, adjusting rings, and gray or ductile iron castings shall be subject to rejection for failure to conform to Specifications.

B. Individual sections of bases, risers, and tops may be rejected for following:

1. Fractures or cracks passing through bell, except for single end crack not exceeding joint depth.
2. Excessive patching.
3. Grouted pipe openings.
4. Defects indicating imperfect proportioning, mixing, and molding.
5. Surface defects indicating honeycombed or open texture.
6. Damaged ends, where such damage prevents making satisfactory joint.
7. Manhole steps out of line, not properly spaced or damaged.
8. Continuous crack having surface width of 0.01 inch or more and extending for length of 12 inches or more, regardless of position.

C. Installation may be rejected for following:
1. Use of individual components subject to rejection.
2. Failure to conform to installation requirements.
3. Visible infiltration.
4. Variation from true vertical alignment by more than 2 percent of depth.

END OF SECTION

SECTION 331416 – POTABLE WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Piping.
2. Reduced-pressure backflow preventers.

1.2 REFERENCE STANDARDS

A. American Society of Mechanical Engineers:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.

B. ASTM International:

1. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
2. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.
3. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
4. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
5. ASTM D3035 - Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
6. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
7. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. American Water Works Association:

1. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings.
2. AWWA C105 - Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. AWWA C110 - Ductile-Iron and Gray-Iron Fittings.
4. AWWA C111 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. AWWA C115 - Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
6. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast.
7. AWWA C153 - Ductile-Iron Compact Fittings.
8. AWWA C203 - Coal-Tar Protective Coatings and Linings for Steel Water Pipe.
9. AWWA C205 - Cement-Mortar Protective Lining and Coating for Steel Water Pipe - 4 In. (100 mm) and Larger - Shop Applied.

10. AWWA C213 - Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings.
11. AWWA C600 - Installation of Ductile-Iron Mains and Their Appurtenances.
12. AWWA C605 - Underground Installation of Polyvinyl Chloride (PVC) and Molecularly Oriented Polyvinyl Chloride (PVCO) Pressure Pipe and Fittings.
13. AWWA C606 - Grooved and Shouldered Joints.
14. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.
15. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service.
16. AWWA C905 - Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 14 In. Through 48 In. (350 mm Through 1,200 mm), for Water Transmission and Distribution.

D. NSF International:

1. NSF 61 - Drinking Water System Components - Health Effects.
2. NSF 372 - Drinking Water System Components - Lead Content.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

1.4 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum one week prior to commencing Work of this Section.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data - Submit manufacturer information for:

1. Piping.
2. Reduced-pressure backflow preventers.
3. Pipe support systems.
4. Concrete encasement and cradles.
5. Disinfection.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Field Quality-Control Reports: For piping and related equipment.

E. Qualifications Statements: For manufacturer and installer.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations.

C. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

D. Test Reports:
1. Test reports in accordance with Section 330505.31 – Hydrostatic Testing.
2. Test reports in accordance with Section 330110.58 – Disinfection of Water Piping Systems.

1.7 QUALITY ASSURANCE

A. Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum 20 years' documented experience.

B. Installers Qualifications: Company specializing in performing Work of this Section with minimum five years' documented experience in installation of Work of this Section.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Storage:

1. Store materials according to manufacturer instructions.
2. Block individual and stockpiled pipe lengths to prevent moving.
3. Do not place pipe or pipe materials on private property or in areas obstructing pedestrian or vehicle traffic.
4. Store PE and PVC materials out of sunlight.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

A. Field Measurements:
1. Verify field measurements prior to fabrication.

2. Indicate field measurements on Shop Drawings.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish Five-year manufacturer's warranty for reduced-pressure backflow preventer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The Washington State Department of Transportation Standard Specifications.
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.

2.2 PIPING

A. DI1 - Ductile Iron Pipe and Fittings:
1. Ductile Iron Pipe, 3 inch through 64 inch, Centrifugally Cast, for Water: ANSI/AWWA C 151
   a. Thickness Class: As indicated in the Contract Documents.
   b. Lining: Cement mortar.
   c. Joints: Push-on unless otherwise noted in the Contract Documents.
2. Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges: ANSI/AWWA C 115
   a. Pressure Class: 250 psi.
   b. Lining: Cement mortar.
3. Ductile Iron Compact Fittings Using Mechanical or Push-on Joints, 3 inch through 24 inch: ANSI/AWWA C 153
   a. Pressure Class: 350 psi.
   b. Lining: Cement mortar.
4. Ductile Iron or Gray Iron Fittings Using Mechanical, Flanged, or Push-on Joints, 3 inch through 24 inches: ANSI/AWWA C 110
   a. Pressure Class for Mechanical or Push-on Ductile Iron Joints: 350 psi.
   b. Pressure Class for Flanged Ductile Iron Joints: 250 psi.
   c. Pressure Class for all Gray Iron Joints: 250 psi.
   d. Lining: Cement mortar.
5. Ductile Iron or Gray Iron Fittings Using Mechanical, Flanged, or Push-on Joints, 30 inches through 48 inches: ANSI/AWWA C 110
   a. Pressure Class for all Material and Joint Types: 250 psi.
   b. Lining: Cement mortar. F. Rubber Gasket Joints Ductile Iron Pressure Pipe and Fittings: ANSI/AWWA C 111
6. Outside Coating for Pipe and Fittings: ANSI/AWWA C 110
   a. See Specification 099000.

B. CU1 - Copper Tubing:

1. Comply with ASTM B88.
2. Type K, annealed.
3. Fittings: ASME B16.22, wrought copper.
4. Joints: Compression connection.

2.3 COUPLINGS

A. Couplings: Smith-Blair OMNI 441 coupling system, or approved substitution. Couplings shall be lined and coated with a minimum thickness of 0.012” of fusion-bonded epoxy, or approved substitution. Coating must comply with AWWA C 213 and AWWA C 550.

B. Flanged Coupling Adapters: Smith-Blair 912, or approved substitution. Couplings shall be lined and coated with a minimum thickness of 0.012” of fusion-bonded epoxy, or approved substitution. Coating must comply with AWWA C 213 and AWWA C 550.

C. HDPE Couplings: Electrofusion couplings to solid wall HDPE and flange by flange elsewhere or as directed by the Engineer.

2.4 REDUCED-PRESSURE BACKFLOW PREVENTERS

A. Manufacturers:

1. FEBCO; A WATTS Brand.
2. Flomatic Corporation.
3. Matco-Norca.
4. NIBCO INC.
5. WATTS.
6. Zurn Industries, LLC.
7. Approved Equal
    a. Substitutions: As specified in Section 016000 - Product Requirements

B. Description:

1. Comply with ASSE 1013.
2. Materials:
    a. Body: Bronze.
    b. Internal Parts: Corrosion Resistant.
    c. Springs: Stainless steel.
3. Double Check Valve Assemblies:
    a. Comply with ASSE 1012.
    b. Description: Two independently operating check valves, with intermediate atmospheric vent.
4. Furnish two gate valves, one strainer, and four test cocks.

2.5 MATERIALS

A. Bedding and Cover:

1. Bedding: Fill Type A3 as specified in Section 310516 Aggregates for Earthwork.
2. Cover: Fill Type A2 or A3 as specified in Section 310516 Aggregates for Earthwork.
3. Soil Backfill from Above Pipe to Finish Grade:

a. Soil Type S1, S2, S3, S4, or S5 as specified in Section 310513 "Soils for Earthwork".
b. Subsoil with no rocks greater than 3 inches in diameter, frozen earth, or foreign matter.

2.6 ACCESSORIES

A. Thrust Restraints: As specified in Section 330509.33 Thrust Restraint for Utility Piping.

B. Pipe Markers: As specified in Section 400597 Identification for Process Equipment.

C. Vaults: As specified in Section 330563 Concrete Vaults and Chambers.

D. Coatings: As specified in Section 099000 – Painting and Coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution

B. and Closeout Requirements: Requirements for installation examination.

C. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

D. Examine roughing-in for site water utility distribution piping to verify actual locations of piping connections before equipment installation.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Section 017000 -

B. Execution and Closeout Requirements: Requirements for installation preparation.

C. Pipe Cutting:
1. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.

2. Use only equipment specifically designed for pipe cutting; use of chisels or hand saws is not permitted.
3. Grind edges smooth with beveled end for push-on connections.

D. Abandonment of pipe:
1. According to Section 024100 – Demolition.

E. Remove scale and dirt on inside and outside before assembly.

F. Prepare pipe connections to equipment with flanges or unions.

G. Protect and support existing distribution piping and appurtenances as Work progresses.

3.3 INSTALLATION OF SITE WATER UTILITY DISTRIBUTION PIPING

A. Bedding: See Section 310516 – Aggregates for Earthwork.

B. Pipe and Fittings:

1. Maintain separation of water main from sewer according to Washington Criteria for Sewer Works Design Section C1-9.1.
2. Install pipe to elevations indicated on Drawings.
3. Handle and assemble pipe according to manufacturer instructions and as indicated on Drawings.
4. Install ductile-iron piping and fittings according to AWWA C600.
5. Route pipe in straight line and re-lay pipe that is out of alignment or grade.
6. Close pipe openings with watertight plugs during Work stoppages.
7. Install access fittings to permit disinfection of water system performed under Section 330110.58 "Disinfection of Water Utility Piping Systems".
8. Thrust Restraints: See Section 330509.33 – Thrust Restraint for Utility Piping
9. Establish elevations of buried piping with not less than 72 inches of cover measured from the top of the pipe barrel to the finished grade unless otherwise shown on drawings.
10. Pipe Markers: As specified in Section 400597 "Identification for Process Equipment."

C. Disinfection: As specified in Section 330110.58 "Disinfection of Water Utility Piping Systems."

3.4 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Tests and Inspections:

1. Pressure test piping system according to AWWA C600. See Section 330505.31 “Hydrostatic Testing.”

2. Compaction Testing:
   a. As specified in Section 312316.13 – Trenching

END OF SECTION 331416

SECTION 333100 - SANITARY SEWERAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sanitary sewerage piping.
2. Flexible couplings.
3. Flexible pipe boots for manhole pipe entrances.

B. Related Requirements:
1. Section 310513 "Soils for Earthwork" for soil for backfill in trenches.
2. Section 310516 "Aggregates for Earthwork" for aggregate for backfill in trenches.
3. Section 312316 "Excavation" for requirements for excavation and backfill as required by this Section.
4. Section 312316.13 "Trenching" for requirements for trenching as required by this Section.
5. Section 312323 "Fill" for requirements for backfilling as required by this Section.
6. Section 330505.41 "Air Testing" for testing of gravity sewerage piping.
7. Section 330505.33 "Infiltration and Exfiltration Testing" for infiltration testing of gravity- sewerage piping.
8. Section 330553 "Identification for Utilities Piping and Equipment" for pipe markers.

1.2 REFERENCE STANDARDS

A. American Water Works Association:
1. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
2. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
3. ASTM D2729 - Standard Specification for Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
4. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with termination of sanitary sewer connection to municipal sewer utility service and trenching.

1.4 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum two weeks prior to commencing Work of this Section.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit manufacturer information indicating Product Data for:

1. Sanitary sewerage piping.
2. Flexible pipe boots for manhole pipe entrances.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer Instructions: Submit special procedures required to install specified products.

E. Source Quality-Control Reports: Indicate results of factory tests and inspections for piping and accessories.

F. Field Quality-Control Reports: Indicate results of Contractor-furnished tests and inspections.

G. Qualifications Statements: For manufacturer and installer.

1.6 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record finished locations of pipe runs, connections, and invert elevations.

1.7 QUALITY ASSURANCE

A. Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installers Qualifications: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Storage:

1. Store materials according to manufacturer instructions.
2. Store valves in shipping containers with labeling in place.
3. Do not store materials on private property without written permission of property owner.
4. Do not stack material higher than recommended by manufacturer.
5. Store PVC materials out of sunlight.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Block individual and stockpiled pipe lengths to prevent moving.
3. Provide additional protection according to manufacturer instructions.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The Washington State Department of Transportation Standard Specifications.
2. Maintain one (1) copy of each standard affecting Work of this Section on Site.

2.2 SANITARY SEWERAGE PIPING

A. Solid Wall PVC Pipe Sizes 4 inch to 15 inch: ASTM D 3034.
1. Minimum Wall Thickness: SDR 35.
2. Joints: Elastomeric gasket joints with ASTM F 477 elastomeric gaskets.

2.3 FLEXIBLE COUPLINGS

A. Manufacturers:

1. Fernco Inc.
2. Romac Industries, Inc.

B. Material: Resilient, chemical-resistant, elastomeric PVC.

C. Attachment: Two stainless-steel clamps, screws, and housings.

2.4 FLEXIBLE PIPE BOOTS FOR MANHOLE PIPE ENTRANCES

A. Manufacturers:

1. Kor-N-Seal
2. A-Lok.

3. Press-Seal Corporation.
4. Approved equal
    a. Substitutions: Specified in Section 016000 – Product Requirements

B. Material: Resilient, chemical-resistant .

C. Comply with ASTM C923.

D. Attachment: stainless-steel clamp, hardware, and housings.

2.5 MATERIALS

A. Bedding and Cover:

1. Bedding: Fill Type A3, as specified in Section 310516 "Aggregates for Earthwork".
2. Cover: Fill Type A2 or A3, as specified in Section 310516 "Aggregates for Earthwork".
3. Soil Backfill from Above Pipe to Finish Grade:

    a. Soil Type S1, S2, S3, S4, or S5, as specified in Section 310513 "Soils for Earthwork".
    b. Subsoil with no rocks more than 3 inches in diameter, frozen earth, or foreign matter.

2.6 ACCESSORIES

A. Locating Wire & Pipe Markers: As specified in Section 330500 "Common Work Results for Utilities."

2.7 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Provide shop inspection and testing of pipe.

C. Owner Inspection:

1. Make completed pipe sections available for inspection at manufacturer's factory prior to packaging for shipment.
2. Notify Owner at least seven days before inspection is allowed.

D. Owner Witnessing:

1. Allow witnessing of factory inspections and tests at manufacturer's test facility.
2. Notify Owner at least seven days before inspections and tests are scheduled.

E. Certificate of Compliance:

1. If manufacturer is approved by authorities having jurisdiction, submit certificate of compliance indicating Work performed at manufacturer's facility conforms to Contract Documents.
2. Specified shop tests are not required for Work performed by approved manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Verify that trench cut is ready to receive Work of this Section.

D. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

C. Correct over-excavation as specified in Section 312323 “Fill.”

D. Remove stones larger than 3 inches or other hard materials that could damage pipe or impede consistent backfilling or compaction.

E. Protect and support existing sewer lines, utilities, and appurtenances.

F. Utilities:

1. Maintain profiles of utilities.
2. Coordinate with other utilities to eliminate interference.
3. Notify Architect/Engineer if crossing conflicts occur.

3.3 INSTALLATION OF PIPING AND MANHOLES

A. Isolation:
1. Isolate hazardous gases and prevent groundwater and other material from entering an existing sewer line by installing a temporary air-tight plug in the first new manhole that

will not restrict existing flow. The plug shall remain until the sewer has been accepted for use.

B. Bedding:

1. Excavate pipe trench as specified in Section 312316.13 "Trenching".
2. Place bedding material at trench bottom.
3. Level materials in continuous layer at minimum 6 inches.
4. Maintain groundwater 1 foot below the pipe invert.
5. Maintain optimum moisture content of bedding material to attain required compaction density.

C. Piping:

1. Install pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.
2. Handle and assemble pipe according to manufacturer instructions and as indicated on Drawings.
3. Control line and grade of the pipe installation by use of a pipeline laser or other Engineer approved means. Check accuracy of laser against line and grade control hubs. Limit variance of installed pipe from line and grade.
4. Use standard lengths of pipe unless otherwise required for installation of tees, fittings, or manholes.
5. Utilize proper tools for cutting and beveling pipe ends and joining pipe. Use manufacturer's recommended tools designed for this task.
6. Remove dirt and other foreign material from pipe.
7. Prepare pipe joint using specified gasket and manufacturer’s recommended lubricant.
8. Mark, or verify that pipe ends are marked, to indicate insertion stop position (home). Ensure that pipe is inserted into bell to this mark. Push spigot into bell using methods recommended by the manufacturer. Protect the end of the pipe during “homing” and do not use excessive force that may result in over-assembled joints, dislodged gaskets, or damaged ends. If full entry is not achieved, disassemble and clean the joint and reassemble
9. Lay pipe to slope gradients as indicated on Drawings.
10. Begin at downstream end of system and progress upstream.
11. Lay bell-and-spigot pipe with bells upstream.
12. When pipe installation is not in progress, block and plug the open end of the pipe to prevent creep, uplift or floating and entrance of water or other material into the pipe
13. Cover:
    a. Install at sides and over top of pipe, to minimum compacted thickness of 6 inches.
14. Backfill and compact as specified in Section 312316.13 "Trenching."
15. Do not displace or damage pipe when compacting.
16. Connect to municipal sewer system.
17. Pipe Markers: As specified in Section 330597 "Identification and Signage for Utilities."

D. Manholes: As specified in Section 330561 "Concrete Manholes."

E. Backfilling:

1. As specified in Section 312323 "Fill."

3.4 TOLERANCES

A. Section 014000 - Quality Requirements: Requirements for tolerances.

3.5 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

C. Request inspection by Engineer prior to and immediately after placing bedding.

D. Testing:

1. If tests indicate that Work does not meet specified requirements, remove Work, replace, and retest.
2. Pipe Testing:

a. Pressure Testing: As specified in Section 330505.41 "Air Testing".
b. Infiltration and Exfiltration Testing: As specified in Section 330505.33 "Infiltration and Exfiltration Testing".

3. Compaction Testing:
a. As specified in Section 312316.13 – Trenching

E. Prepare test and inspection reports.

3.6 PROTECTION

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

C. Cap open ends of piping during periods of Work stoppage.

END OF SECTION 333100

SECTION 333126 - SANITARY PRESSURE SEWER PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Low-pressure sewer piping.
2. Air release valves.
3. Cleanouts.

1.2 REFERENCE STANDARDS

A. ASTM International:
1. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.
2. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
3. ASTM D2241 - Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
4. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
5. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.
6. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.
7. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

B. AWWA
1. ANSI/AWWA C 104: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings, for Water.
2. ANSI/AWWA C 110: Ductile Iron and Gray-Iron Fittings 3 inch through 48 inches for Water and Other Liquids.
3. ANSI/AWWA C 111: Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. ANSI/AWWA C 115: Flanged Ductile Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
5. ANSI/AWWA C 151: Ductile Iron Pipe, Centrifugally Cast for Water.
6. ANSI/AWWA C 153: Ductile Iron Compact Fittings, 3 inch through 24 inch and 54 inch through 64 inch for Water Service

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

B. Coordinate Work of this Section with connection to existing municipal sewer utility service.

1.4 PREINSTALLATION MEETINGS

A. Section 013000 - Administrative Requirements: Requirements for preinstallation meeting.

B. Convene minimum Two week prior to commencing Work of this Section.

1.5 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Submit manufacturer information indicating Product Data for:

1. Low-pressure sewer piping.
2. Air release valves.
3. Cleanouts.
4. Flexible pipe boots for pipe entrances.

C. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

D. Manufacturer Instructions: Submit special procedures required to install specified products.

E. Source Quality-Control Reports: Indicate results of factory tests and inspections for piping and accessories.

F. Field Quality-Control Reports: Indicate results of Contractor-furnished tests and inspections.

G. Qualifications Statement: For manufacturer.

1.6 CLOSEOUT SUBMITTALS

A. A.Section 017000 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Record invert elevations and actual locations of pipe runs, connections, cleanouts and valves.

1.7 QUALITY ASSURANCE

A. Manufacturers Qualifications: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

B. Installers Qualifications: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 016000 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.

C. Storage:

1. Store materials according to manufacturer instructions.
2. Do not store materials on private property without written permission of property owner.
3. Do not stack pipe higher than recommended by pipe manufacturer.

D. Protection:

1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
2. Provide additional protection according to manufacturer instructions.

1.9 EXISTING CONDITIONS

A. Field Measurements:
1. Verify field measurements prior to fabrication.
2. Indicate field measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Perform Work according to:

1. The State of Washington Criteria for Sewer Works Design. Use ‘Force Main’ guidance for pressure pipes.
2. The Washington State Department of Transportation Standard Specifications.

2.2 LOW-PRESSURE SEWER PIPING

A. Ductile Iron Pipe and Fittings:
1. Ductile Iron Pipe, 3 inch through 64 inch, Centrifugally Cast, for Water: ANSI/AWWA C 151 1
   a. Thickness Class: 51
   b. Lining: Cement mortar.
   c. Joints: Push-on unless otherwise noted in the Contract Documents.
2. Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges: ANSI/AWWA C 115
   a. Pressure Class: 250 psi.
   b. Lining: Cement mortar.
3. Ductile Iron Compact Fittings Using Mechanical or Push-on Joints, 3 inch through 24 inch: ANSI/AWWA C 153
   a. Pressure Class: 350 psi.
   b. Lining: Cement mortar.

4. Ductile Iron or Gray Iron Fittings Using Mechanical, Flanged, or Push-on Joints, 3 inch through 24 inches: ANSI/AWWA C 110
    a. Pressure Class for Mechanical or Push-on Ductile Iron Joints: 350 psi.
    b. Pressure Class for Flanged Ductile Iron Joints: 250 psi.
    c. Pressure Class for all Gray Iron Joints: 250 psi.
    d. Lining: Cement mortar.
5. Ductile Iron or Gray Iron Fittings Using Mechanical, Flanged, or Push-on Joints, 30 inches through 48 inches: ANSI/AWWA C 110
    a. Pressure Class for all Material and Joint Types: 250 psi.
    b. Lining: Cement mortar. F. Rubber Gasket Joints Ductile Iron Pressure Pipe and Fittings: ANSI/AWWA C 111
6. Outside Coating for Pipe and Fittings: ANSI/AWWA C 110
    a. Petroleum Asphaltic Outside Coating: 1.0 mil minimum thickness.

B. Flexible Elastomeric Seals: Comply with AWWA C111.

2.3 POLYVINY CHLORIDE (PVC) PRESSURE PIPE

A. Pipe
1. Nominal Diameter of 4” or greater: C900 DR 18 PVC conforming to ASTM D1784.
2. Nominal Diameter less than 4”: Schedule 80 PVC conforming to ASTM D1785.

B. Fittings
1. Nominal Diameter of 4” or greater: C900 DR 18 PVC
    a. ASTM D3212 for integral bell.
    b. ASTM D2467 for socket joint type.
2. Nominal Diameter less than 4”: Schedule 80 PVC.

C. Joints
1. Provide socket type at all locations except unions, valves, and equipment with threaded or flanged end connections.
2. Threaded connections are not acceptable for nominal piping size greater than 2 inches.
3. Do not provide threaded joints for piping systems identified on Drawings or in other Sections to be provided without threaded joints.

D. Flanges
1. PVC, 1 piece socket type, flat faced, conforming to ANSI B16.5 150-lb bolt hole drilling pattern.

E. Gaskets
1. Push on joint: ASTM F477 for elastomeric gaskets.
2. Flanged:
    a. Full-face, 1/8 inch thick flat type.
    b. When mating flange has raised face, use flat ring gasket and provide filler gasket between outside diameter of raised face and flange outside diameter to protect flange from bolting moment.
3. Material compatible with fluid carried in system.

F. Bolting

1. Type 316 Stainless Steel, ASTM A193, Grade B8M hex head bolts and ASTM A194, Grade 8M hex head nuts.
2. Bolts shall conform to ANSI B.1.20.1.
3. Provide washers same material as bolts.

G. Solvent Cement
1. Join socket connections with PVC solvent cement conforming to ASTM D2564.
2. As recommended by pipe and fitting manufacturer to assure compatibility.

H. Thread Lubricant
1. Teflon tape.

2.4 AIR RELEASE VALVES

A. Manufacturers:

1. APCO DeZurik Valve Co.
2. Crispin Valve.
3. Flomatic Corporation.
4. GA Industries, Inc.
   a. Toro Company (The).

B. Description:

1. Body and Cover: Cast iron.
2. Stem and Float: Stainless steel.
3. Trim: Stainless steel.
4. Orifice Seats: Buna-N.
5. Backflushing and Cleaning Accessories:

   a. Shutoff valve at bottom inlet.
   b. Blowoff valve near bottom of valve body.
   c. Clear-water inlet valve with quick-disconnect coupling.
   d. Air inlet with quick-disconnect in valve cover.
   e. Hose with quick-disconnect couplings.

2.5 MATERIALS

A. Bedding and cover.

1. Bedding: Fill Type A3, as specified in Section 310516 "Aggregates for Earthwork".
2. Cover: Fill Type A2 or A3, as specified in Section 310516 "Aggregates for Earthwork".

B. Soil Backfill from above Pipe to Finish Grade:

1. Soil Type S1, S2, S3, S4, or S5, as specified in Section 310513 "Soils for Earthwork".
2. Subsoil: No rocks more than 3 inches in diameter, frozen earth, or foreign matter.

C. Concrete: As specified in Section 033000 "Cast-in-Place Concrete."

2.6 ACCESSORIES

A. Locating Wire & Pipe Markers: As specified in Section 330500 "Common Work Results for Utilities."

B. Thrust & Joint Restraints: As specified Section 330509.33 “Thrust Restraint for Utility Piping.”

C. Coatings: Surface preparation and coating shall be in accordance with Section 099000 – Painting and Coating.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation examination.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

C. Verify that trench cut is ready to receive Work.

D. Verify that excavations, dimensions, and elevations are as indicated on Drawings.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Section 017000 - Execution and Closeout Requirements: Requirements for installation preparation.

B. The type of correcting materials (fine aggregate, coarse aggregate, or lean concrete) depends on type of subsoil, percolation characteristics, and compaction requirements at Site.

C. Correct over-excavation as specified in Section 312323 “Fill.”

D. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

E. Remove stones larger than 3 inches or other hard matter that could damage pipe or impede consistent backfilling or compaction.

F. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

3.3 INSTALLATION OF PIPING

A. Isolation:

1. Isolate hazardous gases and prevent groundwater and other material from entering an existing sewer line by installing a temporary air-tight plug in the first new manhole that will not restrict existing flow. The plug shall remain until the sewer has been accepted for use.

B. Bedding:

1. Excavate pipe trench as specified in Section 312316.13 "Trenching".
2. Place bedding material at trench bottom.
3. Level materials in continuous layer at minimum 6 inches.
4. Maintain groundwater 1 foot below the pipe invert.
5. Maintain optimum moisture content of bedding material to attain required compaction density.

C. Piping:

1. Install pipe, fittings, and accessories according to ASTM D2321, and seal joints watertight.
2. Handle and assemble pipe according to manufacturer instructions and as indicated on Drawings.
3. Control line and grade of the pipe installation by use of a pipeline laser or other Engineer approved means. Check accuracy of laser against line and grade control hubs. Limit variance of installed pipe from line and grade.
4. Use standard lengths of pipe unless otherwise required for installation of tees, fittings, or manholes.
5. Utilize proper tools for cutting and beveling pipe ends and joining pipe. Use manufacturer's recommended tools designed for this task.
6. Remove dirt and other foreign material from pipe.
7. Prepare pipe joint using specified gasket and manufacturer’s recommended lubricant.

8. Mark, or verify that pipe ends are marked, to indicate insertion stop position (home). Ensure that pipe is inserted into bell to this mark. Push spigot into bell using methods recommended by the manufacturer. Protect the end of the pipe during “homing” and do not use excessive force that may result in over-assembled joints, dislodged gaskets, or damaged ends. If full entry is not achieved, disassemble and clean the joint and reassemble

9. Lay pipe to slope gradients as indicated on Drawings.
10. Begin at downstream end of system and progress upstream.
11. Lay bell-and-spigot pipe with bells upstream.
12. P. When pipe installation is not in progress, block and plug the open end of the pipe to prevent creep, uplift or floating and entrance of water or other material into the pipe
13. Cover: 5’ minimum

    a. Install at sides and over top of pipe, to minimum compacted thickness of 6 inches.
14. Backfill and compact as specified in Section 312316.13 "Trenching."
15. Do not displace or damage pipe when compacting.
16. Connect to municipal sewer system.
17. Pipe Markers: As specified in Section 330597 "Identification and Signage for Utilities."

D. Air Release Valves and Valves: Install at locations as indicated on Drawings and according to manufacturer instructions.

E. Valve Boxes: Install at locations as indicated on Drawings and according to manufacturer instructions.

3.4 FIELD QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for inspecting and testing.

B. Retain first option in "Testing Agency" Paragraph below if Owner hires an independent testing agency.

C. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

D. Inspection: Request inspection by Engineer prior to and immediately after placement of bedding.

E. Pressure Testing:

1. As specified in Section 330505.31 "Hydrostatic Testing."

F. Compaction Testing:

1. As specified in Section 312316.13 – Trenching

G. Prepare test and inspection reports.

3.5 PROTECTION

A. Section 017000 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

C. Cap open ends of piping during periods of Work stoppage.

END OF SECTION 333126

SECTION 33 40 00 - STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 023200 Geotechnical Engineering Evaluation

1.2 SUMMARY

A. This Section includes gravity-flow, non-pressure storm drainage with the following components:

1. Pipe and fittings.
2. Cleanouts.
3. Precast concrete catch basins
4. Trench Drains
5. Storm Drain Treatment Devices

B. Work and materials shall comply with the requirements and standards of the most current edition of the Standard Specifications for Road, Bridge, and Municipal Construction as jointly promulgated by the Washington State Department of Transportation and the Washington State Chapter of the American Public Works Association.

C. The Contractor shall coordinate points of connection to assure that inverts and alignment match indicated points on the plans.

1.3 DEFINITIONS

A. PE: Polyethylene plastic.

B. PVC: Polyvinyl chloride plastic.

C. DI: Ductile iron.

D. WSDOT: Washington State Department of Transportation.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

B. Field quality-control test reports: Indicate and interpret test results for compliance with performance requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic structures, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes, catch basins, drywells and other structures according to manufacturer's written rigging instructions.

1.6 PROJECT CONDITIONS

A. Interruption of Existing Storm Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Engineer no fewer than 7 days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Engineers written permission.
3. Contact utility-locator service for area where Project is located before excavating.

B. Site Information: Field verify existing conditions, research public utility records, and locate existing utilities prior to construction. Verify the location, elevation, and size of existing storm drain lines before proceeding with construction activities, including points of connection and utility crossings. Notify the Architect of any discrepancies prior to proceeding.

1.7 PROJECT RECORD DOCUMENTS

A. As-Built Documents: Accurately record location of pipe runs, connections to existing pipes, cleanouts, manholes, drywells, area drains or other structures,

1. Location shall be noted off identified project bench marks or staked property corners.

B. Identify and describe unexpected variations of subsoil conditions or discovery of uncharted utilities.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Refer to Part 3 “Piping Applications” Article for applications of pipe, fitting, and joining materials.

2.2 PVC PIPE AND FITTINGS

A. PVC Gravity Sewer Pipe and Fittings, 15” and Smaller: ASTM D 3034, SDR 35, with bell-and-spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

B. PVC Sewer Pipe and Fittings, 18” and Larger: ASTM F 679, T-1 wall thickness, bell and spigot ends for gasketed joints with ASTM F 477, elastomeric seals.

1. Gaskets: ASTM F 477, elastomeric seals.

C. PVC Force Main Pipe and Fittings: Schedule 80 PVC pressure pipe with solvent welded joints, ASTM D1785.

2.3 NON-PRESSURE-TYPE PIPE COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground non-pressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.4 DUCTILE-IRON PIPE AND FITTINGS

A. Ductile-Iron Pipe: AWWA C151, for push-on joints. Standard Fittings: AWWA C110, ductile or gray iron, for push-on joints. Compact Fittings: AWWA C153, for push-on joints. Gaskets: AWWA C111, rubber.

2.5 CLEANOUTS

A. Cleanouts: Cleanouts shall conform to WSDOT Standard Plan B-85.40-00 and shall have a cast iron ring and cover.

1. Removable stopper is required to prevent the passage of dirt or water.

2.6 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 3000 psi minimum, with 0.45 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed steel.

C. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.

1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

2.7 FILTER FABRIC

A. Filter Fabric: Non-woven geotextile meeting the requirements of WSDOT Standard Specification Section 9-33.2(1) – *Geotextile Properties*, for underground drainage geotextile, moderate survivability, class A

2.8 TRENCH DRAINS

A. Basis of Design : Iron Age Designs - Approved equal - Substitutions: Specified in Section 016000 – Product Requirements

1. Provide trench drain system and all necessary accessories for a complete installation.
2. Basis of Design product shall be Iron Age Designs “Regular Joe” trench drain system, nominal 5-inch width.
3. Trench drain alignment shall incorporate a horizontal radius of 18 feet along the centerline where indicated on the plans.
4. Trench drain system shall be designed to provide continuous positive drainage along entire run.
5. Channel depth shall be a minimum of 6 inches.
6. Bottom of trench drain channel shall be sloped longitudinally at a minimum rate of 0.5 percent (0.5") to ensure proper flow toward outlet structures.
7. System shall be capable of accommodating the specified radius without compromising hydraulic performance or structural integrity.

2.9 Stormwater Treatment Device

A. JELLYFISH JFSI0404 manufactured by Contech Engineered Solutions

B. Approved equal

1. Substitutions: Specified in Section 016000 – Product Requirements

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

3.2 PIPING APPLICATIONS

A. Pipe couplings and special pipe fittings with pressure ratings at least equal to piping rating may be used in applications below, unless otherwise indicated.

1. Use non-pressure-type flexible couplings where required to join gravity-flow, non-pressure drainage piping, unless otherwise indicated. Use where required to join piping and no other appropriate method is specified.

B. Gravity-Flow, Non-pressure Drainage Piping: Use the following pipe materials for each size range:

1. NPS 4 to NPS 15: PVC sewer pipe and fittings, gaskets, and gasketed joints.
2. NPS 18: PVC sewer pipe and fittings, gaskets, and gasketed joints.

C. Pressure Force Main Pipe: Use the following pipe materials for each size range:

1. PVC Force Main Pipe and Fittings: Schedule 80 PVC pressure pipe with solvent welded joints, ASTM D1785.

3.3 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes, catch basins, or other specified drainage structures for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing storm line is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of micro tunneling.

F. Install gravity-flow, non-pressure drainage piping according to the following:

1. Install piping pitched down in direction of flow, at a minimum slope of 1 percent, unless otherwise indicated.
2. Install piping with 36” minimum cover, unless otherwise indicated.
3. Install PVC sewer piping according to ASTM D 2321 and ASTM F 1668.

G. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.4 PIPE JOINT CONSTRUCTION

A. Where specific joint construction is not indicated, follow piping manufacturer’s written instructions.

B. Join gravity-flow, non-pressure drainage piping according to the following:

1. Join PVC sewer piping according to ASTM D 2321 and ASTM D 3034 for elastomeric-seal joints or ASTM D 3034 for elastomeric-gasketed joints.
2. Join dissimilar pipe materials with non-pressure-type flexible couplings.

3.5 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from storm pipes to cleanouts at grade. Install cleanouts complete with appurtenances and accessories indicated. Install cleanouts according to the requirements and standards of the City of Chelan. Install piping so cleanouts open in direction of flow in storm pipe.

B. Set cleanout frames and covers in earth in cast-in-place concrete cylinder, 24-inches in diameter by 12-inches deep.

C. Set cleanout frames and covers in earth with tops 1-inch above surrounding grade except in play field areas.

D. Set cleanout frames and covers in playfield areas with tops 6-inch below surrounding grade.

E. Set cleanout frames and covers in pavement with tops flush with pavement surface.

3.6 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.7 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318/318R.

3.8 TRENCH DRAIN INSTALLATION

A. Install trench drain system in accordance with manufacturer’s written instructions and project drawings.

B. Ensure channel sections are securely joined, aligned to required radius, and set to proper elevation and slope.

C. Provide watertight connection to outlet piping.

D. Coordinate installation with adjacent paving and concrete work to ensure flush, stable grate placement.

3.9 CONNECTIONS

A. Connect non-pressure, gravity-flow drainage piping to building's storm drains.

B. Make connections to drainage piping and structures.

1. Make connections according to the requirements and standards of the City of Chelan
2. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

3.10 IDENTIFICATION

A. Underground warning tape materials and their installation are specified in Section 31 20 00 "Earth Moving."

B. Install continuous underground warning tape directly over piping and at outside edge of underground structures.

1. Use warning tape or detectable warning tape over ferrous piping.
2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.11 FIELD QUALITY CONTROL

A. Inspect and test storm drainage improvements according to requirements of the City of Chelan.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

1. Submit separate reports for each system inspection.
2. Defects requiring correction include the following:

    a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    d. Infiltration: Water leakage into piping.
    e. Exfiltration: Water leakage from or around piping.

3. Replace defective piping using new materials and repeat inspections until defects are within allowances specified.
4. Reinspect and repeat procedure until results are satisfactory.

C. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

1. Do not enclose, cover, or put into service before inspection and approval.
2. Test completed piping systems according to requirements of authorities having jurisdiction.
3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
4. Submit separate report for each test.

D. Replace leaking piping using new materials and repeat testing until leakage is within allowances specified.

E. Placing and compacting pipe bedding shall be witnessed and tested by the Owner's testing agency. Compaction testing shall be done twice per 100 feet of pipe trench.

3.12 CLEANING

A. Clean interior of piping of dirt and superfluous materials and flush with water.

END OF SECTION

SECTION 361413 – TOPSOILING

PART 1 – GENERAL

1.1 DESCRIPTION

This Section consists of removing topsoil from designated areas on site, or as necessary, importing topsoil from approved sources off the site, preparing the ground surface for topsoil application, and placing and spreading the topsoil on prepared areas in accordance with this specification at the locations shown on the plans or as directed by the Owner's Representative.

1.2 RELATED SECTIONS

A. Section 329200 - Planting
B. Section SSSS – Turf and Grasses
C. Section 369219 – Seeding

1.3 QUALITY ASSURANCE

A. It is recommended that an analysis be conducted on any topsoil that is intended to be used on the Project. Contractor shall coordinate with Owner's Representative for soil analysis of topsoil obtained on project site by a qualified, independent soil-laboratory with experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
   1. Soil samples should be tested for percentages of organic matter, gradation of sand, silt and clay content; cation exchange capacity; sodium absorption ratio; deleterious material; pH; and mineral and plant nutrient content of the soil.
   2. Lab issued report shall report suitability for plant growth and state recommendations for quantities of nitrogen, phosphorus, and pot ash nutrients and any limestone, aluminum, sulfate, and / or other soil amendments to be added to produce satisfactory topsoil that is suitable for healthy viable plants.
   3. Lab issued report shall report presence of problem salts, minerals or heavy metals including aluminum, arsenic, barium, cadmium, chromium, cobalt, lead, lithium and / or vanadium. If such problem materials are present, provide additional recommendations for corrective action.
B. Contractor shall obtain and send a minimum of three (3) samples of topsoil from varied locations on the Project Site for testing.
C. Contractor shall be responsible for all testing coordination, payment associated cost with purchasing and installing laboratory recommended soil amendments.
D. No topsoil shall be delivered in a frozen or muddy condition.

PART 2- PRODUCTS

2.1 TOPSOIL

A. Topsoil shall be defined as the surface layer of soil with no admixture of refuse or any material toxic to plant growth, and it shall be reasonably free from subsoil and stumps, roots, brush, stones (1 inches or more in diameter), and clay lumps or similar objects. Brush and other vegetation that will not be incorporated with the soil during handling operations shall be cut and removed. Ordinary sod and herbaceous growth such as grass and weeds are not to be removed, but shall be thoroughly broken up and intermixed with the soil during handling operations. Heavy sod or other cover, which cannot be incorporated into the topsoil by discing or other means, shall be removed.
B. Topsoil furnished by the contractor shall have a pH range of approximately 5.5 pH to 7.5 pH, when tested in accordance with the methods of testing of the Association of Official Agricultural Chemists in effect on the date of invitation of bids. The organic content shall be not less than

2.5%. The material shall be free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. Existing Topsoil Source: reuse topsoil stockpiled on the site. Verify suitability of soil to meet topsoil requirements listed herein through laboratory testing and amend when necessary. Supplement with imported topsoil when quantities are insufficient.
2. Imported Topsoil: import topsoil from off site sources. Provided topsoil must meet the definition above.
    a) If topsoil is not obtained from the project site, suitable topsoil will need to be secured from an off site supplier. The Contractor shall locate and obtain the supply, subject to the approval of the Owner's Representative. The Contractor shall notify the Owner's Representative sufficiently in advance of dependent operations that necessary measurements and tests can be made. The topsoil shall be hauled to the side of the work and placed or spreading, or spread as required. Any topsoil hauled to the site of the work and stockpiled shall be rehandled and placed without additional compensation.
    b) Imported topsoil from local sources or from regional areas having similar soil characteristics to that found at Project Site. Obtain topsoil only from naturally, well drained sites where topsoil occurs in a depth of not less than four inches. Do not obtain from marshes or bogs.

PART 3- EXECUTION

3.1 GENERAL REQUIREMENTS

A. Areas to be topsoiled shall be as shown on the plans or as directed by Owner' Representative.

B. Suitable equipment necessary for proper preparation and treatment of the ground surface, stripping of topsoil, and for the handling and placing of all required materials shall be on hand, in good condition, and approved by the Engineer before the various operations are started.

3.2 PREPARING THE GROUND SURFACE

A. Immediately prior to dumping and spreading the topsoil on any area, the surface shall be loosened by discs or spike-tooth harrows, or by other means approved by the Engineer, to a minimum depth of 4 inches to facilitate bonding of the topsoil to the covered subgrade soil. The surface of the area to be topsoiled shall be cleared of all stones larger than 2 inches in any diameter and any sticks, roots, all litter or other material which may be detrimental to proper bonding, the rise of capillary moisture, or the proper growth of the desired planting. Areas that are too compact to respond to these operations shall receive special scarification at the discretion of the Contractor.

B. Grades on the area to be topsoiled, which have been established by others as shown on the plans, shall be maintained in a true and even condition. Where grades have not been established, the areas shall be smooth-graded and the surface left at the prescribed grades in an even and compacted condition to prevent the formation of low places or pockets where water will stand.

3.3 PLACING TOPSOIL

A. The topsoil shall be spread on areas already tilled and smooth-graded or stockpiled in areas approved by the Owner's Representative. Any topsoil stockpiled by the Contractor shall be rehandled and placed without additional compensation. The sites of all stockpiles and areas adjacent thereto which have been disturbed by the Contractor shall be graded if required and put into a condition acceptable for seeding or other landscape treatment.

B. The topsoil shall be evenly spread on the prepared areas to a uniform minimum depth:

1. 18 inches in planter areas w/ perennials & shrubs only. 24” in those planter areas containing trees

2. No topsoil is required in the areas designated to receive Crusher Fines Mineral Mulch / where plant material is not indicated within the landscape areas.

C. Topsoil shall meet finish grade after light compaction and settlement, unless otherwise shown on the plans or stated in the special provisions.

D. Spreading shall not be done when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to the work.

E. Spreading shall be carried on so that turfing operations can proceed with a minimum of soil preparation or tilling.

F. Manually spread topsoil close to plant or paving to prevent damage.

G. After spreading is completed, the topsoil shall be lightly compacted. The compacted topsoil surface shall conform to the required lines, grades, and cross-sections. Any topsoil or other dirt falling upon pavements as a result of hauling or handling of topsoil shall be promptly removed.

H. All stones, rocks, roots, litter, and foreign matter shall be disposed of offsite by the Contractor.

PART 4- METHOD OF MEASUREMENT

4.1 TOPSOIL, IMPORT AND PLACE

A. Topsoil shall be obtained by the Contractor off site. There will be no measurement for payment for Topsoil as the work is considered incidental to other bid items of the project.

4.2 STOCKPILES

A. Transporting topsoil to and from stockpile areas or maintaining temporary stockpiles shall be considered incidental to other bid items of the project.

4.3 STRIP TOPSOIL

A. No separate measurement shall be made for topsoils that are stripped and stockpiled on site. The Contractor may elect to use on-site topsoils in sections of the project as long as they are not located beneath any pavement section on the project and meet all testing requirements.

PART 5- METHOD OF MEASUREMEN

5.1 TOPSOIL IMPORT AND PLACE

A. No separate payment shall be made for topsoil, it is considered incidental. This price shall be full compensation for furnishing all materials off-site, required testing, and for all preparation, placing, hauling, transporting, spreading of the materials, mechanical rock picking, disposing of deleterious materials off-site, and for all labor, equipment, tools and incidentals necessary to complete the item of work.

END OF SECTION 361413

SECTION 400507 - HANGERS AND SUPPORTS FOR PROCESS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Provide delegated design as well as all labor, materials, equipment, tools, and incidentals required to furnish and install pipe hangers, supports and anchors as specified herein.

B. Section includes:

1. System of pipe supports and anchors with necessary inserts, bolts, nuts, restraining and hanger rods, washers, miscellaneous steel, and other accessories.

1.2 DEFINITIONS

Submerged: At or below peak (maximum) water surface elevations in water holding structure.

1.3 SYSTEM DESCRIPTION

Delegated Design Requirements:

1. Design, detail and installation of pipe support system is the responsibility of Contractor.
2. Design pipe support system components to withstand dead loads imposed by weight of pipes filled with water plus insulation, plus live loads due to thermal expansion, vibration, internal test pressures, seismic forces per ASCE 7, Chapter 13 using an Ip value of 1.5, and have minimum safety factor of 5.
3. Absence of pipe supports and details on Drawings does not relieve Contractor of responsibility for providing them throughout Project.

1.4 SUBMITTALS

Shop Drawings:

1. Pipe supporting system, including manufacturer's product data, dimensions, sizes, types, location, maximum loadings, thrust anchorage, and installation instructions.
2. Delegated Design Submittals: Submit signed and sealed Shop Drawings with design calculations and assumptions in conformance to the application requirements.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum twenty years' documented experience.

B. Installer: Company specializing in performing Work of this Section with minimum three years' documented experience and approved by manufacturer.

C. Licensed Professional: Professional engineer experienced in design of specified Work and licensed in State of Washington.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Aikinstrut.
B. Anvil.
C. Superstrut.
D. Unistrut.
E. Approved equal
   1. Substitutions: Specified in Section 016000 – Product Requirements

2.2 GENERAL

A. Manufacturers Standardization Society (MSS) types indicated are typical of types and quality of standard pipe supports and hangers to be employed.

B. Provide factory fabricated piping hangers and supports, clamps, hanger rod attachments, building attachments, saddles, shields, thrust anchorage, and other miscellaneous products of MSS SP-69 type indicated or shop fabricated supports; comply with MSS SP-58 and manufacturer's published product information. Where MSS type not indicated, provide proper selection for installation requirements and comply with MSS SP-69, MSS SP-89 and manufacturer's published product information.

C. Contractor responsible for design and submittal of anchoring requirements.

2.3 MATERIALS

A. Provide galvanized hangers, rods, clamps, protective shields, metal framing, support components, embedments, and hanger accessories unless otherwise noted.

B. In areas exposed to chemicals or where chemical piping is being supported provide fiberglass framing with 316 stainless steel rods, clamps, support components and hanger accessories unless otherwise noted.

2.4 HORIZONTAL PIPING HANGERS AND SUPPORTS

A. General:

   1. Unless otherwise shown or specified, hangers for 2-1/2 inch and smaller pipe shall be split-ring, adjustable swivel, clevis or roller type, hangers for 3-inch pipe or greater shall be clevis or roller type.
   2. Hangers for use with spring supports shall be split-ring or clamp type.
   3. Hangers for fiberglass reinforced pipe shall be saddle type.
   4. Each hanger shall be designed to permit at least 1-1/2 inch vertical adjustment after installation.

B. Adjustable Swivel Split-Ring Hanger: MSS Type 6.

C. Adjustable Clevis Hanger: MSS Type 1, fabricated from steel.

D. Adjustable Band Hanger: MSS Type 7, fabricated from steel.

E. Adjustable Swivel-Band Hanger: MSS Type 10.

F. Clamp: MSS Type 4.

G. Single Roll Support: MSS Type 41, including axle roller and threaded sockets.

H. Adjustable Roller Hanger: MSS Type 43, including axle roller and clevis.

I. Roll/Stand: MSS Type 44, including roller, stand, and axle.

J. Adjustable Roll/Base: MSS Type 46, including roller, adjustable base, and stand.

K. Steel Brackets: Welded structural steel shapes complying with following.

1. Light Duty: MSS Type 31.
2. Medium Duty: MSS Type 32.
3. Heavy Duty: MSS Type 33.

L. Adjustable Saddle Support:

1. MSS Type 38, including saddle, pipe, and reducer.
2. Fabricate base support from steel pipe and include cast iron flange or welded steel plate.

M. Stanchion Saddle Support:

1. MSS Type 37, including saddle and U-bolt.
2. Fabricate base support from steel pipe and include cast iron flange or welded steel plate.

N. Strap or wire hangers not acceptable.

2.5 VERTICAL PIPING CLAMPS

A. 2-Bolt Riser Clamp: MSS Type 8, galvanized or plastic coated.

B. 4-Bolt Riser Clamp: MSS Type 42, include pipe spacers at inner bolt holes, galvanized or plastic coated.

2.6 HANGER RODS AND ATTACHMENTS

A. Hanger Rods:

1. ASTM A36, threaded both ends or continuous threaded.
2. Rods shall conform to following sizes:

Pipe Size (inches)	Minimum Rod Diameter (inches)
Up to 2	3/8

Pipe Size (inches)	Minimum Rod Diameter (inches)
2-1/2 and 3	1/2
4	5/8
6	3/4
8 to 12	7/8
14 and Up	1
Trapeze Hangers	As Required

B. Turnbuckles: MSS Type 13.

C. Weldless Eye Nut: MSS Type 17.

D. Eye Socket: MSS Type 16.

E. Clevis: MSS Type 14.

2.7 BUILDING ATTACHMENTS

A. Individual Concrete Inserts:

1. MSS Type 18, malleable iron.
2. MSS Type 19, steel.
3. Minimum Safe Load: 1,100 lbs.

B. Continuous Concrete Inserts: *Item subject to AIS compliance.

1. Superstrut.*
2. Unistrut, P-3200 Series.*
3. Or approved equal.

C. Top Beam C-Clamp: MSS Type 19.

D. C-Clamps: MSS Type 23, steel.

E. Single-Side Clamp: MSS Type 25.

F. Top I-Beam Clamp: MSS Type 25.

G. Side Beam Clamp: MSS Type 20.

H. Concrete Anchors:

1. Comply with Section 051200 – Structural Steel Framing.
2. Minimum Safety Factor: 5.

2.8 SADDLES AND SHIELDS

A. Protection Saddles: MSS Type 39.

B. Protection Shields: MSS Type 40.

C. Wood Insulation Saddle:

1. Elcen Metal Products Company.
2. Or approved equal.

2.9 MISCELLANEOUS MATERIALS

A. Metal Framing Systems: *Item subject to AIS compliance.

1. Unistrut, galvanized.*
2. Or approved equal.

B. Shop-Fabricated Anchors and Supports:

1. Steel Plates, Shapes, and Bars: ASTM A36.
2. Restraining Rods: ASTM A307.
3. Fabricate in accordance with Section 051200 – Structural Steel Framing.

PART 3 - EXECUTION

3.1 General

A. Proceed with installation of hangers, supports and anchors after required building structural work is complete and concrete support structure has reached 28-day compressive strength as specified in Section 033000 – Cast-in-Place Concrete.

B. Install hangers, supports, clamps, and attachments from building structure. Comply with MSS SP-69. Grouped parallel runs of horizontal piping to be supported together on trapeze type hangers where possible.

C. Install supports to provide indicated pipe slopes and maximum pipe deflections allowed by ANSI B31.1 are not exceeded.

D. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.

E. Do not support piping from other piping. Do not support trapeze hangers from other piping or trapeze hangers.

F. Prevent contact between dissimilar metals. Where concrete or metal pipe support is used, place 1/8-inch thick Teflon, neoprene rubber or plastic strip under piping at point of bearing. Cut to fit entire area of contact between pipe and support.

G. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated, plastic coated or by other recognized industry methods. Electrician's tape not acceptable isolation method.

H. Apply anti-seize compound to nuts and bolts.

3.2 INSTALLATION OF BUILDING ATTACHMENTS

A. Support piping from structural framing, unless otherwise noted.

B. Concrete inserts:

1. Locate inserts so total load on insert does not exceed manufacturer's recommended maximum load. Engineer shall approve location of inserts.
2. Where necessary to anchor supports to hardened concrete or completed masonry, use concrete anchors.

C. Attach to structural steel with beam clamps.

3.3 THRUST ANCHORS AND GUIDES

A. Thrust Anchors:

1. For suspended piping, center thrust anchors as closely as possible between expansion joints and between elbows and expansion joints. Anchors shall hold pipe securely and be sufficiently rigid to force expansion and contraction movement to take place at expansion joints or elbows and preclude separation of joints.
2. Provide thrust anchors as required to resist thrust due to changes in diameter or direction or dead-ending of pipelines. Anchorage shall be required wherever bending stresses exceed allowable for pipe. Wall pipes may be used as thrust anchors.

B. Pipe guides shall be provided adjacent to sliding expansion joints in accordance with recommendations of National Association of Expansion Joint Manufacturers.

3.4 PIPE SUPPORT

A. Spacing

Type of Pipe	**Maximum Pipe Support Spacing (ft)***
Steel	
10 inch and over	22
8 inch	19
6 inch	17
5 inch	16
4 inch	14

Type of Pipe	Maximum Pipe Support Spacing (ft)*
3-1/2 inch	13
3 inch	12
2-1/2 inch	11
2 inch	10
1-1/2 inch	9
1 inch	7
3/4 inch	6
1/2 inch	5
Copper	
4 inch	12
3-1/2 inch	11
3 inch	10
2-1/2 inch	9
2 inch	8
1-1/2 inch	8
1-1/4 inch	7
1 inch	5
3/4 inch	5
1/2 inch	5
Plastic (Schedule 80 at 100 degrees F)	
8 inch	9-1/2
6 inch	9
4 inch	7-1/2
3 inch	7
2 inch	6
1-1/2 inch	5-1/2
1 inch	5
3/4 inch	4-1/2
1/2 inch	4-1/2
(For plumbing application plastic piping shall be supported at maximum of 4 ft-0 inch spacing.)	
Stainless Steel	
1 inch and smaller	6
1-1/2 inch through 4 inch	8

Type of Pipe	Maximum Pipe Support Spacing (ft)*
6 inch	8
8 inch and 10 inch	10
12 inch	10
14 inch	12
16 inch	12
18 inch and larger	14
Cast Iron and Ductile Iron	
1 inch and smaller	6
1-1/4 inch through 2-1/2 inch	8
3 inch and 4 inch	10
6 inch	12
8 inch	12
10 inch and 12 inch	14
14 inch	16
16 inch and 18 inch	16
20 inch	18
24 inch and larger	18
(For cast iron soil pipe plumbing applications, support at 5 ft-0 inch spacing.)	
Provide supports for Tubing including but not limited to Copper, Fiber-Reinforced Plastic, Rubber, Polyethylene at spacing which allows no more than ¼" sagging between supports.	

*Unless otherwise specified in plans.

B. Where piping of various sizes is to be supported together, space supports for smallest pipe size or install intermediate supports for smaller diameter pipe.

C. Provide minimum of two (2) pipe supports for each pipe run.

D. Pedestal pipe supports shall be used for support of pipes with centerline 8 feet 0 inches AFF or less, unless approved by Engineer.

E. Pedestal pipe supports shall be adjustable with stanchion, saddle, and anchoring flange.

F. Where piping connects to equipment, support by pedestal pipe support and not by equipment, unless approved by equipment manufacturer.

G. Unless otherwise shown or authorized by Engineer, place piping running parallel to walls approximately 1-1/2 inches out from face of wall and at least 3 inches below ceiling.

H. Piping supports for vertical piping passing through floor sleeves shall be galvanized steel riser clamps.

I. Piping passing through sleeves or openings in interior wall sleeves shall be carried by supports or hangers. Do not rest on wall.

J. Support piping in manner preventing undue strain on valve, fitting or equipment. Provide pipe supports at changes in direction or elevation, adjacent to flexible couplings, adjacent to nonrigid joints, and where otherwise shown. Do not install pipe hangers in equipment access areas or bridge crane runs.

K. Install supports to allow controlled movement of piping systems, permit freedom of movement between pipe anchors, and facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

L. Piping shall be free to move when piping expands or contracts, except where fixed anchors are indicated. Where adequate hanger rod swing length cannot be provided or where pipe movement based on expansion of 1 inch/100 feet for each 100 degrees F change in temperature exceed 1/2 inch, provide approved roller supports.

M. Support piping 6 inches and larger on trapeze hangers with rollers.

N. Stacked horizontal runs of piping along walls may be supported by metal framing system attached to concrete insert channels.

O. Coat hangers, clamps, protective shields, metal framing support components, and hanger accessories in accordance with Section 099000 – Painting and Coatings.

3.5 BURIED PIPING

A. Concrete Blocking:

1. Extend from fitting to solid undisturbed earth and installed so joints accessible for repair.
2. Bearing area of concrete thrust blocking shall be as shown on Drawings.
3. If adequate support against undisturbed ground cannot be obtained, install metal harness anchorages consisting of steel rods across joint and securely anchored to pipe and fitting or other adequate anchorage facilities to provide necessary support.
4. Should lack of solid vertical excavation face be due to improper trench excavation, cost of furnishing and installing metal harness anchorages in excess of Contract value of concrete blocking replaced by such anchorages shall be borne by Contractor.

END OF SECTION 400507

SECTION 400552 – VALVES AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Provide all labor, materials, equipment, tools and incidentals to install complete buried and non-buried valves, appurtenances and related accessories as shown on the Drawings and specified herein. Accessories include, but are not limited to valves, extension stems, handles, boxes, and operators.

1.2 SUBMITTALS

A. Submit in accordance with Section 013300 – Submittal Procedures.

B. Shop Drawings:

1. Dimensions.
2. Size.
3. Materials of construction.
4. Weight.
5. Coatings.

C. Quality Control Submittals:

1. Manufacturer Certificate:

   a. Prior to shipment of valves and accessories, submit a sworn affidavit of compliance from the manufacturer stating that the valves for this Project have been manufactured and tested in accordance with ANSI/AWWA, ASTM standards and meet NSF-61 approval for use with potable water.

2. Test Reports:

   a. Three (3) copies of all certified shop test results specified herein.

D. Contract Closeout Submittals:

1. Submit complete operation and maintenance manuals including copies of all approved Shop Drawings.
2. Submit warranty information for valves and actuators.

1.3 QUALITY ASSURANCE

A. Valves and appurtenances provided under this Section should be standard product in regular production by manufacturers whose products have proven reliable in similar service for at least ten (10) years. If required, the manufacturer shall provide evidence of installations in satisfactory operation.

B. All similar items specified under this Section shall be furnished by a single manufacturer. The manufacturer shall have the sole responsibility for the proper functioning of the items as furnished.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not ship materials until Shop Drawings are approved by Engineer in writing.

B. Factory assembled parts and components shall not be disassembled for shipment unless permission is received in writing from the Engineer.

C. Protect threads and seats from corrosion and damage.

D. Protect rising stems and exposed stems with protective oil film and maintain until time of use.

E. Furnish covers for all openings.

F. Store all valves in covered storage off the ground.

G. Finished iron surfaces not painted shall be properly protected to prevent rust and corrosion.

H. Properly handle and store all materials so that no damage or deterioration will occur during shipment or prolonged delay from the time of shipment until installation is completed and ready for operation.

I. Materials damaged during shipping, storage or installation will not be accepted.

1.5 WARRANTY

A. All materials supplied under this Section shall be warranted by the Contractor and the Manufacturer.

B. The materials shall be warranted to be free from defects in workmanship, design, and materials. If any part of the materials should fail during the warranty period, it shall be replaced, and the unit(s) restored, at no expense to the Owner.

C. The Manufacturer’s warranty period shall run concurrently with the Contractor’s warranty period. No exception to this provision shall be allowed.

D. Warranty Period: One (1) year, unless otherwise specified. Warranty period shall commence as outlined in the General Conditions and Division 1.

PART 2 - PRODUCTS

2.1 FLOOR BOXES

A. Provide cast iron floor boxes with bronze bushing.

B. Provide 2-1/2-inch NPT threaded connection to accommodate floors thicker than 6 inches.

2.2 TAPPING SADDLES

A. Tapping saddles shall be used to make “wet” taps into the existing water mains where shown on the Drawings. Tapping saddle bodies shall be made of malleable iron conforming to ASTM A47 Grade 32510, or ductile iron conforming to ASTM A536. Straps shall be made of carbon steel conforming to ASTM A307, electro-galvanized with Di-Chromate Seal. Nuts shall be cold formed, semi-finished, heavy hex steel electro-galvanized with Di-Chromate Seal. Gaskets shall be made of synthetic rubber and shall be suitable for service at maximum operating temperature of piping system, and as specified in individual piping Specification Sections.

B. Tapping saddles shall be Rockwell 313 double strap iron service saddles, or approved equal.

2.3 VALVE BOXES

A. Provide valve boxes for all buried valves. Furnish valve boxes of cast iron base and adjustable top section with cover marked as appropriate for service type (i.e. “Water or “Sewer”). Provide extensions as required to meet grade.
   1. Provide two (2) piece adjustable screw type valve boxes.
   2. Provide 5-1/4 inch diameter valve box.
   3. Provide boxes and covers constructed of cast iron in accordance with ASTM A48, Class B.
   4. Provide valves with extended stem where applicable.
   5. Terminate stem a minimum of 12 inches below box cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Valves and accessories shall be installed as shown on the Drawings and in accordance with individual piping Specification Sections.

B. Valves and accessories shall be installed plumb and true in a first class manner, consistent with the manufacturer’s recommendations.

C. Valves and accessories shall be installed with care to prevent undue strain upon the valve, operators, or other associated pieces of equipment.

END OF SECTION

SECTION 400561 - GATE VALVES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Resilient-seated gate valves.

1.2 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service.

B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
3. ASME B16.34 - Valves - Flanged, Threaded, and Welding End.
4. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.

C. ASTM International:

1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
3. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
4. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

D. Manufacturers Standardization Society:

1. MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges, and Unions.
2. MSS SP-70 - Gray Iron Gate Valves, Flanged and Threaded Ends.
3. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.

1.3 SUBMITTALS

A. Submit in accordance with Section 013300 – Submittal Procedures.

B. Product Data:

1. Manufacturer’s literature describing the equipment, including materials of construction.

C. Shop Drawings:

1. Manufacturer's drawings and cut sheets including plans, elevations, sections, details, and attachments to other Work. Show all important dimensions.

D. Quality Control Submittals:

1. Certificate signed by manufacturer certifying that they comply with requirements of the Specifications and all applicable AWWA and NSF Standards.

E. Contract Closeout Submittals:

1. Operation and Maintenance Data:

a. Submit in accordance with Section 013300 – Submittal Procedures.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Spare Parts:

1. According to manufacturer recommendation.

C. Tools: Furnish special wrenches or other devices required for Owner to maintain and calibrate equipment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all equipment to protect against any damage.

1.6 WARRANTY

A. All equipment under this Section shall be warranted for a period of two (2) years by the Contractor and Manufacturer. Warranty period shall commence as outlined in the General Conditions and Division 1.

B. All similar items specified under this Section shall be furnished by a single manufacturer. The manufacturer shall have the sole responsibility for the proper functioning of the items as furnished.

C. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be promptly repaired or replaced and the equipment restored at no expense to the Owner.

D. The Manufacturer's warranty period shall run concurrently with the Contractor's warranty period.

PART 2 - PRODUCTS

2.1 RESILIENT SEAT GATE VALVES

A. Manufacturers:

1. American Flow Control (Series 2500).
2. Valmatic.
3. Approved equal
   a. Substitutions: Specified in Section 016000 – Product Requirements

B. Description: Resilient Seated Gate Valves: ANSI/AWWA C 509 and/or ANSI/AWWA C 515 (ductile iron only).
1. Body Type: Flanged, or mechanical. End Connections:
   a. Flanged: Flat; ANSI 125 or 150 lb class. Comply with ASME B16.5.
   b. Mechanical:
2. Pressure class: 250 PSI
3. Stem: Nonrising with O-ring seal.
4. Actuator:
   a. Above grade: Gear actuator and handwheel opening counterclockwise.
   b. Below grade: 2-inch square operating nut extended to within 12” of finish grade and a standard two-piece cast-iron 5¼-inch adjustable valve box.
5. Materials:
   a. Body: Ductile iron.
   b. Gate: Type 316 stainless steel
   c. Bolting hardware: stainless steel
   d. Resilient wedge: EPDM
6. Coatings: Protective epoxy coat inside and outside in accordance with AWWA C550.

2.2 SOURCE QUALITY CONTROL

A. Section 014000 - Quality Requirements: Requirements for testing, inspection, and analysis.

B. Provide shop inspection and testing of completed assembly.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valves for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before installation.

3.2 PREPARATION

A. Coordinate with other trades, equipment, and systems to the fullest extent possible.

B. Take all necessary field measurements to determine the exact dimensions for all work and the required sizes of all equipment under this Contract. Verify all pertinent data and dimensions.

3.3 INSTALLATION

A. Install in strict accordance with the Manufacturer's instructions and recommendations in the locations shown on the Drawings. Include providing the required oil and grease in accordance with the Manufacturer's recommendations.

B. Install in accordance with appropriate piping system Specification Section.

3.4 FIELD QUALITY CONTROL

A. After installation, the valves shall be field tested to ensure that all items are in compliance with the Specifications.

B. Manufacturer's Field Services:
   1. The valve manufacturer shall furnish the services of a competent and experienced factory representative who has complete knowledge of proper operation and maintenance of the equipment for a period of not less than one (1) day to inspect the installed, startup and train Owner on the equipment.

END OF SECTION 400561

SECTION 400566 - CHECK VALVES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Check valves.

1.2 REFERENCE STANDARDS

A. American Water Works Association:

1. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-In. Through 24-In. (50-mm Through 600-mm) NPS.

B. ASME International:

1. ASME B16.1 - Gray Iron Pipe Flanges and Flanged Fittings: Classes 25, 125, and 250.
2. ASME B16.5 - Pipe Flanges and Flanged Fittings: NPS 1/2 through NPS 24 Metric/Inch Standard.
3. ASME B16.34 - Valves - Flanged, Threaded, and Welding End.
4. ASME B16.42 - Ductile Iron Pipe Flanges and Flanged Fittings: Classes 150 and 300.

C. ASTM International:

1. ASTM A126 - Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings.
2. ASTM B62 - Standard Specification for Composition Bronze or Ounce Metal Castings.
3. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
4. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.

D. Manufacturers Standardization Society:

1. MSS SP-25 - Standard Marking System for Valves, Fittings, Flanges, and Unions.
2. MSS SP-71 - Gray Iron Swing Check Valves, Flanged and Threaded Ends.
3. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves.
4. MSS SP-125 - Check Valves: Gray Iron and Ductile Iron, In-Line, Spring-Loaded, Center-Guided
5. MSS SP-136 - Ductile Iron Swing Check Valves.

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

1.4 SUBMITTALS

A. Submit in accordance with Section 013300 – Submittal Procedures.

B. Product Data:

1. Manufacturer's literature describing the equipment, including materials of construction.

C. Shop Drawings:

1. Manufacturer's drawings and cut sheets including plans, elevations, sections, details, and attachments to other Work. Show all important dimensions.

D. Quality Control Submittals:

1. Certificate signed by manufacturer certifying that they comply with requirements of the Specifications and all applicable AWWA and NSF Standards.

E. Contract Closeout Submittals:

1. Operation and Maintenance Data:

a. Submit in accordance with Section 013300 – Submittal Procedures.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Spare Parts:

1. According to manufacturer recommendation.

C. Tools: Furnish special wrenches or other devices required for Owner to maintain and calibrate equipment.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver, store and handle all equipment to protect against any damage.

1.7 WARRANTY

A. All equipment under this Section shall be warranted for a period of two (2) years by the Contractor and Manufacturer. Warranty period shall commence as outlined in the General Conditions and Section 017000 - Execution and Closeout Requirements.

B. All similar items specified under this Section shall be furnished by a single manufacturer. The manufacturer shall have the sole responsibility for the proper functioning of the items as furnished.

C. The equipment shall be warranted to be free from defects in workmanship, design and materials. If any part of the equipment should fail during the warranty period, it shall be promptly repaired or replaced and the equipment restored at no expense to the Owner.

D. The Manufacturer's warranty period shall run concurrently with the Contractor's warranty period.

PART 2 - PRODUCTS

2.1 CHECK VALVES

A. All valves to be rated for a minimum of 150 psi.

B. Manufacturers:

1. Val-Matic Valve & Manufacturing Corp.
2. DeZurik.
3. Flygt, a Xylem Company.
4. Or approved equal.
   a. Substitutions: Specified in Section 016000 – Product Requirements

C. Materials:

1. Body: Cast Iron, ASTM A126, Class B; unless otherwise noted.
2. Seat: Stainless Steel, as recommended by manufacturer.
3. Seat Ring: Buna-N.
4. Shaft: Stainless Steel, as recommended by manufacturer.
5. Studs, Bolts, Nuts: Steel, Commercial.
6. Cushion Chamber Assembly: Bronze Trim, ASTM B62.

D. Swing Check Valve
1. Design such that flow area equals normal pipe diameter.
2. Provide counter-weighted, rubber-seated check valve with attached cushion chamber whose function is to permit flow in only one direction, close tightly when its discharge side pressure exceeds its inlet pressure, and to close without a slam or bang.
3. Provide counter-weight arm in horizontal position.

E. Ball Check Valve
1. Design such that flow area equals normal pipe diameter.
2. Fully automatic coated sinking ball.
3. Flat faced flange.

F. Split Disc Check Valve
1. Threaded or flanged double disk check valve, stainless steel body and internals with EPDM seal and seat, US Valve model 07-4-4, 19-4-4, or engineer approved equal.
2. Seal design shall include raised sealing bead for positive seating at both high and low pressure. Disc shall fully overlap synthetic seal.
3. When opening and closing valve shall utilize a lift and pivot action to prevent seal wear and ensure enhanced seal life.

4. Stop and hinge pins shall be stabilized to prevent wear due to vibration. Design shall incorporate raised seat.
5. Valve Closure shall be torsion spring assisted to provide a cracking pressure of 0.25 psig.

G. Flexible Disc Swing Check Valve
1. Design such that flow area equals normal pipe diameter. Seating surface shall be on a 45-degree angle to minimize disc travel.
2. Normally closed, self-sealing.
3. The top access port shall be full size, allowing removal of disc without removal of valve.
4. Disc shall be one-piece construction, precision molded with an integral O-ring type sealing surface and reinforced with alloy steel. Disc shall be nylon reinforced Non-Slam closing characteristics and a maximum cracking pressure of 0.25 psig.
5. Valve disc shall be tested in accordance with ANSI/AWWA C508 and show no signs of wear, cracking, or distortion of valve disc or seat and shall remain drop tight at both low and high pressures.
6. Disc seal be constructed of NSF-61 compliant Buna-N or EPDM.
7. Val-Matic Swing-Flex® Check Valve or Engineer approved equal.

H. Split Disc Air Check Valve
1. Wafer-style, dual disc, with torsion spring induced closure. The disc shall be constructed of cast bronze or aluminum. Seal design shall include a raised sealing bead for positive seating at both high and low pressures. The disc shall fully overlap the seal. The torsion spring shall be 316 stainless steel. opening and closing of the valve shall utilize a lift and pivot action to prevent seal wear and ensure long seal life.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valves for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine roughing-in for piping systems to verify actual locations of piping connections before installation.

3.2 PREPARATION

A. Coordinate with other trades, equipment, and systems to the fullest extent possible.

B. Take all necessary field measurements to determine the exact dimensions for all work and the required sizes of all equipment under this Contract. Verify all pertinent data and dimensions.

3.3 INSTALLATION

A. Install in strict accordance with the Manufacturer's instructions and recommendations in the locations shown on the Drawings. Include providing the required oil and grease in accordance with the Manufacturer's recommendations.

B. Install in accordance with appropriate piping system Specification Section.

3.4 FIELD QUALITY CONTROL

A. After installation, the valves shall be field tested to ensure that all items are in compliance with the Specifications.

B. Manufacturer's Field Services:
   1. The valve manufacturer shall furnish the services of a competent and experienced factory representative who has complete knowledge of proper operation and maintenance of the equipment for a period of not less than one (1) day to inspect the installed, startup and train Owner on the equipment.

END OF SECTION

SECTION 400597 - IDENTIFICATION FOR PROCESS EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

Provide all labor, materials, tools, and incidentals required to furnish and install piping and equipment identifications as specified herein.

Section includes:

1. Plastic pipe markers.
2. Valve tags.
3. Engraved plastic laminate signs.
4. Plastic equipment markers.
5. Piping system color-coding schedule.

Identification furnished as part of equipment is specified as part of equipment assembly in other Sections and shall comply with requirements of this Section.

Refer to Division 26 and 40 Sections for identification requirements of electrical and instrumentation work, not Work of this Section.

Refer to Division 10 and on the Drawings for identification and signage requirements of architectural Work, not Work of this Section.

1.2 SUBMITTALS

A. Submit manufacturer's technical product data and installation instructions for each identification material and device required.

B. Shop Drawings:
   1. Submit list of wording, symbols, letter size, and color-coding for equipment identification and schedule, including equipment tag number, location, function, and valve manufacturer's name and model number.
   2. Submit listing of each flow stream identifier with associated color-coding.
   3. Valve location and ID.

C. Samples: Submit two tags, labels, and equipment nameplates, for each size used on Project.

1.3 MAINTENANCE MATERIAL SUBMITTALS

1. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.
2. Extra Stock Materials: Furnish two containers of spray-on adhesive.
3. Tools: Furnish special crimpers and other devices required for Owner to re-install tags.

1.4 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.

B. Project Record Documents: Record actual locations of tags and nameplates, including valve tag numbers.

1.5 QUALITY ASSURANCE

Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 (five) years.

Regulatory Requirements:

1. ANSI Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Allen Systems, Inc.

Brady (W.H.) Company, Signmark Division.

Industrial Safety Supply Company, Inc.

Marking Services, Inc.

Seton Name Plate Corporation.

Approved equal

1. Substitutions: Specified in Section 016000 – Product Requirements

2.2 MECHANICAL IDENTIFICATION MATERIALS

Provide manufacturer's recommended products as specified for each application.

Where more than single type is specified for application, selection is installer's option, but provide single selection for each product category.

Bands, markers, and identification materials used shall be rated for exterior application and suitable for withstanding occasional washdown. Materials shall be appropriate for installation in areas where there is potential contact with corrosive or otherwise hazardous substances, such as sodium hypochlorite and hydrogen sulfide gas.

2.3 LETTERING AND GRAPHICS

Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified or scheduled. Provide numbers, lettering, and wording as indicated or if not indicated, as recommended by manufacturers or required for proper identification and operation and maintenance of mechanical systems and equipment.

2.4 PLASTIC PIPE MARKERS

Snap-On Type: Provide preprinted, semi-rigid snap-on, color-coded pipe markers complying with ANSI A13.1.

Pressure Sensitive Type: Provide preprinted, permanent adhesive, color coded, pressure sensitive vinyl pipe markers complying with ANSI A13.1. Dot matrix printing is not acceptable.

Small Pipes: For external diameters less than 6-inches (including insulation, if any), provide full band pipe markers, extending 360 degrees around pipe at each location, fastened by one of following methods:

1. Snap-on application of pretensioned, semi-rigid plastic pipe marker.
2. Adhesive lap joint in pipe marker overlap.
3. Taped to pipe (or insulation) with color coded plastic adhesive tape not less than 4 inches wide, full circle at both ends of pipe marker, tape lapped 1-1/2 inches.

Large Pipes: For external diameter 6-inches and larger (including insulation, if any), provide either full band or strip type pipe markers not narrower than 3 times letter height (and of required length), fastened by one of following methods:

4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 4 inches wide, full circle at both ends of pipe marker, tape lapped 3 inches.
5. Strapped to pipe (or insulation) application of semi-rigid type with manufacturer's standard stainless steel bands.

Lettering: Comply with piping system nomenclature as specified, scheduled or shown and abbreviate only as necessary for each application length, and only with approval of Engineer. Lettering height shall be as follows:

Outside Pipe Diameter (inches)	Minimum Letter Height (inches)	Minimum Length of Marker (inches)
3/4 to 1-1/4	1/2	8
1-1/2 to 2	3/4	8
2-1/2 to 6	1-1/4	12
8 to 10	2-1/2	24
Over 10	3-1/2	32

Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

Label and band colors in accordance with ANSI A13.1, Pipe Identification Schedule Section 40 05 05 – Process Mechanical Piping and following:

6. Lettering and arrows:

    a. Black on yellow background for inherently hazardous materials.
    b. White on blue (gaseous) or green (liquid) for low hazard materials.
    c. White on red background for fire quenching materials.

7. Banding: Colors and band spacing as scheduled or as shown on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

Examine all equipment and piping for compliance with requirements for installation tolerances and other conditions affecting performance.

3.2 INSTALLATION

Coordination: Where identification is to be applied to surfaces requiring insulation, painting or other covering or finish including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.3 PIPING SYSTEM IDENTIFICATION

Locate pipe markers with arrows and color bands as follows wherever piping exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), and exterior non-concealed locations.

1. Near each valve and control device.
2. Near locations where pipes pass through walls or floors, ceilings or enter non-accessible enclosures.
3. At access doors, manholes, and similar access points permitting view of concealed piping.
4. Near major equipment items and other points of origination and termination.
5. Spaced intermediately at maximum spacing of 30 feet along each piping run, except reduce spacing to 20 feet in congested areas of piping and equipment.
6. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

Locate color bands at each marker and at intermediate spacing not to exceed 10 feet between bands, and at lesser spacing as indicated or as required by local codes.

Locate directional arrows at each marker. Provide two (2) arrows at each tee or branch fitting.

Where piping is normally visible from more than one side, provide two (2) or three (3) labels and arrows spaced at 120-degree intervals around pipe in accordance with ANSI A13.1.

Painting or Coating:

1. Painting of piping, ductwork, and equipment is work of Section 099000 – Painting and coating.

2. Colors to be in accordance with the following:

USE OF PIPE*	COLOR OF PIPE
RAW SEWAGE	GRAY
MIXED LIQUOR	GRAY
RAS/WAS SUCTION	BROWN WITH YELLOW BANDS
RAS DISCHARGE	BROWN
WAS DISCHARGE	BROWN WITH ORANGE BANDS
NONPOTABLE WATER	PURPLE
POTABLE WATER	BLUE
FIRE MAIN	RED
SODIUM HYPOCHLORITE	YELLOW
COMPRESSED AIR LINE	DARK GREEN
PROCESS AIR LINE	LIGHT GREEN

*NOTE: Language adapted to be consistent with contract documents.

3. Comply with 10-State Standard where not specified.
4. For piping scheduled to be color-coded, but not scheduled for complete painting (such as some plastic piping or aluminum jacked insulation) provide additional banding to represent background color. At each banding location provide following sequence:

   a. 8-inch wide tape of scheduled pipe color.
   b. 4-inch wide tape of scheduled band color.

3.4 MECHANICAL EQUIPMENT IDENTIFICATION

Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, if not otherwise specified for each item or device. Provide signs for each unit having equipment tag number on Drawings or in Specifications. Tag shall at a minimum detail:

1. Manufacturer
   a. Name
   b. Address
   c. Phone Number
2. Model Number
3. Serial Number
4. Design Operating Characteristics
5. Other manufacturer recommended information

3.5 ADJUSTING AND CLEANING

Adjusting: Relocate any mechanical identification device visually blocked.

Cleaning: Clean face of identification devices and glass frames of valve schedules.

3.6 FIELD QUALITY ASSURANCE

Final Survey and Repairs:

1. One (1) year after date of substantial completion, Contractor shall perform walk-through survey of mechanical identification systems and shall remove and replace any bands, labels, tags or markers that are loose, discolored, or defective.
2. Replacement materials shall be provided by Contractor, not drawn from Owner's extra material.

END OF SECTION

SECTION 40 61 13

PROCESS CONTROL SYSTEMS GENERAL PROVISIONS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the furnishing and installation of an instrumentation and control system designated as the Process Control System (PCS).

B. The Contractor shall procure the services of a Process Control System Integrator (PCSI). The PCSI shall be responsible for the following:

1. Coordinate all process control system-related items.
2. Furnish and install all materials, equipment, labor, and services required, except for those services and materials specifically excluded.
3. Achieve a fully integrated and operational PCS as specified herein, in the associated Specification Sections, and as detailed in the Contract Drawings.
4. Check out and calibrate instruments.
5. Perform all testing, training, and startup activities specified to be provided.

C. Equipment and software furnished under this section and under other related sections listed in the Scope of Work paragraph above shall be designed, coordinated, and supplied by the PCSI or supplier.

D. Application Engineering Services will be performed by the City and will include programming of the Programmable Logic Controller (PLC), configuration and development of the Human Machine Interface (HMI), and network configuration and programming necessary to deliver a complete, fully functional system that meets the overall design intent.

E. Work shall include, but not be limited to, the following:

1. Procurement, installation, commissioning, and testing of new process control instruments and appurtenances at the new lift station as indicated on the drawings and design documents.
2. Procurement, installation, commissioning, and testing of a new telemetry panel, including the Programmable Logic Controller (PLC), Local Operator Interface Terminal (OIT), communication equipment, uninterruptible power supply (UPS), and all other components indicated on the drawings, for installation at the lift pump station. The PLC shall be pre-programmed by the City in accordance with the I/O list and the preliminary control descriptions provided in this section.
3. Procurement, installation, commissioning, and testing of radios, antennas, and appurtenances for the integration of the new instrumentation, lift pump station controls and PLC system into the existing plant network and SCADA system as indicated on the design documents.

F. Associated Sections

This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 20	Process Control System Submittals
40 61 21	Process Control System Testing
40 61 26	Process Control System Training
40 61 93	Process Control System Input/Output List
40 61 96	Process Control Descriptions
40 63 43	Programmable Logic Controllers
40 66 00	Network and Communication Equipment
40 66 53	Radio Equipment
40 67 00	Control Panel Enclosures and Panel Equipment
40 67 63	Uninterruptible Power Supply
40 70 00	Instruments
40 71 13	Magnetic Flow Meter
40 72 23	Radar Level Meter
40 72 76	Level Switches
40 73 13	Pressure and Differential Pressure Gauges
40 73 26	Pressure Transmitters
40 73 36	Pressure and Differential Pressure Switches
40 73 63	Diaphragm Seals
40 78 00	Panel Mounted Instruments

G. The PCSI shall coordinate with the Contractor, Owner and Engineer for all scheduling, installation, testing, startup, and training services.

H. The Instrumentation specified in other Divisions shall meet the requirements of the Process Control Systems Sections of Division 40.

1.02 GENERAL

A. The Drawings and Specifications indicate the extent and general arrangement of the systems. If any departures from the Drawings or Specifications are deemed necessary by the PCSI, details of such departures and the reasons shall be submitted to the Engineer for review with or before the first submittal. No departures shall be made without prior written acceptance.

B. The Specifications describe the minimum requirements for hardware and software. Where the PCSI's standard configuration includes additional items of equipment or software features not specifically described herein, such equipment or features shall be furnished as a part of the system and shall be warranted as specified herein.

C. Equipment furnished and installed under this section shall be fabricated, assembled, erected, and placed in proper operating condition in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment

manufacturer, unless exceptions are noted by the Engineer.

D. Requirements specified in this section apply to all equipment specified in the above sections, unless otherwise stated. In the event of a conflict, the most stringent requirements shall override others.

E. The PCSI shall supply, install, and configure all instruments specified in Division 40 and as shown on the Drawings.

F. All equipment and installations shall satisfy applicable federal, state, and local codes.

G. Drawings

1. The Drawings indicate locations and arrangements of equipment and may include installation details and block and one-line diagrams showing connections and interfaces with other equipment. Section 40 61 93 – Process Control System Input/Output List contains the input/output (I/O) points.
2. Principal components of the instrumentation systems shall be as indicated on the Piping and Instrumentation Diagrams (P&IDs) and Section 40 70 00 – Instruments.

H. Dimensional Restrictions

1. Layout dimensions will vary between manufacturers and the layout area indicated on the Drawings is based on typical values.
2. The PCSI shall review the Drawings, the manufacturer’s layout drawings and installation requirements, and make any modifications requisite for proper installation subject to acceptance by the Engineer.
3. At least three (3) feet of clear access space shall be provided in front of all instrumentation and control system components.

I. Workmanship and Materials

1. The PCSI shall guarantee all equipment against faulty or inadequate design, improper assembly or erection, defective workmanship or materials, and leakage, breakage, or other failure. Materials shall be suitable for service conditions.
2. All equipment shall be designed, fabricated, and assembled in accordance with recognized and acceptable engineering and shop practice.
3. Individual parts shall be manufactured to standard sizes and thicknesses so that repair parts, furnished at any time, can be installed in the field.
4. Like parts of duplicate units shall be interchangeable.
5. Equipment shall not have been in service at any time prior to delivery, except for testing.

J. Corrosive Fluids

1. All parts which are exposed to corrosive conditions shall be made from corrosion resistant materials.
2. The PCSI shall submit certification that the instrument manufacturer approves the selection of materials of primary elements that are in contact with the specified process fluid to be inert to the effects of the process fluid.

K. Permits and Agency Approvals

1. The Contractor shall, as part of their work, arrange for and obtain all necessary permits, inspections, and approvals by the authorities having local jurisdiction of such work. This shall include any third-party inspections and testing of panels and equipment.

1.03 GOVERNING CODES AND STANDARDS

A. All performed work covered by this section and all equipment, materials, and installation shall be in accordance with the National Electrical Code (NEC), with applicable federal, state, and local regulations and ordinances, and with the latest edition of the following codes and standards. (Note: Codes and standards are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition in effect at the time of bid opening shall apply.)

1. American National Standards Institute (ANSI).
2. American Society for Testing and Materials (ASTM).
3. Code of Federal Regulations (CFR).
4. Canadian Standards Association (CSA).
5. Factory Mutual (FM).
6. Federal Communication Commission (FCC).
    a. Part 15 – Class A.
7. Institute of Electrical and Electronics Engineers (IEEE).
    a. IEEE 519 – Recommended Practice and Requirements for Harmonic Control in Electric Power Systems.
    b. IEEE C37.90 – Standard for Relays and Relay Systems Associated with Electric Power Apparatus.
8. International Society of Automation (ISA).
9. Insulated Cable Engineers Association (ICEA).
10. National Electric Safety Code (NESC).
11. National Electrical Manufacturers Association (NEMA).
    a. NEMA ICS 1 – Industrial Control and Systems General Requirements.
12. National Fire Protection Agency (NFPA):
    a. NFPA 70 – National Electrical Code (NEC).
    b. NFPA 79 – Industrial Control Equipment.
13. Occupational Safety and Health Administration (OSHA).
14. Underwriters Laboratories, Inc. (UL):
    a. UL 508 – The Standard for Safety for Industrial Control Equipment.
    b. UL 508A – The Standard for Safety for Industrial Control Panels.

c. UL 61010-1 – The Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use: General Requirements.

d. UL 61010-2-201 – The Standard for Safety Electrical Equipment for Measurement, Control, and Laboratory Use: Particular Requirements for Control Equipment.

e. UL 50 – The Standard for Safety for Enclosures for Electrical Equipment.

f. A nationally recognized testing laboratory, as approved by the Authority having jurisdiction, may substitute for UL listing on commercial off the shelf products.

15. United States Defense Standard (MIL-STD).

B. Where reference is made to one (1) of the above standards, the revision in effect at the time of bid opening shall apply.

C. If the issue of priority is due to a conflict or discrepancy between the provisions of the contract documents and any referenced standard, or code of any technical society, organization or association, the provisions of the contract documents shall take precedence if they are more stringent or presumptively cause a higher level of performance.

D. If there is any conflict or discrepancy between standard specifications, or codes of any technical society, organization or association, or between laws and regulations, the higher performance requirement shall be binding on the Contractor, unless directed otherwise by the Owner and/or Engineer.

E. In accordance with the intent of the contract documents, the Contractor accepts the fact that compliance with the priority order specified shall not justify an increase in contract price or an extension in contract time nor limit in any way the Contractor's responsibility to comply with all laws and regulations at all times.

1.04 RELATED WORK

A. All equipment and work provided under any division of these project specifications, including, but not limited to, vendor supplied instrumentation and control panels, shall fully comply with the relevant requirements of Division 40 sections.

B. Conduit and Cable

1. The Process Control conduit systems are specified in Electrical Division 26.

2. Instrumentation signal cable and alarm, control, and status wiring are specified in Electrical Division 26.

C. The contract documents indicate both vendor and PCSI supplied instruments, devices, and control panels. The distinction between equipment suppliers shall be shown on the Drawings, Instrument Device Schedule (IDS), and Panel Schedules. The PCSI shall provide all equipment as instruments, devices, and control panels that are not listed as supplied by vendors.

D. Related Equipment, Materials, and Appurtenances

1. Related equipment and materials may include, but will not be limited to, instrumentation, motor controllers, valve actuators, chemical feeders, analytical measuring devices, conduit, cable, and piping as described in other sections or furnished under other

contracts.

2. The PCSI shall provide all auxiliary and appurtenances devices necessary for system operation or performance, such as transducers, relays, signal amplifiers, signal boosters, signal converters, intrinsic safety barriers, signal isolators, special power supplies, special cable, special grounding, software, and drivers to interface with existing equipment or equipment provided by others under other sections of these specifications, whether they are shown on the Drawings or not.
3. All equipment shall be designed and installed in full conformity with the Drawings, specifications, engineering data, instructions, and recommendations of the manufacturer, and the manufacturer of the related equipment.

E. Coordination

1. Systems supplied under this section shall be designed and coordinated by the PCSI for proper operation with related equipment and materials furnished by other suppliers under other sections of these specifications, under other contracts, and, where applicable, with related existing equipment.
2. The PCSI shall coordinate with the Contractor, Owner, Engineer and other suppliers of Instrumentation and Controls equipment specified under other Divisions that interface with the PCS for all scheduling, installation, testing, startup, and training services.

1.05 PCSI QUALIFICATIONS.

A. General

1. Successfully completed work of similar or greater complexity on at least three (3) previous projects within the last five (5) years. Successful completion shall be defined as a finished project completed on time, without any outstanding claims or litigation involving the PCSI. Potential references shall be for projects where the PCSI contract was of similar size to this project.
2. Been in the same industry performing the type of work specified in this specification section for a minimum of 15 years.
3. Maintain competent and experienced service personnel to service the hardware and software furnished for this project.
4. Hold an adequate Certificate of Insurance for the project work specified herein and in other related sections.
5. Submit a team organization chart, resumes, and training certifications.
6. Employ personnel who have completed and hold certificates for required training.
7. Certifications and training credentials of all individuals working on the Owner’s systems must be submitted and approved prior to commencing work.
8. If the PCSI has worked with the Owner, provide a list of projects previously completed. The PCSI may be rejected based on past performance on the Owner’s projects and may not use rejection to claim additional compensation or time.
9. Be capable of responding to on-site problems, at a minimum, within 12 hours of notice. Provide an on-site response within four (4) hours of notification starting at two (2) months before scheduled startup to two (2) months after startup completion.

10. Being listed in this specification does not relieve any potential PCSI from meeting the qualifications and criteria specified in this section.
11. Any proposed PCSI firm not shown on the pre-qualified list below must be identified and submitted a minimum of 10 days prior to bid opening and must be approved by the Owner. The Owner will announce via the addendum process a minimum of five (5) days prior to bid if the proposed PCSI has been accepted. The Owner reserves the right to accept or reject any firm based on the Owner's evaluation of qualifications, past performance, or experience (or lack thereof) with the Owner.

B. PCSI's Qualifications

1. The PCSI shall be a "systems integrator" regularly engaged in the business of supplying and installing computer-based monitoring, control, data acquisition systems, instrumentation, and their associated subsystems as they are applied to the municipal water and wastewater industry.
2. The PCSI shall have the following minimum qualifications:
    a. Maintain a permanent, fully staffed and equipped service facility within 200 miles of the project site with full-time employees capable of designing, fabricating, installing, calibrating, testing, and troubleshooting the systems specified herein.
    b. Hold a valid UL-508 certification for their panel fabrication facility.
    c. The intended PCSI shall furnish the information requested in the Instrumentation and PCSI Questionnaire bound elsewhere in the Documents. References including contact names, telephone numbers, and general project description shall be included in the questionnaire. The users and project lists shall be for similar control equipment, software, and type of projects.
3. The following PCSIs, listed in no particular order, have been pre-approved for this work by the Owner:
    a. Control System Northwest
    300 Simon St SE
    East Wenatchee, WA 98802
    Phone: 509.860.5890
    Attn: Travis Williams

1.06 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures for general submittal requirements.

B. Refer to Section 40 61 20 – Process Control System Submittals for the specific submittal requirements.

1.07 SPARE PARTS

A. Refer to the individual Specification Sections for the spare parts requirements.

1.08 HAZARDOUS AREAS

A. Equipment, materials, and installation in areas classified as hazardous on the Drawings shall

comply with NEC Articles 500, 501, 502, and 503 and shall include, but not be limited to, the following:

1. **Conduit Seals:** Provide conduit sealing fittings in accordance with NEC Article 501.15 to prevent the passage of flammable gases or vapors.
2. **Intrinsic Safety**: Intrinsically safe circuits shall utilize approved intrinsic safety (IS) barriers or isolators installed in accordance with NEC Article 504 and manufacturer's requirements.
3. **Purge/Pressurization Systems:** Where required, provide purge or pressurization systems in accordance with NEC and NFPA 496, including associated monitoring, devices, alarms and Interlocks.

B. Equipment and materials installed in hazardous areas shall be UL listed for the appropriate hazardous area classification.

1.09 SHIPPING, STORAGE, AND HANDLING

A. Shipping, storage, and handling shall be in accordance with Section 11 29 00 – Product Delivery, Storage, and Handling.

B. All electronic equipment and instruments shall be suitably packaged to facilitate handling and to protect against damage during transit and storage in accordance with the manufacturer's instructions. All equipment shall be boxed, crated, or otherwise completely enclosed and protected during shipment, handling, and storage. All equipment shall be protected from exposure to the elements, shall always be kept dry, and shall not be exposed to adverse ambient conditions.

C. Painted surfaces shall be protected against impact, abrasion, discoloration, and other damage. Painted surfaces that are damaged prior to acceptance of equipment shall be repainted to the satisfaction of the Engineer.

D. Each shipment shall include an appropriate shipping list that indicates the contents of the package, including the specific instrument tags. The shipping list shall be accessible without exposing the instruments to the atmosphere. The shipping list shall also contain any cautionary notes regarding storage of the instruments, including requirements to protect the instrument from static discharge, desensitizing chemicals (solvents, paints, etc.), or ambient atmospheric conditions.

E. The manufacturer's special instructions for field handling, storage, and installation required for protection shall be securely attached to the packaging for each piece of equipment prior to shipment. The instructions shall be stored in resealable plastic bags or other means of protection.

F. Individual instruments shall be appropriately tagged or labeled to positively identify the device. All identification shall be visible without the need to unpack the instrument from its protective packaging.

G. Instrument shipment and storage requirements shall be coordinated with the Engineer or Owner prior to shipment. The PCSI shall provide adequate storage and be ready to accept the shipment before shipping any equipment to the site. Additional shipping and storage requirements shall be as detailed in the individual instrument specifications.

H. Equipment shall be installed in its permanent, finished location shown on the Drawings within seven (7) calendar days of arriving onsite. If the equipment cannot be installed within seven (7) calendar days, the equipment shall not be delivered to the site but stored offsite at the Contractor's expense, until such time that the site is ready for permanent installation of the equipment.

I. Where space heaters are provided in equipment, provide temporary electrical power and operate space heaters during jobsite storage, and after equipment is installed in permanent location, until equipment is placed in service.

J. Components which are shipped loose due to transportation limitations shall be assembled and disassembled by the manufacturer prior to shipment to assure that all components fit together and are adequately supported.

K. If any apparatus has been damaged, such damage shall be repaired at no additional cost to the Owner.

1.10 WARRANTIES

A. The manufacturer's warranties shall start from date of Substantial Completion in accordance with Section 01 78 36 – Warranties and be as specified in each Specification Section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 COORDINATION MEETINGS

A. PCSI Kick-off Meeting

1. A project kick-off coordination meeting shall be held within two (2) weeks after submitting the first phase submittals including Deviation List, Project Plan, and Schedule Submittals. The purpose of the meeting shall be to discuss the following:
    a. The PCSI Project Plan and Schedule Submittal.
    b. To summarize the PCSI understanding of the project.
    c. Any proposed substitutions or alternatives.
    d. Schedule testing and delivery deadline dates.
    e. Provide a forum to coordinate hardware and software related issues.
    f. Request any additional information required from the Owner.
2. Prepare and distribute an agenda for this meeting a minimum of one (1) week before the scheduled meeting date.
3. The meeting will last up to two (2) hours.
4. Meeting minutes shall be provided for each meeting to the Owner and Engineer within five (5) working days of the meeting date. Sections shall be established within the minutes that clearly identify project team decisions and action items with responsible party. Final minutes shall be prepared and submitted to the Engineer following receipt of input from the meeting attendees.

3.02 INSTALLATION REQUIREMENTS

A. The installation of equipment furnished hereunder shall be by the Contractor or their assigned subcontractors.

B. Refer to the individual Specification Sections for the specific installation requirements.

C. Field Wiring

1. Field wiring materials and installation shall be in accordance with the electrical section.
2. The shield on each process instrumentation cable shall be continuous from source to destination and be grounded at only one (1) ground point for each shield.

D. Salvage of Existing Equipment

1. Existing equipment and materials removed or replaced under this contract shall be delivered to the Owner at a location designated by the Owner or shall be properly disposed of at the Owner's discretion. Care shall be taken to avoid damage to equipment delivered to the Owner.
2. Any mounting brackets, enclosures, stilling wells, piping, conduits, wiring, or openings that remain after removal of equipment and support hardware shall be removed or repaired in a manner acceptable to the Owner. Transmitters or switches containing mercury shall be removed and disposed of by personnel trained in the handling of hazardous materials and using approved procedures.

3.03 SYSTEMS CHECK

A. The PCSI shall provide the services of a trained and experienced field supervisor to assist the installation contractor during installation, and to calibrate, test, and advise others of the procedures for installation, adjustment, and operation.

1. Field Manager
   a. The PCSI shall appoint a field services manager who shall be responsible for the coordination of all system check-out and startup activities, and who shall be immediately available to the Engineer and Owner by phone or on site for the duration of this project.

B. Field Inspection at Delivery

1. The field supervisor shall inspect major equipment items within five (5) working days of delivery, to ensure that the equipment was not damaged during shipment and shall supervise or assist with unpacking, initial placement, and initial wiring of the system.

C. Field Calibration of Instruments

1. After each instrument has been installed, a technical representative of the PCSI shall calibrate each instrument and shall provide a written calibration report for each instrument, indicating the results and final settings. A typical instrument calibration report is attached to the end of the Section 40 61 21 – Process Control System Testing.
2. The adjustments of calibrated instruments shall be sealed or marked, insofar as possible, to discourage tampering.

3. Instrument calibration shall be done before checkout of the system operation.

D. Training for Installation Personnel

1. The field supervisor shall train the installation personnel in reading and understanding submittal drawings, and in the correct installation and wiring procedures for the equipment. The PCSI shall submit a Certification of Training to the Owner and Engineer. Certification shall be issued for each installation personnel and shall state that the personnel have completed the training.

E. Field Inspection Prior to Start Up

1. After installation and wiring connections are complete, the field supervisor, with additional PCSI personnel shall verify that each external connection to the system is correctly wired, and field process components and devices are functioning as intended. The PCSI shall be responsible for completing the following scope of work.

a. Analog Signals – Analog input signals shall be simulated at the transmitting source and verified to be received at the proper register address in the control system. Analog outputs shall be generated at the control system, and verified to be received with the correct polarity, at the respective receiving device.

b. Discrete Signals – Discrete input and output signals shall be simulated and verified that they are received at the respective receiving device, and at the proper voltage.

c. Devices by Other Suppliers – If interrelated devices furnished by other suppliers, under other contracts, or by the Owner, such as valve actuators, motor controls, chemical feeders, and instruments, do not perform properly at the time of system checkout, the field supervisor shall use suitable test equipment to introduce simulated signals to and/or measure signals from these devices to locate the sources of trouble or malfunction.

d. System Check Out Report:

1) The PCSI shall submit a written report to the Engineer documenting the results of all system checkout tests.

2) The Engineer may request additional documentation to establish responsibility for any required corrective actions.

3) The PCSI shall provide written verification to the Engineer or Owner confirming that all external connection checks have been successfully completed.

4) This verification shall be submitted prior to initiating system startup or field acceptance testing

F. Startup Assistance – After the field supervisor has completed the system check and submitted his report, the PCSI shall supply a factory-trained engineer and programmer to provide on-site startup assistance. During the startup period, these personnel shall thoroughly check all equipment, correct any deficiencies, and verify the proper operation of all components.

END OF SECTION

SECTION 40 61 20

PROCESS CONTROL SYSTEMS SUBMITTALS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the submittal requirements for the Process Control System (PCS).

B. Associated Sections

1. This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 13	Process Control System General Provisions
40 61 21	Process Control System Testing
40 61 26	Process Control System Training
40 61 93	Process Control System Input/Output List
40 61 96	Process Control Descriptions
40 63 43	Programmable Logic Controllers
40 66 00	Network and Communication Equipment
40 66 53	Radio Equipment
40 67 00	Control Panel Enclosures and Panel Equipment
40 67 63	Uninterruptible Power Supply
40 70 00	Instruments
40 71 13	Magnetic Flow Meter
40 72 23	Radar Level Meter
40 72 76	Level Switches
40 73 13	Pressure and Differential Pressure Gauges
40 73 26	Pressure Transmitters
40 73 36	Pressure and Differential Pressure Switches
40 73 63	Diaphragm Seals
40 78 00	Panel Mounted Instruments

1.02 GENERAL

A. General Submittal Requirements:

1. Refer to Section 01 33 00 – Submittal Procedures for general submittal requirements.
2. Submittals shall demonstrate that the equipment and services to be furnished comply with the provisions of these specifications and shall provide a complete record of the equipment as manufactured, delivered, installed, and placed in service.

3. Submittals shall be complete and include equipment dimensional, assembly, and installation drawings, wiring and schematic diagrams, connection details, specifications, ranges, installation requirements, and data covering the materials used and the parts, devices and accessories forming a part of the system furnished. Submittals consisting of only general sales literature shall not be acceptable.
4. Certification by the supplier that the equipment and materials to be provided are suitable for the service intended. A letter stating that all components used on the sensors or elements exposed to chemicals are fully compatible (A or Excellent compatibility rating) with the service and chemicals specified in the design documents. The letter shall state that the instrument(s) and/or meters supplier has reviewed the MSDS sheets of all the chemicals being conveyed in the system including the summary of hazards, and physical and chemical data. MSDS sheets of the chemicals shall be requested from the City by the Contractor.
5. A complete description of chemical resistance of the component materials that will come in contact with chemicals, as specified herein.
6. Individual drawings and data sheets submitted at random intervals will not be accepted for review.
7. Equipment tag numbers or identifications used on the Drawings shall be referenced where applicable.
8. Shop drawing title blocks shall include, at a minimum, the Process Control System Integrator (PCSI) registered business name and address, Owner and project name, drawing name, revision level, and shall identify personnel responsible for the content of the Drawing(s).
9. Incomplete or partial submittals not complying with the submittal requirements outlined in this section will be rejected without review.
10. Submittals shall be bound in separate three-ring binders. Each binder shall include an index and sectional dividers. Each section shall have a uniquely numbered tab divider, and each component within each section shall have a separate binder tab divider. The cover and edge of each volume shall contain the information as specified in Section 01 78 23 – Operation and Maintenance Data. All drawings shall be reduced to a maximum size of 11-inches by 17-inches and Z-folded to 8.5-inches by 11-inches for inclusion inside the binder. Maximum binder thickness shall be 3 inches.
11. All electronic submittals shall be submitted in a searchable PDF format. The PDF file shall include an index and be bookmarked by section and individual device or component. Submittals that are not bookmarked shall be rejected without review.
12. PLC Programs shall be submitted in the native format of the Programmable Logic Controller (PLC) as suggested by the manufacturer and as a PDF printout.
13. The Engineer and Owner will review shop drawings a maximum of two (2) times. The cost of review for the second resubmittal and for each subsequent review by the Engineer and Owner shall be charged to the Contractor in the form of a deductive change order.

B. Submittal Order

1. First Stage Submittals
    a. The Qualifications and Deviation List, Project Plan, and Schedule submittals may be submitted together.

b. Qualifications Submittal – Within 30 calendar days after Notice to Proceed.

c. Deviation List, Project Plan, and Schedule (PCSI) – Within 45 calendar days after Notice to Proceed.

d. Submittal requirements are specified within this section.

2. Second Stage Submittals

a. Submit on second stage submittals only after the first stage submittals have been approved.

3. Third Stage Submittals

a. Submit on third stage submittals only after the second stage submittals have been approved.

4. Fourth Stage Submittals

a. Preliminary Operations and Maintenance Manuals (O&Ms) shall be submitted prior to any factory testing and/or field installation of equipment and instruments.

b. Submittal requirements are specified within this section.

c. Refer to Section 01 78 23 – Operation and Maintenance Data for general O&M requirements.

d. Separate submittals shall be made for each submittal listed below in the order they are shown.

Submittal Group Title	Individual Submittal Title	Early Stage	First Stage	Second Stage	Third Stage	Fourth Stage
Qualifications and Deviation List, Project Plan, and Schedule submittal	40 61 13 Process Control System General Provisions -Qualifications Submittal		√			
	40 61 13 Process Control System General Provisions - Deviation List, Project Plan, and Schedule		√			
Hardware and Software Packages Submittal	40 66 00 Network and Communication Equipment			√		
	40 66 53 Radio Equipment			√		
Control Panel Hardware Submittal	40 63 43 Programmable Logic Controllers			√		
	40 67 00 Control Panel Enclosures and Panel Equipment			√		
	40 67 63 Uninterruptible Power Supply			√		
	40 78 00 Panel Mounted Instruments			√		
Field Instruments Submittal	40 70 00 Instruments			√		
	40 70 93 Attachment A - Instrument Device Schedule			√		
	40 71 13 Magnetic Flow Meter			√		
	40 72 23 Radar Level Meter			√		
	40 72 76 Level Switches			√		
	40 73 13			√		

Submittal Group Title	Individual Submittal Title	Early Stage	First Stage	Second Stage	Third Stage	Fourth Stage
	Pressure and Differential Pressure Gauges					
	40 73 26 Pressure Transmitters			√		
	40 73 36 Pressure and Differential Pressure Switches			√		
	40 73 63 Diaphragm Seals			√		
Process Control and Input/Output (IO) List Submittal	40 61 93 Process Control System Input/Output List				√	
	40 61 93A Attachment A - PCS Input/Output List				√	
	40 61 96 Process Control Descriptions				√	
Process Control Graphics HMI Screens and Controller Program Submittal	By the City of Chelan				√	
Panel Layout Drawings and Wiring Diagrams Submittal	40 67 00 Control Panel Enclosures and Panel Equipment				√	
Testing Plan Submittals (PCSI)	40 61 21 Process Control System Testing				√	
Training Plan Submittals (PCSI)	40 61 26 Process Control System Training				√	
Spares, Expendables, and Test Equipment Lists Submittal	40 61 13 Process Control System General Provisions				√	
Test Results	40 61 21 Unwitnessed Factory Acceptance Test Results				when comp-leted	when comp-leted

Submittal Group Title	Individual Submittal Title	Early Stage	First Stage	Second Stage	Third Stage	Fourth Stage
	40 61 21 Unwitnessed Operational Readiness Test Results				when comp-leted	when comp-leted
	40 61 21 Witnessed Operational Readiness Test Results				when comp-leted	when comp-leted
	40 61 21 Functional Demonstration Test Results				when comp-leted	when comp-leted
	40 66 00 Network Cable Installation Test Results				when comp-leted	when comp-leted
	40 66 53 Radio Link Acceptance and Network Acceptance Test Results				when comp-leted	when comp-leted
Process Control System Operations and Maintenance (O&M) Manuals	40 61 13 Process Control System General Provisions					√

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 SUBMITTAL REQUIRMENTS

A. Qualifications Submittal

1. Detailed information on staff and organization to show compliance with the Quality Assurance requirements of this section.
2. Submit details of personnel assigned to the project and the organizational structure, including the PCSI's project manager, project engineer, lead project technicians, quality assurance reviewer, etc. Include project roles, contact information, and key individual resumes and specify in writing their commitment to the project.
3. The Qualifications submittal shall be submitted and approved before any other submittals from this section will be accepted. Failure to meet the minimum requirements shall be grounds for rejection as a PCSI. The Qualifications submittal shall, at a minimum, contain the following:
    a. Copies of International Society of Automation (ISA) Certified Control Systems Technician (CCST) Level 1 certificates for all field technicians or resumes demonstrating a minimum of 10 years of verifiable plant start-up experience.

b. Notarized statement from the firm's financial institution demonstrating ability for the firm to meet the obligations necessary for the performance of the work.

c. Copy of UL-508 certificate for panel fabrication facilities.

d. Project references for water or wastewater projects as defined in the Quality Assurance paragraphs.

e. Documentation to demonstrate the ability to complete this project, including resumes of key staff, financial capacities, details on engineering, design, fabrication, field service capacity, and the location of staff responsible for responding to the site within four (4) hours to resolve startup issues.

B. Deviation List, Project Plan, and Schedule Submittal

1. Deviation List Submittal

a. Submit a detailed list of any exceptions, functional differences, or discrepancies between the system proposed by the PCSI and this specification.

b. The Deviation List shall consist of a paragraph-by-paragraph review of the Specifications indicating acceptance or any proposed deviations, the reason for exception, the exact nature of the exception, the proposed substitution, and details of any contract financial credits offered so that an evaluation may be made by the Engineer.

c. If no exceptions are taken to the Specifications or Drawings, the PCSI shall make a statement as such. If there is no statement by the PCSI, then it is acknowledged that no exceptions are taken.

d. The acceptability of any device or methodology submitted as an “equal” or “exception” to the specifications shall be at the sole discretion of the Engineer.

2. Project Plan Submittal

a. The PCSI Project Plan submittal shall be submitted prior to scheduling the PCSI Kick-off Meeting.

b. The Owner/Engineer will not accept subsequent submittals until the PCSI Project Plan submittal is approved.

c. A brief and concise description of the proposed system by the PCSI showing the understanding of the project work, including major hardware and software components, proposed work schedule, startup, and coordination.

d. A preliminary system architecture drawing showing the principal items of equipment furnished, including model numbers, and their interrelationships to each other and other systems.

e. Approach to work including the replacement of existing equipment with new equipment, switchover (Maintenance of Plant Operations (MOPO) during the system transition), startup and commissioning, testing, training, and any other tasks as required by these specifications.

f. Preliminary list of Human Machine Interface (HMI) software, PLC software, and PLC hardware, including version numbers, solely to determine compliance with the requirements of the contract documents prior to beginning development of system programming. Review and approval of software and hardware systems as part of this Project Plan stage shall not relieve the PCSI of meeting all the functional and

performance requirements of the system as specified herein. Substitution of the manufacturer or model of these systems after the submittal is approved is not allowed without Engineer approval.

g. Sample formats of the shop drawings to be submitted and in conformance with the requirements of the specifications. At a minimum, include samples of panel fabrication drawings, loop, and Input/Output (I/O) wiring diagrams.

h. Preliminary coordination meeting agendas as specified herein.

i. Training plan outline.

3. Project Schedule Submittal

a. The project schedule shall be prepared in Gantt chart format clearly showing task linkages for all tasks and identifying critical path elements. The PCSI schedule must be based on and coordinated with the General Contractor’s project schedule to meet all project milestones, including all meetings, field installation, testing, and start-up milestones in their schedule.

b. The project schedule shall illustrate PCS related major project milestones including the following:

1) Schedule for all subsequent project submittals. Include the time required for Contractor submittal preparation, Engineer's review time, and a minimum of two (2) complete review cycles.

2) Proposed dates for all project coordination meetings.

3) Hardware purchasing, fabrication, and assembly (following approval of related submittals).

4) Software purchasing and configuration (following approval of related submittals).

5) Shipment of instrument and control system equipment.

6) Installation of instrument and control system equipment.

7) Dates and duration of all required testing. Testing schedule shall include submittal approval of test procedures with a minimum of 30 days prior to testing commencement.

8) Schedule shall include submittal of documentation of completed testing activities for review and approval by the Engineer prior to equipment shipment, startup, or subsequent project work.

9) Schedule for system switchover, startup, and/or going online for each major system. At a minimum, include the schedule for each process controller and HMI server/workstation provided under this Contract.

10) Schedule for all training, including submittal and approval of O&M manuals, factory training, and onsite training.

C. Hardware and Software Submittal

1. General

a. Submittals including only general sales literature will not be accepted.

b. Shop drawing and manufacturer data sheet submittals shall be complete, fully demonstrating compliance with all Specification requirements and features.

c. Selected features and options shall be clearly indicated by highlighting, circling, or pointing arrows to each selection that makes up the manufacturer ordering/model number code.

d. Physical details shall include, at a minimum, physical layout and dimensions, construction details, National Electrical Manufacturers Association (NEMA) rating, hazardous area rating, electrical power requirements and consumption, communication ports, signal connection ports, heat dissipation, and installation requirements.

e. Functional details shall include, at a minimum, details of internal features, such as communication protocols, control functions, programming parameters, jumper settings, software features, and licensing requirements.

f. Provide Ethernet switch port assignment schedules for any modifications to the existing switches and for the new switches. An existing switch port assignment table is available upon request.

g. Manufacturer warranty details shall include, at a minimum, the length of term, level of on-site support (if any), and speed of replacement.

2. System Architecture Diagram (PCSI)

a. Submit a complete system architecture diagram showing – in schematic form – the interconnections between major hardware components including control centers, panels, power supplies, consoles, computer and peripheral devices, networking equipment, PLC processors, PLC I/O modules, local operator interfaces, and equipment. The system architecture shall be complete and shall depict all required cables, media type between components, raceway requirements (conduit, wireway, etc.), raceway identification, network protocol used at each network level, details on connection requirements, such as cable pin-outs, port numbers, and rack slot numbers. The intent of this specification requirement is for the PCSI to develop a diagram that is complete in every aspect to allow purchase of all required equipment by part number, and to allow a qualified technician to interconnect all equipment without having to refer to additional manuals or literature. Minimum sheet size shall be 11x17 (inch), however, the use of a larger sheet size or more than one (1) sheet is also acceptable.

3. Software

a. Provide a complete software list or bill of materials (BOM), including all software items and quantities to be supplied by the PCSI.

b. Details of all stand-alone computer software packages required by the Specifications.

c. Submit details of the process controller, local operator graphic panel, and HMI software application packages to be used for each piece of equipment. All standard and optional features to be provided shall be indicated.

d. Submit details of all other required software packages to be provided including, but not limited to, network/communication utility (Open Platform Communication (OPC), Simple Network Management Protocol (SNMP), and Uninterruptible Power Supply (UPS)), field instrument utility (HART, Fieldbus, etc.), and computer software (MS Office, Adobe Acrobat, etc.).

e. Provide details of all software license and software support license agreements indicating quantities and assignment of licenses to the Owner.

D. Instrumentation Submittal:

1. The submittal shall include a complete instrument list or BOM including all instruments to be supplied by the PCSI. Instrument tagging shall adhere to the loop numbering and tagging scheme shown within the Drawings and Specifications.
2. Submit complete documentation of each field instrument using an ISA S20 (TR20) style data sheet format in electronic and 8.5x11 (inch) print format. Instrument data sheets shall include the following information, at a minimum:
   a. General (Header):
      1) Instrument type (Title).
      2) Specification reference.
      3) Document revision number and date.
   b. Sensor/Controller/Field Meter/Transmitter:
      1) Sensor, Controller, Field Meter, and Transmitter details shall include, at a minimum:
         a) Physical: Size and dimensions of equipment. Materials of construction for enclosure and wetted parts.
         b) Ratings: NEMA rating, hazardous area classification, and temperature ratings for the equipment.
         c) Sizing Calculations: Provide details of equipment selection based on any manufacturer required sizing, calculations, configurations, etc.
         d) Electrical Requirements: Note voltage, power requirements (two-wire or four-wire), and power consumption data.
         e) Inputs/Outputs: Input and output characteristics and types.
         f) Heat Dissipation: Note manufacturer’s listed heat dissipation value for the equipment.
         g) Installation Details: Mounting details in sufficient detail to determine compliance with the requirements of the Contract Documents.
         h) Internal Features: Communication protocols, control functions, programming parameters, jumper settings, software features, and licensing requirements.
         i) Range, size, and graduations in engineering units.
         j) Complete manufacturer/model number.
   c. Accessories and Special Requirements:
      1) List all required accessories, special options, software, tools, and calibration equipment to be provided. Provide complete manufacturer/model numbers for each accessory and/or manufacturer option codes.
      2) Submit details of digital network interface requirements including type, wiring requirements, configuration details, device addressing, and process control system interface.

d. Instrument Tag List:

1) Provide specific project information for all instruments, of each type, included on the ISA-S20 (TR20) style data sheets. Instrument information shall include, at a minimum:

a) Plant equipment number and ISA tag number per the Piping and Instrumentation Diagrams (P&IDs) and/or the Engineer's Instrument List.

b) Instrument description including plant area/system location.

c) Instrument scale range and engineering units (or setpoints for discrete instruments).

d) Project drawing reference(s).

E. I/O List Submittal

1. The PCSI generates a detailed I/O list to be submitted to the Engineer for review and approval.

a. The PLC programming cannot progress before receiving official approval of this submittal.

b. The Engineer shall verify naming convention conforms with PLC and HMI Procedures.

c. The I/O list shall follow the I/O List format and be submitted as a Microsoft Excel electronic document and 8-1/2 inch by 11-inch hard copy.

d. The I/O list shall include all active points and spare points for the system.

e. The I/O list shall be arranged such that each PLC, Remote Terminal Unit (RTU), or control panel system has a dedicated worksheet. At a minimum, I/O worksheet tables shall include the following information:

1) Tag name(s): The identifier assigned to a device that performs a function in the control system. As part of this information, the loop number of the tag shall be broken out to allow for sorting by loop. PLC and HMI tag names shall be the same.

2) Description: A description of the function of the device (text that includes signal source, control function, etc.). Include the text, "Spare Points," for all I/O module points that are not connected to equipment.

3) Engineering Range/State: The range in engineering units corresponding to an analog 4-20 mA signal, or the state at which the value of the discrete points is "1."

4) Engineering Units: The engineering units associated with the Analog I/O.

5) Alarm Limits: Include alarm limits based on the control descriptions and the Drawings.

6) Alarm State.

7) Alarm Priority: Include alarm priority based on the Owner's preference.

8) HMI Update Rate.

9) Historical Logging.

10) Modbus Address: The Modbus address for peer-to-peer data points.

11) PLC and HMI Address.

12) Wiring Information: The physical wiring termination points at the PLC designated by rack, slot, and channel.

13) Signal Type: Use DO – Discrete Output, DI – Discrete Input, AO – Analog Output, AI – Analog Input, PI – Pulse Input, or PO – Pulse Output.

14) Instrument Limits.

15) State Text: Designation of the "on" and "off" state values for discrete points.

16) Output Type.

F. Control/Network Panel Drawings Submittal

1. Provide a complete list of all panels to be supplied.
2. Provide a complete hardware list or BOM including all hardware to be supplied by the PCSI. For each hardware component, submit a cover page that lists, at a minimum, date, specification number, product name, manufacturer, model number, location(s), and power required.
3. Catalog cuts for supplied Programmable Logic Controller (PLC), process controller equipment, RTUs, including central processing units, redundancy units, memory, input modules, output modules, modems, network interface modules, mounting racks, and power supplies. Submit descriptive literature for each hardware component that fully describes the units being provided.
4. Catalog cuts for HMI servers, HMI workstations, historian servers, memory, printers, mass storage devices, modems, peripherals, power supplies, networking, and all other hardware being provided. Submit descriptive literature for each hardware component, which fully describes the units being provided.
5. Panel drawing submittals shall be complete, fully demonstrating compliance with all specification requirements and features. Panel drawings shall include, but not be limited to, the following for each panel supplied:
   a. Panel Layout and BOM (with quantity).
   b. Panel Power Wiring Schematics.
   c. Panel I/O Wiring Diagrams.
6. The Drawings shall be furnished for all panels, consoles, and equipment enclosures specified in related PCSI sections. The panel assembly and elevation drawings shall be drawn to scale and detail all equipment in or on the panel. The panel drawings shall be at least 11x17 (inch) print size. As a minimum, the panel drawings shall include the following:
   a. Interior and exterior panel elevation drawings to scale.
   b. Nameplate schedule.
   c. Conduit access locations.
   d. Panel construction details.

e. Cabinet assembly and layout drawings to scale. The assembly drawing shall include a BOM on the drawing with each panel component clearly defined. The BOM shall be cross-referenced to the assembly drawing so that a non-technical person can readily identify any component of the assembly by manufacturer and model number.

f. Fabrication and painting specifications including color (or color samples).

g. Panel control schematics and interconnection diagrams detailing the electrical connections of all equipment in and on the panel. Diagrams shall include power and signal connections, UPS and normal power sources, all panel ancillary equipment, protective devices, wiring and wire numbers, and terminal blocks and numbering.

h. Point-to-point I/O wiring diagrams depicting wiring within the panel as well as connections to external devices. The diagram shall identify all device terminal points that the system connects to, including terminal points of equipment not supplied by the PCSI. Wiring labeling used on the Drawings shall match that shown on the contract documents and approved by the Owner/Engineer. Field device wiring shall include the device ISA-tag and a unique numeric identifier. The PLC I/O wiring shall be numbered with rack number, slot number, and point number. Two-wire and four-wire equipment shall be clearly identified, and power sources noted. Submit final wire numbering scheme for approval by the Owner/Engineer. Point-to-point drawings shall be 11x17 (inch) minimum in size.

i. Submit construction details, NEMA ratings, intrinsically safe barrier information, gas sealing recommendations, purging system details, etc. for panels located in hazardous locations or interfacing to equipment located in hazardous areas.

j. Heating and cooling calculations for each panel supplied indicating conformance with cooling requirements of the supplied equipment and environmental conditions. Calculations shall include the recommended type of equipment required for both heating and cooling.

k. Submit evidence that all control panels shall be constructed in conformance with UL 508 and bear the UL seal confirming the construction. Specify if UL compliance and seal application shall be accomplished at the fabrication location or by field inspection by UL inspectors. All costs associated with obtaining the UL seal and any inspections shall be borne by the Contractor and included in the contract.

l. Submit seismic calculations and anchoring requirements in conformance with Division 01.

m. Process Controller Memory Sizing Calculation:

   1) Submit memory sizing calculations for controller program memory, including additional memory beyond the memory available for process control applications. This includes scratch pad or “housekeeping” programs, additional overhead for programming formats, redundancy; and shall be included in the total memory sizing calculation. Submit calculations verifying that the total memory provided will be adequate for the specified requirements.

n. Power Supply Sizing Calculations

   1) Submit calculations to show compliance with specified power supply sizing requirements of the Specifications.

o. Battery Backup UPS Sizing and Runtime Calculations:

1) Submit functional line diagrams showing all major system components and external connection diagrams for all electrical equipment shall be submitted for review. A manufacturer's standard connection diagram or schematic showing more than one (1) scheme of connection will not be accepted, unless it is clearly marked to show the intended connections.
2) Submit calculations to show compliance with specified UPS capacity sizing and battery runtime requirements of the Specifications.
3) The report shall certify that the UPS will provide the required backup time at the specified UPS loading and UPS ambient temperature. The report shall include anticipated continuous electrical load calculations, backup time calculations, and shall indicate the battery end-voltage used in the analysis.

G. Detailed Control Narratives Submittal:
1. This submittal shall include all application programs developed to implement the control functions specified herein and within the contract documents.
2. The process control schemes shall be developed in accordance with the requirements defined in the Specifications. At a minimum, this submittal shall include the following:
a. A brief scope of the control function.
b. List of all scanned inputs to the control function.
c. A short narrative of the control strategy.
d. Any assumptions made in developing the program.
e. I/O database list showing all inputs and outputs (i.e., AI, DI, AO, DO), calculated points, and pseudo points associated with the control function.
f. PLC communication and hardware monitoring.
g. List of all operator inputs/outputs to and from the control function. A description of the operation of any panels shall be described as it relates to the control function.
h. All anticipated failure contingencies shall be described in detail.
i. All applications' programs shall be developed in a structured manner and shall follow an intuitive arrangement. Programs shall utilize standard program templates or subroutines for repetitive logic, such as equipment control, flow total calculations, and equipment runtime calculations. All applications' programs shall be submitted in 8.5-inch x 11-inch format. All programs shall be fully annotated throughout to facilitate diagnosis by instrumentation technicians with basic programming knowledge.
j. This submittal shall also include copies of the PLC I/O configuration tables and I/O reference usage table. In addition, any special switch settings or hardware configuration requirements, such as communications port configurations, shall be described in detail and submitted.

H. Process Graphics Submittal:
1. Submit all proposed graphic displays, trends, and logs to support the control strategy narratives.
2. Submitted graphic displays and trends shall be no less than 8.5-inch x 11-inch full-color

prints.

3. For the existing graphic screens, the modified graphics shall include a description of all the changes.
4. The quantity of graphic displays to be provided shall be as required to depict all monitoring and control requirements defined herein and in the contract documents. All processes and equipment shown on the Drawings shall be shown in a similar manner. The graphic displays shall represent all process flow paths and all associated equipment units, pumps, meters, valves, gates, feed systems, and auxiliary systems whether monitored or not.
5. Predefined trend displays shall be developed for easy recall using index display or standard display recall buttons. Predefined trends shall be developed for all analog inputs. Grouping of analog inputs shall be as defined by the Owner/Engineer. A maximum of eight (8) points shall be assigned to a trend.
6. For graphics that will be duplicated several times for similar equipment or purposes, submit a typical display for only the first equipment.
7. Each HMI process operation function, such as operation button and alarm acknowledgement functions, shall be configured with the proper security privileges to prevent unauthorized operation.

I. Controller Program Submittal:

1. Submit software logic and documentation for function block language used for the application engineering effort.
2. Program documentation shall include individual rung, network, and/or command descriptions with abundant comments to clearly identify function and intent of each code segment. The link between “coil” and “contact” shall be clearly presented, the function of each timer described, the purpose of each subroutine call labeled and defined, etc. Program documentation shall be sufficiently clear to allow determination of compliance with the process control requirements included in the Process Control Loop Descriptions.
3. The submittal shall demonstrate that all logic provided under this project follows the same structure and format and reflects a common programming approach. Any custom subroutines or function blocks shall be described in detail and include all inputs with allowable ranges, outputs, and internal logic of the block.
4. Submit details of control system communication. Submit hardware and software configuration information in sufficient detail to verify performance of the communication system as detailed herein and on the Drawings. Include descriptions of drivers and the impact of drivers on controller memory configuration. Any specific communication block memory addresses shall be defined.
5. Submit a memory usage report for the controller. This report shall indicate both used and unused memory addresses. Include constant and variable memory assignment records that tabulate area, location, number, and description of each numeric constant or variable stored in memory.
6. Submit method and logic for special housekeeping programs and routines including redundancy, clock synchronization, value scaling, alarm handling, archiving, etc. Submit information for all digital systems including controllers and HMI equipment.
7. Submit cross reference index of I/O allocation, controller memory address, HMI graphic

systems address, and HMI graphic screen where the I/O point will appear. Every physical I/O point as well as calculated or virtual I/O required for the implementation of the process scheme shall be included.

8. Make additional changes to the software configuration, beyond those identified in the initial draft submittal, based on comments during the factory and field tests and during the commissioning process as required.

J. Testing Plan Submittal:

1. The Testing Plan submittal shall include all the testing requirements in Section 40 61 21 – Process Control System Testing, for both the PCSI.
2. This submittal will outline the approach to testing the various components of the system to validate the HMI and PLC programming meets the requirements. In addition, sample test forms and procedures shall be included to allow the Owner/Engineer an opportunity to comment on format and content prior to the PCSI developing the detailed test procedures. Additional components of this submittal shall include test approval and punch list procedures.
3. Test Procedure Submittals: Submit the procedures proposed to be followed for each test. Procedures shall include test descriptions, forms, and checklists to be used to control and document the required tests. Include sign-off forms for each testing phase or loop with sign-off areas for the PCSI, Engineer, and Owner. Submit separate procedures for each test phase.
4. Test Documentation: Upon completion of each required test, document the test by submitting a copy of the signed-off test results. Testing shall not be considered complete until the signed-off test results have been submitted and favorably reviewed. Submittal of other test documentation, including “highlighted” wiring diagrams with field technician notes, are not acceptable substitutes for the formal test documentation.
5. Each loop shall have a Loop Status sign-off form to organize and track its inspection, adjustment, and calibration. These forms shall include the following information and check-off items:
    a. Project Name.
    b. Loop Number.
    c. Detailed test procedure indicating exactly how the loop will be tested, including all required test equipment, necessary terminal block numbers, and simulation techniques required.
    d. Tag Number for each component.
    e. Check-offs/sign-offs for each component.
        1) Tag/identification.
        2) Installation.
        3) Termination – Wiring.
        4) Termination – Tubing.
        5) Calibration/adjustment.
    f. Check-offs/sign-offs for the loop.

1) Panel interface terminations.
2) I/O interface terminations.
3) I/O signal operation.
4) Inputs/outputs operational: Received/sent, processed, adjusted.
5) Total loop operation.
6) Space for comments.
7) Sign-off and date fields for the Contractor, the Owner/Engineer, and the PCSI.

6. Each active analog subsystem element shall have a Component Calibration form. These forms shall have the following information, including space for data entry:
   a. Project Name.
   b. Loop Number.
   c. ISA Tag Number and I/O Module Address.
   d. Manufacturer.
   e. Model Number/Serial Number.
   f. Summary of Functional Requirements, for example:
      1) For Indicators: Scale ranges.
      2) For Transmitters/Converters: Scale and chart ranges.
      3) For Computing Elements: Function.
      4) For Controllers: Action (direct/reverse) control modes (PID).
      5) For Switching Elements: Unit range, differential (FIXED/ADJUSTABLE), reset (AUTO/MANUAL).
      6) For I/O Modules: Input or output.
   g. Calibrations, for example:
      1) For Analog Devices: Required and actual inputs and outputs at 0, 50, and 100 percent of span.
      2) For Discrete Devices: Required and actual trip points and reset points.
      3) For Controllers: Mode settings (PID).
      4) For I/O Modules: Required and actual inputs or outputs for 0, 50, and 100 percent of span.
   h. Space for comments.
   i. Sign-off and date fields for the Contractor, the Owner/Engineer, and the PCSI.
7. The Testing Plan submittal shall include all the testing requirements in Section 40 66 00 – Network and Communications Equipment.
   a. Outline the approach to completing the cable testing described in Network and Communications Equipment. At a minimum, include the following:
      1) Test equipment to be used.

2) Testing forms to be used with the following:

a) Parameters to be tested.

b) Test acceptance thresholds.

c) Circuit ID number (Cable Tag ID).

d) Overall pass/fail indication.

e) Date and time of test.

8. The Testing Plan submittal shall include all the testing requirements in Section 40 66 53 – Radio Equipment.

a. Outline the approach to completing the Link Acceptance Test (LAT) and Network Acceptance Test (NAT) described in Radio Equipment. At a minimum, include the following:

1) List of parameters to be tested and test acceptance thresholds.

2) Link Identification (access point – subscriber).

3) Overall pass/fail indication.

4) Date and time of test.

K. Training Plan Submittal

1. The Training Plan submittal shall include all the training requirements in Section 40 61 26 – Process Control System Training, for the PCSI.

2. This submittal shall provide an overview of the proposed PCSI training for the Owner's O&M staff. The training program shall be coordinated with the Owner's staff so that the schedule and content meet their needs. The approved submittal shall be used as the basis for development of training manuals that will be provided to all attendees.

3. Upon receipt of the Engineer's comments on the preliminary training plan, submit the specific proposed training plan. The training plan shall include:

a. Definitions, objectives, and target audience of each course.

b. Schedule of training courses including proposed dates, duration, and locations of each class.

c. Submit outlines of the specific training, resumes of trainers, prerequisite requirements for each class, and general samples of handouts for review.

d. Complete copy of all proposed handouts and training materials. Training information shall be bound and logically arranged with all materials reduced to a maximum size 11x17 (inch), then folded to 8.5x11 (inch) for inclusion into the binder.

L. Spares, Expendables, and Test Equipment Lists Submittal:

1. This submittal shall include for each Subsystem:

a. A list of, and descriptive literature for, spares, expendables, and test equipment as specified in Division 40.

b. A list of, and descriptive literature for, additional spares, expendables, and test equipment recommended by the manufacturer. The PCSI shall furnish all standard

recommended spare parts as indicated in the manufacturer's instruction manuals, for each component in the process control system.

c. Unit and total costs for the additional spare items specified or recommended for each subsystem.

M. Test Results:

1. As the tests listed in the table and described in the testing plan are completed, submit signed testing documentation.
   a. Submit test results for each of control system tests described in Section 40 61 21 – Process Control System Testing.
      1) Unwitnessed Factory Acceptance Test (UFAT).
      2) Unwitnessed Operational Readiness Test (UORT).
      3) Witnessed Operational Readiness Test (WORT).
      4) Functional Demonstration Test (FDT).
2. Network Cable Acceptance Test Results – include reports detailing cable acceptance testing specified in Section 40 66 00 – Network and Communication Equipment. Test reports shall include the following information for each Ethernet cabling element tested:
   a. Results of each testing criteria listed in Section 40 66 00 – Network and Communication Equipment Specification.
   b. Circuit ID number (Cable Tag ID).
   c. Overall pass/fail indication.
   d. Date and time of test.
   e. Contractor signature certifying that the test results are accurate and complete.
3. Radio Link Acceptance and Network Acceptance Test Results – Include reports detailing link and network acceptance testing specified in Section 40 66 53 – Radio Equipment. Test reports shall include the following information for each radio element tested:
   a. Results of each testing criteria listed in Section 40 66 53 – Radio Equipment.
   b. Link Identification (access point – subscriber).
   c. Overall pass/fail indication.
   d. Date and time of test.

N. Process Control System Operations and Maintenance (O&M) Manuals:

1. Submit in accordance with Section 01 78 23 – Operation and Maintenance Data. O&M manuals shall be provided in both hardcopy and electronic copy.
2. The O&M manuals shall include complete instruction books for each item of equipment and software furnished. Where instruction booklets cover more than one (1) specific model or range of device, product data sheets shall be included which indicate the device model number and other special features.
3. The O&M manuals shall, at a minimum, contain the following information:

a. Table of Contents shall be provided for the entire manual with the specific contents of each volume clearly listed. The complete Table of Contents shall appear in each volume.

b. Instrument and Equipment Lists

1) The instrument and equipment lists shall be developed in Microsoft Excel format and provided as a hardcopy in the O&M and electronically as part of the final PDF.

2) An instrument list for all devices supplied including tag number, description, Specification Section and paragraph number, manufacturer, model number, serial number, range, span, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.

3) An equipment list for all non-instrument devices supplied listing description, Specification Section and paragraph number, manufacturer, model number, serial number, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.

4) Certified calibration data for all flow metering devices.

5) Submit Factory calibration result for the instruments.

4. Equipment O&M Information:

a. Data sheets shall be provided for all field and non-field instrumentation devices. Provide a cover page for each device, piece of equipment, and original equipment manufacturer (OEM) software that lists date, specification number, product name, manufacturer, model number, location(s), and power required. Preferred format for the cover page is ISA-TR20.00.01-2001 (updated in 2004-2006), general data sheet; however, other formats are acceptable provided they contain all required information.

b. Vendor O&M documentation for each device, piece of equipment, or OEM software shall be either new documentation written specifically for this project or modified standard vendor documentation. All standard vendor documentation furnished shall have all portions that apply clearly, indicated with arrows, circles, or highlighted. All portions that do not apply shall be neatly lined out or crossed out. Groups of pages that do not apply at all to the specific model supplied shall be removed.

c. Any component requiring custom software configuration or dip switch settings, that information shall be included along with the corresponding data sheets and O&M information.

d. Provide the record documentation of the system audit as specified in Section 40 61 21 – Process Control System Testing. Include further test results described in the Test Results submittal requirements.

e. Include the calibration forms developed as specified in Section 40 61 21 – Process Control System Testing.

f. Include reports detailing network device configurations. Include all connections, addresses, and port assignments for each configured network device.

g. Include Optical Time Domain Reflectometer (OTDR) trace plots for all fiber optic cables.

5. Software O&M Information:
    a. All O&M procedures for the applications software and system configuration shall be furnished.
    b. All software applications, programs, and configuration files shall be provided on electronic media disks independent of computer hard disk files. Files shall be provided on machine-loadable media capable of being used by a technician to restore the installed software using the existing hardware and software programs.
    c. The manuals shall contain operating and maintenance data written specifically for this project.
    d. At a minimum, the following information shall be provided in the manuals.
        1) A comprehensive index.
        2) All documentation from previous submittals updated to reflect the as-built system.
        3) Detailed service, maintenance, and operation instructions for each item supplied, including procedures for backing up files and archiving historical data.
        4) List of personnel to be contacted for warranty and emergency services, including name, address, telephone number, pager or cell phone number, fax number, and email address.
        5) Printouts of every graphic display with all dynamic points referenced.
        6) Printouts of all configuration files.
        7) Printouts of all documented PLC programs.
        8) Electronic media disks containing all HMI, PLC, and other custom-configured files used on the Project.
        9) Final PID Loop Tuning Parameters for all associated control loops.
6. As-Built Drawings
    a. As-built drawings shall be complete and including all drawings and diagrams specified in this section. Drawings shall include all wiring, fabrication, and interconnection drawings for all the equipment the PCS is connected to, including terminal points of equipment not supplied by the PCSI.
    b. As built documentation shall include information from submittals, as described in this Specification and the other process control system specifications and be updated to reflect the as-built system. Errors in or modifications to the system resulting from the Factory and/or Functional Demonstration Tests shall be incorporated in this documentation.
7. Original Licensed Software
    a. Submit original software provided under this Contract. Submit original paper based and electronic documentation for all software provided.
    b. Submit license agreement information including serial numbers, license agreements, User Registration Numbers, and related information.
    c. Provide media in software sleeves within the O&M manual.
8. Control Panel Operations Narrative Manual:

a. Record documentation shall have a Control Panel Operations Narrative manual for every PLC control panel. Provide a hardcopy of each manual to be placed in its respective enclosure. The information to be included in this manual:

1) Describe the purpose of PLC.

2) Control Descriptions.

3) PLC Tag Info: A brief explanation of each tag and its function.

4) PLC Input/Output List.

5) Control Panel layout.

6) Control Panel Wiring Diagrams (including all the communications between the PLC modules and the terminal blocks).

7) Printout of the PLC Function Block codes of the PLC program.

8) Soft copies of the PLC code and configuration information.

9. Electronic O&M Information:

a. Provide an electronic version of all equipment manuals and data sheets, along with any software back-up of configuration files. Electronic documents shall be supplied in PDF format.

b. Provide electronic files for all custom-developed manuals including training manuals. Text shall be supplied in both Microsoft Office format and PDF format.

c. Provide electronic files for all drawings produced. Drawings shall be in AutoCAD ".dwg" format and in PDF format. Drawings shall be provided using the AutoCAD eTransmit feature to bind external references, pen/line styles, fonts, and the drawing files into individual zip files.

d. Each computer system hardware device shall be backed up onto DVD after Substantial Completion and shall be turned over to the Owner.

e. If specified in the training section, provide digital copies of all training videos. Videos shall be in a format that is readable by standard DVD players and by standard PC DVD drives. Format shall be a minimum of 1920 by 1080 pixels and shall include sound.

END OF SECTION

SECTION 40 61 21

PROCESS CONTROL SYSTEMS TESTING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the testing requirements for all process equipment, instruments, and devices that are monitored, controlled, or otherwise part of the Process Control System (PCS) and is detailed in the Contract Drawings and those specified in Section 40 61 13 – Process Control System General Provisions.

B. Testing of vendor supplied equipment connecting to the PCS shall adhere to the same testing requirements herein. The Project Control System Integrator (PCSI) shall coordinate with the vendor(s) for integration and testing of their equipment into the PCS.

C. The PCSI shall coordinate all testing activities with the Owner, Engineer, Contractor, all affected subcontractors, equipment suppliers, and vendors.

D. The PCSI shall provide all labor, materials, equipment, and incidentals required to complete all testing listed herein.

E. The PCSI shall perform all tests listed per testing requirements as specified herein.

1. Factory Testing
    1. Unwitnessed Factory Acceptance Test (UFAT).
2. Field Testing
    1. Unwitnessed Operational Readiness Test (UORT).
    2. Witnessed Operational Readiness Test (WORT).
    3. Functional Demonstration Test (FDT).
    4. Site Acceptance Test (SAT).

F. The PCSI shall provide to the Engineer certified calibration/recalibration (for existing Instruments) reports for field instruments and devices specified or shown on the Drawings immediately upon completion of calibration.

1. Receipt of any calibration/recalibration certificates shall in no way imply acceptance of any work or of instruments supplied.
2. Each calibration/recalibration certificate shall be signed and dated by an authorized representative of the PCSI. Completed certificates shall be submitted to the Engineer through the submittal process.
3. A typical instrument calibration certificate form is included at the end of this section.

1.02 TEST – GENERAL

A. The PCSI shall test all PCS equipment at the factory prior to shipping to the site. To the extent possible, all PCS equipment shall be tested as a single fully integrated system at the factory.

B. Each test shall be performed in the cause-and-effect format. The person administering the test shall initiate an input (cause) and, in which the system's or subsystem's produce the correct result (effect).

C. Whether explicitly stated on the test procedures, the Engineer reserves the right to test or retest all specified functions to determine compliance with the functional requirements. Additional testing by the Engineer to determine compliance with the specified requirements shall be performed at no additional cost to the Owner. The Engineer's decision shall be final regarding the acceptability and completeness of all testing.

D. Test using actual process variables, equipment, and data when possible. If it is not practical to test with actual process variables, equipment, and data, variables, equipment, and data shall be simulated.

E. The PCSI shall prepare and submit testing procedures to be approved by the Owner and Engineer that shall demonstrate the system conforms to the Specifications.

F. The PCSI shall notify the Engineer and Owner in writing at least 14 days before the proposed testing date.

G. If any test is concluded unsuccessfully, the test shall be repeated.

H. Equipment shall not be shipped to the project site until the Engineer and/or Owner has received all Factory Acceptance testing submittals and approved the system ready to ship in writing.

I. Correction of Deficiencies

1. Deficiencies in workmanship and/or items not meeting specified testing requirements shall be corrected to meet such requirements at no additional cost to the Owner.
2. Testing shall be repeated after correction of deficiencies are made until the test is deemed successful. This work shall be performed at no additional cost to the Owner.

1.03 RELATED WORK

A. Refer to Section 40 61 13 – Process Control System General Provisions.

B. Refer to Section 40 61 18 – Application Engineering Services.

1.04 SUBMITTALS

A. The PCSI shall submit all testing documents in one submittal. Testing documents shall include the following:

1. Testing Procedures
    1. Detailed procedures proposed to be followed for each test specified herein. The test procedures shall serve as the basis for the execution of the required tests to demonstrate that the PCS meets, and functions as specified.
    2. Sample test forms and procedures to be included to allow the Owner/Engineer an opportunity to comment on format and content prior to the PCSI developing the detailed test procedures.

3. Structure procedures in an orderly and easy to follow manner to facilitate an efficient and comprehensive test. Tests shall be in a cause-and-effect format.
4. Procedures shall include test descriptions, forms, and checklists to be used to control and document the required tests.
5. The PCSI shall include punch list forms with the test procedures to document issues that arise during the testing. Punchlist forms, at a minimum, shall include a specification cross reference; an issues description field; a resolution description field; and a sign-off area for the PCSI, Owner, and Engineer.
6. Indicate all pre-testing setup requirements, all required test equipment, and simulation techniques to be used.
7. Include the demonstration and validation under normal operating conditions and under various failure scenarios as specified in the contract documents.

2. Testing Status Sign Off forms
    1. Develop project specific Input/Output (I/O) Status and Automatic Control Strategy signoff forms to be used during factory and field testing to organize and track each loop's inspection, adjustment, calibration, configuration, and testing status and sign off. Include sign-off forms for each testing phase showing all loops with sign-off areas for the PCSI and the Owner/Engineer.
    2. Separate forms for factory and field testing can be used, or they can be combined, at the discretion of the PCSI.
    3. Testing Status signoff forms shall provide space to note any deficiencies and whether the test passed or failed.
    4. Example forms are shown in the Appendices.
3. Testing Documentation
    1. After completion of each required test, the signed Testing Status signoff forms shall be submitted to the Owner/Engineer within 10 days of completion of each test.
    2. Testing shall not be considered complete until the signed-off forms have been submitted and approved.
    3. Submittal of other test documentation, including "highlighted" wiring diagrams with field technician notes, are not acceptable substitutes for the formal test documentation.

B. Testing may not start until all testing submittals have been approved.

1.05 COST OF TRAVEL

A. Scheduled tests will only be attended once by the Owner and/or Engineer. If the test is not successful, all subsequent tests will be performed at the PCSI's expense.

B. The PCSI shall reimburse the Owner and Engineer for all labor and expenses incurred in connection with attending repeated test necessitated by system failure or inadequate preparation.

C. Reimbursement will go through the Owner with the Engineer invoicing the Owner for all expenditures associated with retesting.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. The PCSI shall conduct factory testing prior to equipment shipping to the project site.

B. The PCSI shall conduct field testing once all equipment and devices that makeup the PCS have been installed.

C. All tests shall be specifically addressed in the Test Procedure submittal.

D. All tests shall be recorded on the approved Test Status Signoff forms.

3.02 FACTORY TESTS

A. Unwitnessed Factory Acceptance Test (UFAT)

1. The purpose of the UFAT is for the PCSI to verify the functionality, performance, and stability of the system prior to the Engineer and/or Owner attending the Witnessed Factory Acceptance Testing (WFAT).
2. Temporary network connections will be required to confirm the network configuration. Temporary wiring of primary elements, final control elements, and field-mounted transmitters is not required.
3. All panels, consoles, and assemblies shall be inspected and tested to verify their conformance with related submittals, Specifications, and Drawings.
    1. All provided panels and enclosures shall undergo a thorough inspection to verify integrity of cabinet enclosures, frame structures, paint work, and finish, etc. Review panel drawings to ensure they accurately reflect panel layout and wiring.
    2. Perform a system audit to verify all components have been staged for testing and have been documented properly with correct model numbers, serial numbers, etc. The following audit documentation shall be provided at the WFAT and submitted as part of the Operations and Maintenance (O&M) Manual documentation:
        1) For each workstation and server, list all of the software installed (including the operating system), with software revision number, software improvement modules or patches installed, license number and owner registration information, warranty period, vendor and local distributor names and contacts.
        2) For each microprocessor-based component connected to control communication backbone in system (Programmable Logic Controllers (PLCs), managed switches, protocol converters, communication cards on final field devices, radios, etc.), list firmware revision, vendor and local distributor information, and system, warranty information, and configuration parameters (e.g., communication settings, fail position settings, etc.).
    3. The PCSI shall load, configure, and test any specialized virtual software on the computers, switches, and other equipment.

4. Application software shall be loaded on the PLCs and Human Machine Interface (HMI) computers and the entire system shall be tested. The test shall be conducted to verify readiness for the WFAT.
5. Panel wire pull tests shall be performed to ensure all wiring has been secured with appropriate torque to prevent wires from coming loose.
6. The Uninterruptible Power Supply (UPS) shall be tested to verify that the UPS switches power correctly while keeping all UPS powered loads online. Testing of the UPSs to determine if they have been sized correctly to maintain the specified runtime shall be performed during field testing.
7. A complete I/O point checkout shall be performed on all I/O to verify proper operation of input/output points from panel terminations to HMI and Operator Interface Terminal (OIT) nodes. All I/O include all wired spare points. I/O checkout shall be recorded on the Test Status Sign-Off form.
    1) Discrete Inputs – Points shall be jumpered at field terminal blocks in PLC panels to verify proper status in HMI and OIT nodes.
    2) Analog Inputs – Points shall be connected to a signal generator at field terminal blocks in PLC panels to verify proper status in HMI and OIT nodes. Signals shall be verified at zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of full scale.
    3) Discrete Outputs – Points shall be tested by manipulating the output from the HMI and OIT nodes. The signal shall be verified by connecting a digital multimeter to measure continuity at field terminal blocks.
    4) Analog Output – Points shall be tested by manipulating the analog output value at the HMI and OIT. The signal shall be verified by utilizing a digital multimeter to measure current or voltage generated at field terminal blocks. Signals shall be verified at zero percent, 25 percent, 50 percent, 75 percent, and 100 percent of full scale.
8. All control strategies shall be verified using simulation or other means to verify that all logic performs as expected. Verify faults and logical failure conditions for control strategies, such as instrument failures, equipment failures, loss of communication between HMI server and PLC, loss of peer-to-peer communication, out of range testing (over and under scale) for analog inputs, and all other strategies specified in Section 40 61 96 – Process Control Descriptions.
9. For each subpanel, inspection shall include, but not be limited to, I/O subsystem physical layout, power supply sizing and mounting, cable routing, wire runs across hinges properly installed, fans and blowers unobstructed and mounted to maximize air flow, power conditioning correctly installed, and the overall layout and installation of components meets the manufacturer's recommendations and standard industry accepted practices.

4. Upon successful completion of the UFAT, the PCSI shall submit a record copy of the UFAT Status Sign-Off form. Once the form is submitted, the PCSI shall notify the Engineer and Owner in writing that the system is ready for the WFAT. No other notice of the WFAT will be accepted. The Engineer and/or Owner shall schedule a test date within 30 days of receipt of this submittal.

3.03 FIELD TESTS

A. Unwitnessed Operational Readiness Test (UORT)

1. The purpose of the UORT is to check that process equipment, instrument installation, instrument calibration, instrument configuration, field wiring, control panels, and all other related system components are ready to monitor and control the processes. This test will determine if equipment is ready for operation.
2. This test shall take place after the installation of all PCS components and prior to the Functional Demonstration Test (FDT) and startup. Prior to starting this test, relevant process equipment shall be installed and mechanically tested, instruments installed, control panels installed, and field wiring complete.
3. The Unwitnessed ORT (UORT) shall be performed prior to the Witnessed ORT (WORT).
4. The ORT shall be conducted by the PCSI, Contractor, subcontractors, equipment vendors, and any others that are responsible for process equipment being monitored or controlled by and through the PCS.
5. All deficiencies found shall be corrected and retested by the PCSI prior to commencement of the FDT.
6. Required Documents for Test:
    1. Master copy of the PCSI developed field Testing Sign-Off forms.
    2. Testing Procedures.
    3. Calibration forms.
7. The PCSI shall maintain sign-off forms and calibration forms at the job site and make them available to the Engineer/Owner at any time.
8. The following tests shall be performed as part of the ORT:
    1. Instrument calibration, configuration, and set-up.
    2. I/O Testing from field device to PLC and to HMI/OITs.
    3. Testing of individual process control strategies.
9. Instrument calibration, configuration, and set-up.
    1. Calibrate, configure, and set-up all components and instruments to perform specified functions. This includes tuning all process equipment proportional integral derivative (PID) loops.
    2. Calibration Form
        1) The PCSI shall maintain a calibration form in field to document any component or instrument requiring dip switch settings, calibration, or custom configuration. These forms shall provide a summary of the actual settings used in the field to allow an Instrument technician to replace the device entirely and configure it to function as it did before.
        2) Calibration information shall be added to the Instrument Data Sheet and added to a copy of the manufacturer’s standard, “Configuration Sheet,” or a separate form shall be created.

a) If a separate form is used, the form shall list project name, loop number, ISA tag number, I/O module address, manufacturer, model number/serial number, output range, and calibrated value.

3) Required information shall include, but not be limited to:

a) Discrete Devices: Actual trip points and reset points.

b) Instruments: Any configuration or calibration settings entered into the instrument

c) Controllers: Mode settings (PID).

d) I/O Modules: Dip switch settings, module configuration (if not documented in native programming documentation).

4) Any device that allows configuration files to be backed up to a laptop, the PCSI shall make configuration files to be available to the Engineer and/or Owner for inspection. Submit backup files as part of the final system documentation.

10. I/O Testing

1. The PCSI in conjunction with the Contractor shall test all signals under process conditions. Each I/O shall be tested from the field device to the PLC terminal block and from the PLC to HMI/OIT. Simulation of I/O, such as jumpering inputs, will not be accepted unless authorized by the Engineer.

2. The following I/O tests shall be performed:

1) Discrete Input – At the device or instrument, change the signal condition from an inactive to active state. Observe the results on all indicators within the loop, such as HMI screens, OIT screens, pilot lights, horns, beacons, etc.

2) Analog Input – Test the analog signal over the entire engineering range at various intervals including 0% , 25%, 50%, 75%, and 100%as well as on the increasing and decreasing range. Observe results on all indicators within the loop, such as HMI screens, OIT screens, recorders, digital indicators, etc.

3) Discrete Output – Signals shall be tested by switching equipment to manual control at the HMI and OIT nodes and turning output on or using other means to turn output on, then verifying equipment responds accordingly.

4) Analog Output – Test analog signal over entire engineering range at various intervals including 0%, 25%, 50%, 75%, and 100% as well as on increasing and decreasing range by switching equipment to manual control at HMI and OIT nodes and manipulating the variable output, then verify equipment responds accordingly.

11. Testing of Automatic Control Strategies

1. All automatic control strategies shall be verified using actual process equipment and instruments, or other means, to verify logic performs as expected. Verify faults and logical failure scenarios for control strategies, such as instrument failures, equipment failures, loss of communication between the HMI server and PLC, loss of peer-to-peer communication, out of range testing for analog inputs, loss of power, and all other strategies specified in the control strategy document.

2. Repeat all systems' tests specified under factory testing.

3. The UPS shall be tested to verify UPS switches power correctly while keeping all UPS powered loads online. Test the UPS capacity by switching offline power to UPS and verify if they maintain specified runtime.
4. Panels modified by this Contract shall test the internal control panel temperature under full running conditions to ensure proper cooling/ventilation is being provided.
5. Upon successful completion of the UORT, the PCSI shall submit a record copy of test results and request scheduling of the WORT.

B. Witnessed Operational Readiness Test (WORT)

1. The purpose of the WORT is to check that process equipment, instrument installation, instrument calibration, instrument configuration, field wiring, control panels, and all other related system components are ready to monitor and control the processes. This test will determine if equipment is ready for operation.
2. Before scheduling the WORT, the PCSI shall determine through their own UORT and through their internal quality assurance program that the PCS is ready for the witnessed operational readiness testing by the Owner and Engineer.
3. The WORT shall follow all requirements listed for the UORT.
4. The PCSI shall submit to the Engineer the complete and signed Testing Status forms indicating that all tests have been completed and are ready for the Functional Demonstration Test (FDT).

C. Functional Demonstration Test (FDT)

1. The purpose of the FDT is to certify that the entire PCS is ready for operation by demonstrating each specified function on a paragraph-by-paragraph, loop-by-loop, and site-by-site basis. The FDT is to be witnessed by the Engineer and/or Owner.
2. The FDT shall be performed after successful completion of the ORT and individual process startup, and prior to the Site Acceptance Test (SAT). The FDT shall be completed in a single testing period. The testing period may span over several days.
3. Failure of 5% of I/O tested or more than one (1) hour of troubleshooting during the FDT will deem the test as unsuccessful and the FDT shall be rescheduled once the system is ready for retesting.
4. All testing shall be the same as specified under the ORT, except that the entire installed system shall be tested and all functions demonstrated using live field-based data to the greatest extent possible.
5. Required Documents for Test:
    1. Set of panel drawings and wiring diagrams from WFAT and ORT with corrections noted.
    2. A set of Contract Drawings and Specifications including addenda and change orders.
    3. Signed-off master copy of the PCSI developed field testing sign-off forms.
    4. Testing procedures.
    5. Copy of completed calibration forms.
    6. One (1) copy of all O&M Manuals for the PCSI supplied equipment.

6. The daily schedule during the FDT shall be as follows:
    1. Morning meeting to review the day's test schedule.
    2. Scheduled tests and sign-offs.
    3. End of day meeting to review the day's test results and to review or revise next day's test schedule.
    4. Unstructured testing period by the Engineer and/or Owner.
7. The system shall operate for 96 continuous hours without failure before this test shall be considered successful. The start of the continuous hours will commence after all testing has been completed.
8. Punch list items and resolutions noted during the test shall be documented on the Punch List/Resolution form. In the event of rejection of any part or function test procedure, the PCSI shall perform repairs, replacement, and/or retest within 10 days.
9. Upon successful completion of the FDT, the PCSI shall submit a record copy of test results to the Engineer and/or Owner as specified and request the scheduling of the SAT.

D. Site Acceptance Test (SAT)
1. The purpose of the SAT is to verify that the PCS is capable of functioning as specified and intended for an extended period and without major malfunctions.
2. The SAT duration shall be 30 consecutive days under full plant process operations. The SAT will be deemed successful if there are no major non-field-repairable malfunctions.
    1. Any malfunction which cannot be corrected within 24 hours of occurrence by the PCSI personnel, or more than two (2) similar failures of any duration, will be considered a non-field-repairable malfunction.
    2. Any malfunction during the SAT shall be analyzed and corrected by the PCSI. The Engineer and/or Owner will determine whether any such malfunctions are sufficiently serious to warrant a repeat of this test.
    3. In the event of any part or function of the SAT being rejected, the PCSI shall perform repairs or replacement within five (5) days of the event. Upon completion of repairs by the PCSI, the SAT will be restarted from the date which the PCSI successfully corrected the malfunction(s), and the Engineer and/or Owner have accepted and signed off on the repairs.
    4. Malfunctions shall include any logic sequencing that is not operating per the Specifications.
3. During the SAT plant operations, the PCSI shall be present and available to address any potential issues that may impact the overall system process.
    1. The PCSI shall provide personnel who have intimate knowledge of the system, its functionality, hardware, and software.
    2. When the PCSI personnel are not onsite, they shall be available by phone, with their phone number given to the Owner for immediate assistance. The PCSI personnel shall be able to be onsite within five (5) hours of a notification by the Owner.
4. While this test is proceeding, the Engineer and Owner shall have full use of the system. Only plant operating personnel shall be allowed to operate equipment associated with live plant processes. Plant operations shall remain the responsibility of the Owner, and the

plant operators' decisions regarding plant operations shall be final.

5. During the SAT, no software or hardware modifications shall be made to the system without prior approval from the Owner or Engineer.
6. Upon successful completion of the SAT and subsequent review and approval of complete system final documentation, the system shall be considered substantially complete, and the one-year warranty period shall commence.

E. Certificate of Installation

1. Following successful completion of the SAT, the PCSI shall submit a Certification of Installation to the Owner and Engineer. Certification shall state that the PCS installation has been completed in conformance with plans and Specifications. Certification shall be on the PCSI corporate letterhead and signed by an officer of the company.

END OF SECTION

CALIBRATION CERTIFICATE						
Instrument Name & Service						
Tag Number/Loop Number						
Instrument Location						
Manufacturer						
Model Number						
Adjustable Range						
Calibrated Range						
Remarks						
Installation Per Manufacturer's Requirements?			Yes		No	
Installation Per Contract Documents?			Yes		No	
If "No", explain						
Calibration Test:						
	Input (Units)		Output (Units)		Accuracy	
0%						
25%						
50%						
75%						
100%						
Switch Test	Switch Point Upscale		Switch Point Downscale		Setting Deadband	
Setpoint 1						
Setpoint 2						
Setpoint 3						
I hereby certify that the above information is correct and accurate, to the best of my knowledge, and that the instrument indicated above has been supplied, installed, calibrated, and tested in accordance with the manufacturer's recommendations and the Contract Documents, unless otherwise noted. Receipt of this Calibration Certification shall in no way imply acceptance of any work or instrument supplied as a part of this Contract.						
PCSI's Signature:				Date:		

SECTION 40 61 26

PROCESS CONTROL SYSTEMS TRAINING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the training requirements for process equipment, instruments, and devices that are monitored, controlled, or otherwise part of the Process Control System (PCS) and as detailed in the Contract Drawings and those specified in Section 40 61 13 – Process Control System General Provisions.

B. The Process Control System Integrator (PCSI) shall coordinate all training activities with the Owner, Engineer, Contractor, all affected subcontractors, equipment suppliers, and vendors.

C. The PCSI shall include training for equipment items not manufactured by the PCSI. This training shall be provided by an authorized manufacturer's representative as set forth within this section and related sections of the Specifications.

D. The training and instruction shall be directly related to the system being supplied.

E. The training program shall represent a comprehensive program covering all aspects of the Operations and Maintenance (O&M) of the system.

F. The PCSI shall conduct training courses for Owner personnel. Training shall be provided for the following, and as outlined under this Specification Section:

1. Instruments.
2. Process Control System Hardware.
3. Process Control System Software.
4. SCADA Network System.

G. Unused specified training courses/sessions shall be returned as a credit to the Contract.

1.02 TRAINING – GENERAL

A. Training Summary

1. The following training courses listed in the summary table shall, at a minimum, be provided:

Training Course Description	Minimum Course Duration (hours)	Maximum Number of Trainees per Course	Number of Times Course to be Given	Intended Audience
PCSI Onsite Training				
Installed Process Control System Training (PCSI)	1	2	1	Maintenance, Administrator
PLC Hardware and Software Training (PCSI)	1	2	1	Maintenance

Instruments PCSI Training (PCSI)	1	2	1	Maintenance
Instruments Training - Operator familiarity (PCSI)	1	2	1	Operations

2. Definitions of Audience Roles:
    a. Administrator – Personnel responsible for maintaining the Human Machine Interface (HMI)/Supervisory Control and Data Acquisition (SCADA) system.
    b. Maintenance – Personnel responsible for maintaining the field controller hardware and instrumentation system.
    c. Operations – Personnel responsible for daily plant operations.
    d. Management – Non-daily operations personnel.

B. The Owner shall select technicians, operators, engineers, and managers of the facility to be trained on new processes and equipment included within the project scope. The training courses shall address operation, maintenance, and troubleshooting of the system provided. The courses shall be designed specifically for the type of personnel attending, such as operators, engineers, etc.

C. The PCSI standard training courses may be used to meet the training objectives specified. Where standard courses do not meet these objectives, additional coursework shall be developed.
    1. Clock hour requirements for each level of training shall be as listed herein. A “clock hour” is defined as one (1) hour of instruction or supervised training exercise.
    2. Training hour requirements are the number of hours of training to be provided for each student. Additional training time shall be provided if considered necessary to meet the training objectives.

D. Training Instructors
    1. All onsite training shall be conducted by experienced instructors who are intimately familiar with the operation and control of the Owner’s facilities and with the specific system supplied.

E. Training Material
    1. Provide detailed training manuals to supplement the training courses. The manuals shall include specific details of equipment supplied and operations specific to the project. The manuals shall be provided in hardcopy for each student. Provide electronic copy of each training manual in PDF format for the Owner’s future use.
    2. The trainer shall make use of teaching aids, manuals, slide/video presentations, etc. After the training services, all training materials shall be delivered to the Owner.

F. Training Costs
    1. All costs associated with the manufacturer’s training sessions, including travel and lodging expenses for the Engineer and/or Owner, shall be the responsibility of the PCSI and shall be included in the Contract Price. Travel arrangements for the Engineer and/or Owner shall be via non-stop flights, originating and terminating to the closest airport to

the location where the training will be conducted. The PCSI shall also provide ground transportation between the airport, lodging accommodations, and the training facility for Engineer and/or Owner personnel.

G. Training Schedules

1. All training schedules shall be coordinated with and at the convenience of the Owner. Shift training may be required to correspond to the Owner's working schedule.

H. Lessons

1. Training lesson plans and other information shall be submitted at least 30 days prior to the start of training.

I. Video Recording

1. The Owner reserves the right to videotape all custom training sessions. All training tapes shall become the sole property of the Owner.
2. Pre-recorded videos of the PCSI's standard training programs may be substituted if they cover the same topics and are developed for the same versions of hardware and software, subject to prior approval by the Owner.
3. Furnishing videos of standard training programs shall not relieve the PCSI from any of the training requirements specified herein.

1.03 RELATED WORK

A. Refer to Section 40 61 13 – Process Control System General Provisions.

1.04 SUBMITTALS

A. Training Plan Submittal

1. The PCSI shall provide proposed lesson plans or outlines for all training courses specified herein. Training submittals shall include:
   a. Course objectives and target audience.
   b. Proposed schedule including proposed dates, duration, and location.
   c. Resumes of trainers, including instructors' qualifications and experience
   d. Prerequisite requirements for each class.
   e. Samples of handouts for review.
2. Complete copies of all proposed handouts and training materials. Training information shall be bound and logically arranged with all materials reduced to a maximum size of 11 inch by 17 inch, then Z-folded to 8.5 inch by 11 inch for inclusion into the binder.
3. Refer to Section 40 61 13 – Process Control System General Provisions for the submittal order.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 ONSITE TRAINING

A. Training personnel shall be intimately familiar with the control system equipment, its manipulation, and configuration. Training personnel shall command knowledge of system debugging, program modification, troubleshooting, maintenance procedure, system operation, and programming, and shall be capable of transferring this knowledge in an orderly fashion to technically oriented personnel.

B. Installed Process Control System Training

1. Provide training for the Owner's personnel in the functionality, maintenance, and troubleshooting of the installed control system. The training shall be held before the WORT, but not more than two (2) months before.
2. Training and instruction shall be specific to the system that is being supplied.
3. Training shall consist of classroom instructions and hands-on instruction utilizing the Owner's system.
4. Detailed training shall be provided on the actual configuration and implementation for this Contract. Training shall cover all aspects of the system that will allow the Owner's personnel to maintain, modify, troubleshoot, and develop future additions/deletions to the system. The training shall cover the following subjects, at a minimum:
    a. System overview.
    b. System hardware components and specific equipment arrangements.
    c. Periodic maintenance.
    d. Troubleshooting and diagnosis.
    e. Network configuration, communications, and operation.
    f. TCP/IP addressing procedures for all Ethernet devices.

C. PLC Hardware and Software

1. Provide training for the Owner's personnel in the operation, maintenance, troubleshooting, etc. of the PLC hardware and software system. The training shall be held before the WORT, but not more than two (2) months before.
2. Training and instruction shall be specific to the system that is being supplied.
3. Training shall consist of classroom instructions and hands-on instruction utilizing the Owner's system.
4. Detailed training shall be provided on the actual configuration and implementation for this Contract. Training shall cover all aspects of the PLC system that will allow the Owner's personnel to maintain, modify, troubleshoot, and develop future additions/deletions to the PLC system. The training shall cover the following subjects, at a minimum:
    a. PLC system overview.

b. PLC system architecture.

c. PLC system hardware components and specific equipment arrangements.

d. PLC system startup, shut down, load, backup, and PLC failure recovery.

e. Periodic maintenance.

f. Troubleshooting and diagnosis down to the I/O card level.

g. PLC configuration, communications, and operation.

D. Instrument PCSI Training

1. Provide instruction on the maintenance of the field and panel instrumentation for the Owner's instrumentation technicians. This training shall be conducted before the WORT, but no more than one (1) month before and at a time suitable to the Owner. This training shall take place at the Owner's facility. At a minimum, the following shall be included:

a. Training in standard hardware maintenance for the instruments provided.

b. Specific training for the actual instrumentation configuration to provide a detailed understanding of how the equipment and components are arranged, connected, and set up for this Contract.

c. Test, adjustment, and calibration procedures.

d. Troubleshooting and diagnosis.

e. Periodic maintenance.

E. Instruments – Operator Familiarity

1. Provide operator level instruction on the use of the field and panel instrumentation for the Owner's operations staff. This training shall be conducted before the 30-day Site Acceptance Test (SAT), but no more than one (1) month before and at a time suitable to the Owner. This training shall take place at the Owner's facility. Include hands on demonstration of the information each transmitter indicates, and the method used to retrieve any operator information from the transmitter, including use of pushbuttons and interpretation of international graphic symbols used on the instruments.

F. Network System Training

1. Provide instruction on the maintenance and administration of the network system for the plant personnel including Owner's network technicians. This training shall be conducted before the WORT, but no more than one (1) month before and at a time suitable to the Owner. This training shall take place at the Owner's facility. At a minimum, the following shall be included:

a. Network Setup and Configuration

1) Hardware system types, architecture layout, physical connections, and locations.

2) General switch and router configurations.

3) IP Addressing.

4) Security configurations.

5) Routing, VLAN, and other configurations.

b. Network Maintenance and Administration
   1) Routine maintenance.
      a) System backups.
      b) System restoration.
      c) Firmware and patch updates.
   2) Network Administration.
      a) Software and hardware tools.
      b) Addition or removal of network connections.
      c) Troubleshooting.
   3) Repair and replacement of equipment.

END OF SECTION

SECTION 40 61 93

PROCESS CONTROL SYSTEM INPUT/OUTPUT LIST

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the Process Control System (PCS) Input/Output (I/O) List for the controller. The list is intended to reflect the signals that serve as the basis of the application to be programmed by the ASP (Applications Services Provider) who is furnishing the process monitoring and control functionality specified within this Division or as indicated on the Drawings.

B. Equipment and services provided under this section shall be subject to all Associated Sections listed below.

C. This section shall be used and referenced only in conjunction with the PCS sections.

D. This section supplements the PCS section. I/O data is indicated on the Drawings or the I/O List.

1.02 ASSOCIATED SECTIONS

This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 13	Process Control System General Provisions
40 61 18	Application Engineering Services
40 61 96	Process Control Descriptions

1.03 SUBMITTALS

A. Submittals shall be in accordance with the PCS General Provisions and Applications Engineering Services (AES) sections.

1.04 CONTROLLER INPUT/OUTPUT TAGS

A. For consistency between the field and Programmable Logic Controller (PLC)/Human Machine Interface (HMI) tag names, the same tag naming convention used for instrument or equipment tags, including sequence loop numbers, shall be used for the PLC/HMI tag numbering.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.01 GENERAL

A. The PCS I/O List is based on the contract documents and included within the tables attached to this section. The ASP shall follow standards to complete the I/O list submittal as described

in the PCS General Provisions and AES sections.

B. The power source originates either from within the PLC or I/O enclosure.

3.02 INPUT/OUTPUT LIST

A. The Input/Output List is included to provide further details and requirements for the PLC/HMI programming. The PCS I/O List:

1. Summarizes the minimum physical signal requirements of the control loops represented in the contract documents. Provide additional soft signals as required to fully implement the functionality described in these contract documents.
2. Does not show all hardware and software necessary to perform all control functions specified herein and as shown on the Drawings. The PCSI shall provide all hardware and software necessary to provide a complete and working system.
3. Is not intended to be an inclusive listing of all elements and appurtenances required to execute the loop functions. It is intended to supplement and complement the Drawings and other Specification Sections. The design I/O List shall not be considered equal to the exact field wired I/O.

B. The I/O list includes the following information:

1. Item: An arbitrary sequential number that is for reference only.
2. Controller ID.: Controller identification is a sequential number for a given type within a specific controller (PLC or Remote Terminal Unit (RTU)).
3. IO Type: The identifier of the type of I/O signal, including:
   a. AI: Analog Input.
   b. AO: Analog Output.
   c. DI: Discrete Input.
   d. DO: Discrete Output.
   e. PI: Pulse Input or accumulator Type Input.
   f. EAI: Ethernet Analog Input.
   g. EDI: Ethernet Discrete Input.
4. Field Device: Tag number of the instrument or equipment identifier associated with the I/O point.
5. Loop No.: Numeric (or alphanumeric) loop designation for the instrument or equipment.
6. I/O Tagging Suffix: Multi-letter designation to uniquely identify the PLC/HMI tags. Suffixes will be per the International Society of Automation (ISA) Standards and the Owner's guidelines.
7. I/O Tag No.: The identifier assigned to the instrument or equipment that performs a function in the control system. Tag naming shall follow the ISA tag numbering and the Owner’s guidelines.
8. Service Description: A description of the function of an instrument or equipment that includes signal source and control function (i.e. Filter 1 Loss-of-Head).

9. IO Range: Engineering Range or State – The range in engineering units corresponding to an analog signal or scalable variable (LO/HI), or the text description corresponding to each state of a discrete point (ON/OFF).
10. Engineering Unit (EU): The Engineering Range associated with the analog I/O or scalable variable.
11. Alarm Information: This column includes alarm limits to be verified by the programmer during startup and commissioning. This includes the following information:
    a. Alarm/Event (designation of the data point as an Alarm or an Event).
    b. HI HI: High-High Alarm Limit (If applicable).
    c. HI: High Alarm Limit (If applicable).
    d. LO LO: Low-Low Alarm Limit (If applicable).
    e. LO: Low Alarm Limit (If applicable).
12. Historical Information: Points to be placed into Historian.
    a. Update Rate (sec): Rate that a data point is collected by the Historian. These rates shall be finalized by the Owner during the project construction phase.
    b. Historical Logging: This column indicates whether a data point is to be historized.
13. Analog Data:
    a. Signal Type: This will typically be 4-20mA, but could also be 1-5Vdc, RTD, or Network Protocols (i.e. Ethernet/IP, Modbus TCP, Modbus RTU, FLD-BUS, Profibus DP or PA, serial, HART, or similar) to indicate the signal type of the associated input or output.
    b. Power: This will typically be “2-wire” for devices that are loop powered from the PLC enclosure, “3-wire” for combination loop-powered and externally powered devices, or “4-wire” for devices that are powered from external power supplies, unless noted otherwise.
14. Discrete Data:
    a. Signal Type: This will be 120VAC, 24VDC, or similar to indicate the signal type of the associated input or output.
    b. Closed State: This will indicate the state of the input or output when it is considered to be closed or energized (normal, alarm, running, failed, etc.).
    c. Interposing Relay: This will be either ‘Yes’ or ‘No’ to indicate whether the input or output requires an interposing relay. Relays are typically required to isolate external voltage sources. See Specifications for additional details.
15. Drawing/Piping and Instrumentation Diagram (P&ID) No.: This is the drawing number of the drawing or P&ID where the device is shown.
16. Remarks: This column may include a cross reference to another Specification Section where applicable, or to a note which provides additional information.

END OF SECTION

Item	Controller ID	IO Type	Field Device	Loop Number	I/O TAGGING SUFFIX	I/O TAG No.	Service Description	I/O Range HI / ON	I/O Range LO / OFF	Engineering Unit	ALARM / EVENT	Alarm HI HI	Alarm HI	Alarm LO	Alarm LO LO	Historical Information Update Rate (sec)	Historical Logging	Analog Signal Type	Analog Power Type	Discrete Signal Type	Discrete Close State	Discrete Interposing Relay	Drawing/P&ID No.	Remarks
1	PLC-100	AI	LIT	110	LI	LIT_110_LI	LIFT STATION WETWELL LEVEL	15	0	FEET	EVENT	X	X	X	X	1	Y	4-20mA	2-WIRE	N/A	N/A	N/A		
2	PLC-100	EDI	RAD	100	XA	RAD_100_XA	LIFT STATION COMMUNICATION LOST	ALARM	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	NO COMM.	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION FROM RA
3	PLC-100	DI	LSHH	110	LAHH	LSHH_110_LAHH	LIFT STATION WETWELL HIGH-HIGH LEVEL	ALARM	NORMAL	N/A	ALARM	X	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	LEVEL HIGH	N/A		
4	PLC-100	DI	LSH	110	LWCO	LSH_110_LWCO	LIFT STATION WETWELL LOW WATER CUTOFF	ALARM	NORMAL	N/A	ALARM	N/A	N/A	N/A	X	1	Y	N/A	N/A	120VAC	LEVEL LOW	N/A		
5	PLC-100	EDI	VFD	101	Y	VFD_101_Y	LIFT PUMP NO. 1 IN-AUTO	AUTO	NOT AUTO	N/A	EVENT	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	IN-AUTO	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
6	PLC-100	EDI	VFD	101	YIR	VFD_101_YIR	LIFT PUMP NO. 1 RUNNING	RUNNING	OFF	N/A	EVENT	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	RUNNING	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
7	PLC-100	EDI	VFD	101	XA	VFD_101_XA	LIFT PUMP NO. 1 MOTOR FAIL	FAIL	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	MOTOR FAIL	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
8	PLC-100	EDI	VFD	101	UA	VFD_101_UA	LIFT PUMP NO. 1 VFD FAULT	FAULT	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	VFD FAULT	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
9	PLC-100	EDO	VFD	101	UCR	VFD_101_UCR	LIFT PUMP NO. 1 RUN COMMAND	RUN CMD	STOP CMD	N/A	EVENT	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	RUN CMD	YES		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
10	PLC-100	EAI	VFD	101	FDBK	VFD_101_FDBK	LIFT PUMP NO. 1 SPEED FEEDBACK	100	0	%	EVENT	N/A	N/A	N/A	N/A	1	Y	ETHERNET/IP	N/A	N/A	N/A	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
11	PLC-100	EAO	VFD	101	SC	VFD_101_SC	LIFT PUMP NO. 1 SPEED SETPOINT	100	0	%	EVENT	N/A	N/A	N/A	N/A	1	Y	ETHERNET/IP	N/A	N/A	N/A	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
12	PLC-100	DI	TSH	101	TAH	TSH_101_TAH	LIFT PUMP NO. 1 MOTOR TEMPERATURE HIGH	HIGH	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	TEMP HIGH	N/A		
13	PLC-100	DI	MSH	101	MAH	MSH_101_MAH	LIFT PUMP NO. 1 SEAL LEAK	LEAK	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	LEAK	N/A		
14	PLC-100	EDI	VFD	102	Y	VFD_102_Y	LIFT PUMP NO. 2 IN-AUTO	AUTO	NOT AUTO	N/A	EVENT	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	IN-AUTO	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
15	PLC-100	EDI	VFD	102	YIR	VFD_102_YIR	LIFT PUMP NO. 2 RUNNING	RUNNING	OFF	N/A	EVENT	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	RUNNING	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
16	PLC-100	EDI	VFD	102	XA	VFD_102_XA	LIFT PUMP NO. 2 MOTOR FAIL	FAIL	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	MOTOR FAIL	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
17	PLC-100	EDI	VFD	102	UA	VFD_102_UA	LIFT PUMP NO. 2 VFD FAULT	FAULT	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	VFD FAULT	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
18	PLC-100	EDO	VFD	102	UCR	VFD_102_UCR	LIFT PUMP NO. 2 RUN COMMAND	RUN CMD	STOP CMD	N/A	EVENT	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	N/A	RUN CMD	YES		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
19	PLC-100	EAI	VFD	102	FDBK	VFD_102_FDBK	LIFT PUMP NO. 2 SPEED FEEDBACK	100	0	%	EVENT	N/A	N/A	N/A	N/A	1	Y	ETHERNET/IP	N/A	N/A	N/A	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
20	PLC-100	EAO	VFD	102	SC	VFD_102_SC	LIFT PUMP NO. 2 SPEED SETPOINT	100	0	%	EVENT	N/A	N/A	N/A	N/A	1	Y	ETHERNET/IP	N/A	N/A	N/A	N/A		SIGNALS TO COMMUNICATE VIA CAT6 CONNECTION
21	PLC-100	DI	TSH	102	TAH	TSH_102_TAH	LIFT PUMP NO. 2 MOTOR TEMPERATURE HIGH	HIGH	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	TEMP HIGH	N/A		
22	PLC-100	DI	MSH	102	MAH	MSH_102_MAH	LIFT PUMP NO. 2 SEAL LEAK	LEAK	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	LEAK	N/A		
23	PLC-100	DI	PSH	120	PAH	PSH_120_PAH	LIFT STATION DISCHARGE PIPELINE HIGH PRESSURE	HIGH	NORMAL	N/A	ALARM	N/A	X	N/A	N/A	1	Y	N/A	N/A	120VAC	PRESS HIGH	N/A		
24	PLC-100	EAI	FIT	120	FI	FIT_120_FI	LIFT STATION EFFLUENT FLOW	2100	0	GPM	EVENT	N/A	N/A	N/A	N/A	1	Y	ETHERNET/IP	2-WIRE	N/A	N/A	N/A		SIGNAL TO COMMUNICATE VIA CAT6 CONNECTION
25	PLC-100	AI	PIT	120	PI	PIT_120_PI	LIFT STATION DISCHARGE PRESSURE	100	0	PSIG	EVENT	N/A	N/A	N/A	N/A	1	Y	4-20mA	2-WIRE	N/A	N/A	N/A		
26	PLC-100	DI	ZSO	100	ZAO	ZSO_100_ZAO	TELEMETRY PANEL FRONT DOOR OPENED	OPENED	CLOSED	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	DOOR OPENED	N/A		
27	PLC-100	DI	LCP	100A	JA	LCP_100A_JA	TELEMETRY PANEL AC POWER FAIL	FAIL	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	FAIL	N/A		
28	PLC-100	DI	LCP	100B	JA	LCP_100B_JA	TELEMETRY PANEL DC POWER FAIL	FAIL	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	FAIL	N/A		
29	PLC-100	DI	UPS	100C	JA	UPS_100C_JA	TELEMETRY PANEL UPS LOW BATT.	LOW BATT	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	LOW BATT	N/A		
30	PLC-100	DI	GEN	200	YI	GEN_200_YI	GENERATOR IN AUTO	IN AUTO	NOT IN AUTO	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	IN AUTO	N/A		
31	PLC-100	DI	GEN	200	YIR	GEN_200_YIR	GENERATOR RUNNING	RUNNING	STOPPED	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	RUNNING	N/A		
32	PLC-100	DI	GEN	200	YAS	GEN_200_YAS	GENERATOR E-STOP	E-STOP	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	E-STOP	N/A		
33	PLC-100	DI	GEN	200	UA	GEN_200_UA	GENERATOR FAULT	FAULT	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	FAULT	N/A		
34	PLC-100	DI	GEN	200	TAH	GEN_200_TAH	GENERATOR HIGH TEMPERATURE	HIGH TEMP	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	HIGH TEMP	N/A		
35	PLC-100	DI	GEN	200	LAL	GEN_200_LAL	GENERATOR LOW FUEL LEVEL	LOW LEVEL	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	LOW LEVEL	N/A		
36	PLC-100	DI	ATS	200A	JI	ATS_200A_JI	ATS - UTILITY POWER	NORMAL	GEN	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	NORMAL	N/A		
37	PLC-100	DI	ATS	200B	JI	ATS_200B_JI	ATS - GEN POWER	GEN	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	GEN	N/A		
38	PLC-100	DI	ATS	200	YA	ATS_200_YA	ATS - FAIL	FAIL	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	FAIL	N/A		
39	PLC-100	DO	ATS	200	UCR	ATS_200_UCR	ATS - RUN COMMAND	RUN CMD	NORMAL	N/A	ALARM	N/A	N/A	N/A	N/A	1	Y	N/A	N/A	120VAC	RUN CMD	N/A		

SECTION 40 61 96

PROCESS CONTROL DESCRIPTIONS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Specification Section provides general control loop requirements for the programming of the Process Control System (PCS) by the Process Control Integrator.

B. These descriptions are intended to provide an overview of the operating concept of the plant process equipment rather than describing in detail every operating feature or interlock.

C. All Process Control System Programmable Logic Controller (PLC) programming and Operator Interface Terminal (OIT) or Operator Workstation Station (OWS) graphics and programming shall be performed as defined herein.

1.02 ASSOCIATED SECTIONS

A. This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 13	Process Control System General Provisions
40 61 18	Process Control System Submittals
40 61 93	Process Control System Input/Output List

1.03 SUBMITTALS

A. Refer to Section 01 33 00 – Submittal Procedures for general submittal requirements.

B. Refer to Section 40 61 20 – Process Control System Submittals for the specific submittal requirements.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Control descriptions are provided for each process area and are attached at the end of this section. The following is a list of attached sections that have detailed control descriptions for each process area. The list shows the specification attachment number and process area with accompanying process number.

Spec No.	**Area Name**	**Area Number**
40 61 96-01	City of Chelan Lift Station No. 1	100
40 61 96-02	Backup Generator Unit - Chelan LS	200

B. The control descriptions are organized in the following format:

1. General
    a. Process Area.
    b. Process Overview.
    c. Associated Equipment.
    d. Associated Instruments.
    e. Associated PLC.
    f. Associated Control Panels.
    g. Associated Piping and Instrumentation Diagrams (P&IDs).
2. Controller Programming
    a. Control Modes.
    b. Software Permissives.
    c. Hardwired Interlocks.
    d. Calculated Alarms and Variables.
    e. Power Failure.
3. System Configuration
    a. Status.
    b. Setpoints.
    c. Trending.
    d. Alarms.
    e. Human Machine Interface (HMI) Requirements.
4. Alarm Management.

3.02 GENERAL CONTROL CRITERIA

A. General configuration and programming tasks are required for system PLCs. Each PLC may have several occurrences of each of these tasks or may not have any occurrences of some or all of these tasks.

B. The Input/Output (I/O) lists in Section 40 61 93.01 – Input/Output List and detailed equipment control descriptions included in the attachments of this section shall be referenced to determine the requirements for each PLC.

C. All alarm and control setpoints shall be adjustable by the Operator at the HMI unless specifically stated otherwise, even if not shown on the Drawings.

D. HMI computers shall function as a monitoring system, not as a controller, for the process equipment. The computer shall download setpoints and other information to the PLCs, and the PLCs shall perform all control algorithms, so a temporary failure of any HMI computer will not disrupt plant control.

E. Rack and module definitions for each PLC, as well as the PLC communications'

configuration, shall be completely configured to allow proper addressing of all field connected I/O points. This shall include configuration of any Remote Input/Output (RIO) racks.

F. The PLC database will include both field I/O points and internally generated points required for programming. All field I/O points and internal programming points shall be fully defined according to database naming conventions approved by the Owner. At a minimum, each database point shall be provided with a tag name, engineering unit, alarm parameters, and description.

G. All PLC-generated process alarms, equipment statuses, and process variable values shall be available at any operator workstation.

H. Failure of a PLC shall result in safe shutdown of associated process equipment. Interposing relays shall be provided where required to ensure that equipment will revert to its fail-safe condition. Failure of any PLC or its communication shall be alarmed on the HMI computer.

3.03 EQUIPMENT CONTROL AND CONTROL MODE OVERVIEW

A. The control descriptions correspond to the P&ID control hierarchical layers shown as process area, field panels, PLC, and Supervisory Control and Data Acquisition (SCADA).

B. The control descriptions consist of four (4) control modes. There may be one (1) or more mode per loop depending on the process and associated equipment. Control modes consist of the following:

1. Local Manual Control – This is the lowest layer of control and is typically located either in the process area located near the equipment or in the field panels at an equipment's control panel or Motor Control Center (MCC).

2. Local Auto Control – This layer of control is typically located in the field panels at the equipment's control panel or MCC, either by hardwired relay logic or process specific PLCs. This control is most commonly used in batch processes or vendor supplied systems.

3. Remote Manual Control – This layer of control is typically provided at the OIT/HMI. This control allows operators to manipulate process equipment remotely. Commands issued at the OIT/HMI are sent to the PLC where signals are generated to process equipment for control and monitoring.

4. Remote Auto Control – The highest layer of control is done by the process control system PLC. In remote auto, operators typically enter a control setpoint at an OIT/HMI. Process instrumentation provides feedback signals to the PLC. The PLC is programmed to take the setpoints and feedback signals and to manipulate process equipment according to a specific algorithm. Any functions done in the operator workstations also take place at all the SCADA OITs.

C. Descriptions for local control are included in the detailed equipment control descriptions. They are provided primarily for documentation purposes and for information. These controls are provided by the equipment vendors and require no programming effort with the exception of process interfacing, such as setpoint adjustments, etc.

D. Descriptions for remote control are included in the detailed equipment control descriptions

and are to be used by the Process Control System Integrator (PCSI) to program algorithms for process equipment control.

3.04 PLC PROGRAMMING FUNCTIONAL REQUIREMENTS

A. The following covers functional requirements of the software, which are generic and may or may not be related to any specific control loop.

B. Analog Scaling

1. Each analog input and output will be appropriately scaled for use in internal PLC programming, monitoring by the HMI computers, or transmission to other PLCs.
2. Requirements for raw count values shall be coordinated with the Operator interface software to ensure compatibility.

C. Flow Totalization:

1. Every reading that monitors the flow of the main water flow needs to be totalized daily.
   a. Only values with a good value status are totalized.
   b. All flow totals will be maintained in millions of gallons (MG) for MGD rates.
   c. Flow rates and flow totals shall be indicated and recorded at the HMI.
2. Running Total
   a. The running total starts at the beginning of the day and totalizes the volume throughout the day.
   b. At the end of the day, it resets that total and starts over.
   c. Before the total is reset, it is stored for examination throughout the next day. Therefore, the flow total consists of two (2) values: the previous day's total and the total for the current day since midnight.
      1) For example: The total reading is calculated by integrating the minutely average of the MGD readings every minute. The minutely average needs to be scaled to millions of gallons per minute before it is totalized. While MGD units are used in this example, flow totalization may be for other volumetric flow units, such as gallons per minute (gpm), standard cubic feet per minute (scfm), etc.
   d. The PCSI shall provide flow totalization in the base units of the flow signal being totalized, unless stated otherwise in the specifications.
   e. Flow shall not be totalized:
      1) When a valve is closed or a pump is not running, the flow totalizer shall not accumulate values caused by noise or errors in calibration.
      2) If the analog signal is outside the 4-20 mA range.
      3) If the value of the flow input is less than 2 percent of the full range of the input.

$$MG_{Daily} = \sum_{1}^{1440} \frac{MGD_{MinAvg}}{60Min * 24Hours}$$

3. Each flow totalization shall come with a reset button on the HMI screen.

D. Equipment Runtimes and Starts

1. To support routine maintenance functions, all motorized equipment (pumps, motors, motorized gates, etc.) whose “run” status is monitored by a PLC, will have their runtime and number of starts accumulated by the respective PLC.
    a. The runtime procedure will monitor the status of the equipment “run” contact and when the equipment is running, increment a software timer that maintains equipment runtime to within a one-minute resolution.
    b. The timer shall stop incrementing, but not reset, when the “run” contact indicates that the equipment is not running.
    c. The timer value shall increment an hour counter that maintains an integer value representing the equipment runtime in hours.
    d. The counter value shall be available for display on the HMI computer.
2. Both the runtime and number of starts will continue to be collected until reset by an operator with permissions at the supervisor level and above. When reset, both values will be set to zero, and the date/time when it was reset will be noted. A manual reset of the runtime value shall be available at the HMI.
3. Two runtime parameters shall be provided for equipment:
    a. Accumulated Runtime – Accumulates for the life of the equipment.
    b. Resettable Runtime – Runtime with reset capabilities.

E. Equipment Availability

1. Remote Switch Monitoring
    a. In general, equipment with PLC control has been provided with a local selector switch that transfers control to the PLC.
    b. The PLC shall monitor the position of this switch to determine if the equipment is available for PLC control.
    c. If the equipment is not available, the PLC program shall not attempt to implement remote manual or automatic status changes for the equipment.
    d. The PLC program may, however, need to implement special routines if equipment unavailability affects a sequence (as described in the detailed equipment descriptions).
2. Equipment Out Of Service tag (OOS) Command
    a. All controllable equipment is provided with the ability to have an operational tag applied to it.
    b. Upon receiving an Out Of Service tag command from the Operator, the control logic will inhibit all remote controls of the equipment.

F. Power Faults and Maintained Outputs

1. The use of maintained control outputs to equipment should be evaluated to determine whether contacts need to be de-energized upon power loss, so equipment does not automatically energize upon restoration of power, and if any startup sequencing is needed. Utilize plant power monitoring systems to determine when utility power is lost

and restored.

G. Maintained/Momentary Outputs

1. The need for maintained or momentary control outputs shall be determined from the I/O listing and the electrical schematics.
2. In general, equipment with only one (1) control output indicated in the I/O list shall be programmed for a maintained control output.
3. Equipment with two (2) (or more) control outputs shall be programmed for momentary outputs.
4. Provisions shall be made, in either case, to remove the active state (start, open, forward, initiate, etc.) control output when an equipment failure is sensed or when the equipment transitions from available to unavailable (local switch change).

H. Control Mode Transition:

1. Equipment Failures
   a. Unless otherwise indicated in the equipment control descriptions, equipment in automatic mode shall be transitioned to manual mode (and stopped) if the equipment fails or becomes unavailable or if the PLC processor resets.
2. Manual/Auto Bumpless Transfer
   a. Programming at the PLC shall be such that switching between manual and automatic control modes results in a smooth (bumpless) transition without upsetting the process or inadvertently changing equipment states.
   b. Equipment running in local manual mode shall be tracked by the PLC code such that the PLC maintains the running status and speed setpoint when switching the equipment's Hand-Off-Auto (or Local-Remote) switch from Hand to Auto (or Local to Remote).
   c. When switching equipment directly into an automatic proportional integral derivative (PID) or sequence type control function, the PLC shall use the tracking values (running status and speed) as initial values.
3. Equipment running or stopped in automatic mode shall remain running or stopped when manual mode is selected.
4. Peer-to-Peer Communications
5. If equipment tracking is via peer-to-peer communications (rather than hardwired interface) and the communications link goes down, the PLC shall be programmed to re-verify equipment running and speed status before allowing the switch to remote control mode.
6. This is intended to prevent PLC code from inadvertently shutting down equipment when communications are restored.

I. PID Tuning Parameters:

1. All tuning parameters for each PLC software PID controller are entered at the HMI.
2. Tuning trends are provided to tune and monitor each PID operation.
3. Tuning parameters' settings are password protected.

3.05 ALARM CRITERIA

A. Preclusion logic shall be added to all applicable alarms. This logic will prevent secondary alarms that are a direct result of a primary alarm from being annunciated. For example, station power failure should not cause a circuit breaker-tripped alarm to be annunciated.

B. All software adjustable alarm setpoints accessible from the HMI shall have adjustable deadbands unless specifically noted otherwise.

C. Plant personnel must acknowledge all alarms before they can be cleared. No alarm shall clear automatically until it has been acknowledged.

D. Command Fault (Discrepancy) and Failure Alarms:

1. For all controlled devices, such as pumps, valves, etc., if the device is commanded to Start or Stop (or Open or Close) by the PLC and the device feedback state does not match the commanded state within a pre-set time, a Command Fault Alarm is generated by the PLC for display and alarming at the HMI (valves shall remain in the last state).
2. If a duty pump, or system, is commanded to start and does not start within the pre-set time, an alarm shall be generated by the PLC for display and alarming at the HMI and the standby pump shall start without operator intervention.
3. If a device feedback state does not match the commanded state at any time, excluding the change of state described above, an Uncommanded Change of State Alarm is generated by the PLC for display and alarming at the HMI (valves shall remain in the last state).
4. After a Command Fault Alarm occurs, the device cannot be started again until the Operator at the HMI has issued a Reset. All controlled devices with feedback shall generate Failure alarms at the PLC for display and alarming at the associated process graphic displays, even if not shown on the Drawings.
5. All motors shall be programmed so that if a motor stops for any reason, it shall not be re-started automatically once the problem with the motor has been resolved.
    a. The start command on the HMI shall not be a maintained contact but a momentary command to the PLC. The run status signals of all motors shall seal in the control output to the motor once the momentary start command drops out.
    b. The run confirmations shall be on a five (5) second timer delay in that if the run confirmation is not present after five (5) seconds, the contact output to the motor from the PLC shall drop out. Thus, the only way a motor can be restarted after five (5) seconds by the SCADA system is if the Operator reinitiates the start command for that motor on the HMI or when that motor control at the HMI is placed in complete automatic mode and the SCADA OWS, through logic/interlocks, requests the motor to run.

E. Analog Alarms:

1. All analog alarms shall be generated at the HMI level as follows, with the exceptions of bad value processing and deviation alarms.
    a. If the analog point’s value exceeds or drops below the alarm limit value and set time delay has been passed, then an alarm shall be generated at the HMI for display and alarming.

b. To eliminate excessive alarm reporting, the analog point shall remain in alarm until the analog point's value returns beyond the limit set by the analog limit deadband.

2. All process analog inputs are displayed, historically collected, and trended. Low-low, low, high, and high-high alarms shall be calculated at the PLC for display and alarming.
   a. Nuisance alarms, such as low turbidity, shall be inhibited.
   b. When a valve is closed or a pump is not running, the analog flow signal associated with that valve or pump shall not generate a low flow alarm, and it shall be forced to a zero value.
3. When an analog signal deviates outside the normal 4–20 mA operating range due to instrument malfunction, wiring fault, or PLC input card failure, the control system shall treat the condition as an instrument failure state. The fail response (fail-high or fail-low) shall be determined during detailed design based on process safety requirements, instrument function, and Owner operational standards.
   a. Upon detection of an out-of-range analog signal, the following control system actions shall occur:
      1) Alarm the signal at any local OITs and in the HMI system.
      2) If the analog signal is associated with a control loop or ratio control loop, that loop shall go into manual.
      3) If the analog signal is used in a calculation, that calculation shall use the last good analog signal. The computer shall place the control loop in manual if using the calculation.
   b. The final failure strategy shall be coordinated with the process design intent to ensure safe, stable, and predictable plant operation during instrument failure conditions.
4. Manual Override:
   a. This capability is implemented within the PLC controller. Since scaling is processed at the controller, the manual override value (operator entered at the HMI) will be in engineering units, not raw counts. When a point is placed in manual override mode, the point's associated data quality is forced to be "Good" as well. Providing this capability in the controller allows the rest of the logic to operate in the manual override mode.
5. Data Quality
   a. A key attribute of every analog input is its associated data quality. This is a simple Boolean value that indicates whether the analog reading can be trusted. The value is reset when the value is good, and it is set when it is bad. There are several checks done on the value before it is declared as "Good."
6. Bad Value Processing:
   a. If the value is not in Manual Override, then the raw value needs to be processed further before it is converted into its engineering units.
   b. Check to ensure the raw reading is within the limits of the instrument. These limits are specified on an individual point basis.
      1) Normally, the limits need to check over or under-range (open-loop) values, such as the raw count readings for 3-21mA on a 4-20mA instrument.

2) Depending upon the process being monitored, it may require the range to be narrowed further. For example, a temperature instrument may have a range from 0 degrees F to 200 degrees F. If the process being measured is water temperature, then the readings should never get outside 40 degrees F to 100 degrees F.

3) By specifying this set of limits, any reading outside this range would indicate an instrument problem.

4) If the raw reading is outside these limits, the point's data quality would be set to "Bad."

5) The controller will not maintain the last good reading; values will be presented as processed by the controller.

7. Deviation Alarms:

a. For all variable speed pumps, if the pump is commanded to run at a specific speed and the speed feedback signal deviates from the commanded speed by a pre-set deadband (initially set for 5%) for a pre-set time period (initially set for 30-seconds), a Speed Deviation alarm is generated by the PLC for display and alarming at the HMI.

b. For all modulating valves, if the valve is commanded to a specific position, and the position feedback signal deviates from the requested position by a pre-set deadband (initially set for 5%) for a pre-set time period (initially set for 30-seconds), a Position Deviation alarm is generated by the PLC for display and alarming at the HMI.

c. For all controlled setpoints (i.e., level, flow, etc.), if a process is requested to a specific setpoint, and the control variable feedback signal deviates from the requested setpoint by a pre-set deadband (initially set for 5%) for a pre-set time period (initially set for 30-seconds), a Setpoint Deviation alarm is generated by the PLC for display and alarming at the HMI.

F. Communication Alarms:

1. Provide specific communication status(es) for all Peer-to-Peer data communications. Upon a Peer-to-Peer communication failure, a communication failure alarm shall be generated at each PLC for display and alarming at the HMI. This communication failure alarm shall also be utilized for the associated control strategy.

END OF SECTION

SECTION 40 61 96.01

CC-1 LIFT STATION REHABILITATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Specification Section provides detailed control loop descriptions for the programming of the Process Control System (PCS) by the Applications Services Provider (ASP).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. City of Chelan – Lift Station No. 1 – Area 100

B. Process Overview

1. The lift station will operate using an automatic level-based duplex pump control strategy with integral VFDs. Submersible pump start/stop and speed control will be controlled by wet well level setpoints from a primary level transmitter, with float switches provided as redundant backup controls. The system will utilize a lead-lag configuration with automatic alternation, allowing one pump to operate under normal conditions and both pumps to run during high-level events.
2. Critical alarms such as wet well high level and pump overload will be monitored locally and transmitted to the City's SCADA system via radio telemetry for remote supervision. Pump runtime will be tracked for maintenance purposes, and operation will be maintained during power outages through automatic transfer to standby generator power, with provision for portable generator connection for additional reliability.

C. Associated Equipment

	Equipment Service Description	Equipment Tag Numbers
1.	Submersible Pump No. 1	PMP-101
2.	Submersible Pump No. 2	PMP-102

D. Associated Instruments

	Instrument Service Description	Instrument Tag Number
1.	Wet well Level transmitter	LE/LT-110
2.	High-High Level Alarm	LSHH-110
3.	High Level Float - Lag Pump	LSH-110
4.	Medium Level Float - Lead Pump	LSM-110
5.	Low level Stop	LSL-110
6.	Low Low-Level Cutoff (Protection)	LLSL-110

7. Force Main Effluent Flow Meter FE/FIT-120
8. High Discharge Effluent Pressure Switch PSH-120
9. Force Main Effluent Pressure Transmitter PIT-120

E. Associated Programmable Logic Controller (PLC)

1. PLC-100

F. Associated Control Panels

1. LCP-100

G. Associated Piping and Instrumentation Diagrams (P&IDs)

1. I-003

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. When the H/O/A selector switch is in the HAND position, the pump shall operate under local control from the VFD. The operator shall be able to start/stop and adjust pump speed from the VFD interface at the pump control panel.
2. Switching the H/O/A selector to OFF shall immediately stop the pump.

B. Local Automatic Control Mode

1. Upon wet well level transmitter failure or invalid signal, pump operation shall automatically transfer to backup float-based control to maintain operation and prevent overflow.
2. The **High-High Level float** shall initiate operation of all available pumps.
3. The **Low-Level float** shall stop pumps in sequence.
4. The **Mid-Level float** shall initiate lead pump operation.
5. The **High-Level float** shall initiate lag pump operation.
6. The **Low-Low Level float** shall provide pump shutdown protection to prevent dry run conditions.
7. **High-High** and **Low-Low** float switches shall be hardwired to both the PLC and MCC/VFD control circuit to provide alarm indication and independent protective shutdown.
8. Upon restoration and validation of the level transmitter signal, the operator shall manually reset the control system to return to normal PLC-based automatic operation.

C. Remote Manual Control Mode

1. When the H/O/A selector switch is in the AUTO position, the operator shall be able to control the pump from the SCADA system.
2. A software AUTO/MANUAL selector shall be provided at SCADA HMI.
3. When the SCADA control mode is set to MANUAL, the operator shall be able to

start/stop the pump and adjust speed remotely via SCADA.

4. All commands shall be subject to permissives and interlocks.

D. Remote Automatic Control Mode

1. When the H/O/A selector switch is in AUTO, and the SCADA control mode is set to AUTO, the PLC shall control pump operation based on wet well level.

2. Lead–Lag Operation

a. Pumps shall operate in a lead–lag configuration.

b. Lead pump assignment shall be selectable as:

- Manual selection by operator, or
- Automatic alternation based on accumulated runtime.

3. Pump Start Logic

a. The lead pump shall start when wet well level rises above the start setpoint and remains above the setpoint for an adjustable time delay (initially 60 seconds).

b. The lag pump shall start when:

- The lead pump reaches its maximum operating speed, AND
- This condition persists for an adjustable delay (initially 120 seconds).

4. Multi-Pump Speed Control

a. Upon initiation of a lag pump start, the lag pump shall ramp up to its minimum operating speed while the running pump remains at its maximum operating speed.

b. After the lag pump reaches minimum operating speed, both pumps shall be released to operate at a common speed as determined by the PID level controller.

5. Level Control

a. The PLC shall regulate pump speed to maintain the wet well level at the defined setpoint.

b. Speed limits shall be configurable and verified during startup and commissioning.

6. Pump Stop Logic

a. Pumps shall stop in reverse lead–lag order as wet well level decreases.

b. A pump shall be stopped when:

- The level falls below the stop setpoint, AND
- The condition persists for an adjustable delay (initially 120 seconds).

E. Software Permissives

1. None

F. Hardwired Interlocks

1. LSLL-110 Low Wet well Level Cutoff (shutoff all pumps)
2. MSH-101 Pump Leak Detected will shut down the pump.

3. TSH-101 High Temp. will shut down the pump.
4. MSH-102 Pump Leak Detected will shut down the pump.
5. TSH-102 High Temp. will shut down the pump.
6. PSH-120 High Discharge Pressure will shut down both pumps

G. Calculated Alarms and Variables
   1. None

H. Power Failure
   1. Control shall resume with the control mode established prior to the power failure.

3.03 SYSTEM CONFIGURATION

A. Status
   1. The Human Machine Interface (HMI) shall indicate the following statuses at a minimum:
      a. PLC Heartbeat.
      b. Level meter.
      c. Flow meter.
      d. Discharge Pressure Transmitter.
      e. Pump Running (Typ. of 2)
      f. Pump In Auto (Typ. of 2)

B. Alarms
   1. The HMI shall indicate the following alarms at a minimum:
      a. PLC Panel AC Power fails.
      b. PLC Panel DC Power fails.
      c. Low Water Level Cutoff.
      d. Hi-Hi Level.
      e. High Discharge Pressure.
      f. Communication Loss.
      g. Panel Door Opened.
      h. Power on UPS.
      i. UPS Fails.
      j. Motor Fail. (Typ. of 2)
      k. VFD Fault. (Typ. of 2)
      l. High Temperature. (Typ. of 2)
      m. Seal Fail. (Typ. of 2)

C. Setpoints

1. The HMI shall include the following setpoints at a minimum:
   a. Wet Well Level Pump Start setpoint. (Typ. of 2)
   b. Wet Well Level Pump Stop setpoint. (Typ. of 2)

D. Trending

1. All PLC inputs, outputs, and setpoints shall be recorded for trending at the HMI.

E. HMI Requirements

1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owner's current HMI Standards and Conventions.

END OF SECTION

SECTION 40 61 96.02

BACK-UP GENERATOR AND ATS UNITS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Specification Section provides detailed control loop descriptions for the programming of the Process Control System (PCS) by the Applications Services Provider (ASP).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 GENERAL

A. Emergency Standby Generator Unit for Wagner Facilities.

B. Process Overview

1. A continuous electrical power supply is provided to the Pump Stations by the Utility Service Company.
2. The primary objective of the Standby Generator Control System is to maintain continuous and reliable operation of critical equipment at City of Chelan - Lift Station No.1 during utility power outages or electrical supply failures.

C. Associated Equipment

	Equipment Service Description	Equipment Tag Numbers
1.	Stand by Generator Unit	GEN-200
2.	Automatic Transfer Switch	ATS-200

D. Associated Instruments

	Instrument Service Description	Instrument Tag Number
1.	As per the vendor supplied control system	

E. Associated Programmable Logic Controller (PLC)

1. PLC-100

F. Associated Control Panels

1. GEN-200 Control Panel
2. LCP-200 Telemetry Panel

G. Associated Piping and Instrumentation Diagrams (P&IDs)

1. I004

3.02 CONTROLLER PROGRAMMING

A. Local Manual Control Mode

1. Only for maintenance or test purposes the generator can be started locally

B. Local Automatic Control Mode

1. The ATS continuously monitors the incoming utility power supply. Upon detection of a utility power failure, the ATS initiates the standby generator start sequence.
    a. The Generator Control Panel supervises the startup sequence to ensure a smooth transfer to generator power.
    b. The standby generator is set to start automatically within 60 seconds of a power outage.
    c. Once the generator is in operation, the control system shall monitor generator performance parameters, including voltage, frequency, and active alarms or abnormal conditions.
    d. When utility power is restored, the ATS shall automatically transfer the load back to the utility source and initiate the generator cooldown and shutdown sequence.
2. The generator shall automatically start and operate for a minimum of 30 minutes on a weekly basis for exercise purposes.

C. Remote Manual Control Mode

1. None

D. Remote Automatic Control Mode

1. None

E. Software Permissives

1. As per the vendor supplied control system.

F. Hardwired Interlocks

1. As per the vendor supplied control system.
2. ATS-200 - No Utility Power

G. Calculated Alarms and Variables

1. None.

H. Power Failure

1. Power failure does not apply for this equipment.

3.03 SYSTEM CONFIGURATION

A. Status

1. The Human Machine Interface (HMI) shall indicate the following statuses at a minimum:
    a. Generator in AUTO.
    b. Generator Running.

c. ATS in Utility Power.

B. Alarms

1. The HMI shall indicate the following alarms at a minimum:

a. Generator Emergency Stop

b. Generator Common Fault.

c. Generator High Cooling Temperature.

d. Fuel Tank Low Level.

e. ATS in Generator Power.

C. Setpoints

1. The HMI shall include the following setpoints at a minimum:

a. None

D. Trending

1. All PLC inputs, outputs, and setpoints shall be recorded for trending at the HMI.

E. HMI Requirements

1. Equipment and instrumentation shall be depicted on the HMI screen. Displays shall be per the Owner’s current HMI Standards and Conventions.

END SECTION

SECTION 40 63 43

PROGRAMMABLE LOGIC CONTROLLERS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This Section includes Programmable Logic Controllers (PLCs) and associated input/output (I/O) hardware for control of process equipment with field instrumentation.

B. The Drawings or PLC Schedule indicate the required PLC hardware for each project location. Furnish the minimum quantities shown; however, provide additional hardware if necessary to complete the installation, accommodate space limitations, or address unforeseen field conditions.

1.02 ASSOCIATED SECTIONS

A. This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 13	Process Control System General Provisions
40 61 18	Application Engineering Services

1.03 SUBMITTALS

A. Submittals shall be per 40 61 13 – Process Control System General Provisions and 40 61 20 – Process Control System Submittals.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications

1. A qualified manufacturer shall be capable of providing training, parts, and coordination of emergency maintenance and repairs.
2. The manufacturer shall have a local office within one hundred (100) miles of the jobsite or have technicians available on-site within four hours of emergency notification.
3. The manufacturer shall have a local full-time staff of employees that have developed and commissioned a minimum of three (3) new Allen Bradley-based systems within the past 12 months. The manufacturer must have a minimum of five (5) years' experience designing, installing, and commissioning SCADA systems.
4. The manufacturer shall have a minimum of three (3) full-time employees qualified to perform the SCADA system work.

B. The manufacturer of this equipment shall have produced similar equipment for a minimum of five (5) years. When requested by the OWNER/ENGINEER, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

C. The programmable controller and all the corresponding components within the family of controller products shall be manufactured by a company who regularly manufactures and services this type of equipment.

D. The manufacturer shall comply with ISO 9001 standards for "Quality Systems – Model for Quality Assurance in Design/Development, Production, Installation, and Servicing".

E. The manufacturer shall provide complete technical support for all the products. This shall include factory or on-site training, regional application centers, local or factory technical assistance, and a 24/7/365 technical support phone service.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery, storage and shipping shall be per 40 61 13 – Process Control System General Provisions.

1.06 NOMENCLATURE AND IDENTIFICATION DEFINITIONS

A. AI: Analog Input.

B. AO: Analog Output.

C. Fixed I/O: A PLC style consisting of a fixed number of I/O, a processor, and a power supply all in one enclosure. Some fixed PLCs have limited expansion ability.

D. CPU: Central Processing Unit.

E. DI: Discrete Input.

F. Distributed I/O: Hardware specially designed to function as Remote I/O.

G. DO: Discrete Output.

H. HMI: Human-Machine Interface.

I. I/O: Input and/or Output.

J. Master/Slave: Communication between devices in which one device, the master, controls all communications. The other devices, the slaves, respond only when queried by the master. Typically used in a Remote I/O application.

K. Modular I/O: A PLC style consisting of cards that are assembled to comprise a complete unit. All I/O, CPU, and Power Supply are dedicated cards. Typically, these cards are inserted into a chassis.

L. Peer-to-Peer: Communication between two or more devices, typically PLCs, in which each device can control the communication exchange.

M. PID: Control action, proportional plus integral plus derivative.

N. PLC: Programmable Logic Controller.

O. Remote I/O: I/O that is located remotely from the processor. Remote I/O can communicate over a variety of communication protocols and can use standard rack based I/O, or special Remote I/O hardware referred to as Distributed I/O.

P. SCADA: Supervisory Control and Data Acquisition.

1.07 WARRANTY

A. Provide warranty per Section 01 78 36 – Warranties and as specified herein.

B. The manufacturer shall warrant the equipment to be free from defects in material and workmanship for two years from the date of acceptance of the equipment containing the items specified in this Section. Within such period of warranty, the manufacturer shall promptly furnish all material and labor necessary to return the equipment to new operating condition. Any warranty work requiring shipping or transporting of the equipment shall be performed by the CONTRACTOR at no expense to the OWNER.

1.08 SPARE PARTS

A. All spare parts shall be packaged to prevent damage during long-term storage. Identify all packages with indelible markings on the exterior describing contents.

B. Provide complete ordering information including manufacturer, part number, part name, hardware and software revision levels, and equipment for which the part is to be used.

C. The following PLC spare parts shall be furnished at a minimum:

1. Processors: Provide one spare processor unit(s) for each unique processor installed.
2. Memory Cards: Provide spares for each type of card installed.
3. I/O Cards: Provide spares for each unique I/O module type installed. Provide two spares, or 10% of installed quantity, whichever is greater.
4. Network Interface, Remote I/O, and Communication Modules: Provide one spare communication module for each unique communication module installed.
5. Specialty Modules: Provide, as a minimum, a spare of each type of module identified. Provide an additional spare for every ten (10) modules of a specific type installed.
6. PLC Power Supplies: Provide one spare power supply for each unique power supply installed.
7. Chassis: Provide spare chassis for each unique chassis installed.
8. Fixed PLCs: Provide spares for each unique type of PLC installed.
9. Miscellaneous Components (including cables): Provide spares for each unique component installed.

1.09 SPARE I/O AND SLOTS

A. Refer to Section 40 61 93 Input/Output List for summaries of I/O type quantities for each PLC.

B. Each panel containing PLC I/O shall include at least 20 percent (minimum of four) spare

points of each type (AI, AO, DI, and DO) for future use, regardless of whether any of those point types are used in that panel or not. The spares shall be the same type of I/O modules supplied.

C. For chassis-based PLC systems, provide at least two spare slots for the addition of future I/O in each chassis provided. For non-chassis-based PLC systems, provide adequate space to the right of the last I/O card in each row of I/O cards for at least two future I/O cards (width should be based on the widest I/O card provided in the panel).

D. Spare output points that require the use of an external relay shall be supplied with the external relay.

E. All installed unused points on all I/O modules shall be wired to terminal blocks in the order that they occur on the I/O modules. Unwired spares shall not be acceptable.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable.

1. Programmable Logic Controller
    a. Allen Bradly CompactLogix 5069-L310ER.
2. Operator Interface Terminal
    a. Allen-Bradley PanelView Plus 7 series.
    b. No equal.

2.02 GENERAL

A. Provide PLC equipment with the required memory and functional capacity to perform the specified sequence of operation with the scheduled input and output points.

B. PLC systems shall include processors, memory cards, power supplies, input/output modules, communication modules, redundancy modules, and remote interface modules as required to satisfy project requirements.

1. Provide memory cards for all PLC CPUs provided on this project.

C. Furnish products listed and classified by Underwriters Laboratories (UL), Canadian Standards Association (CSA), or Factory Mutual (FM) approval as suitable for the purpose specified and indicated.

D. All equipment and devices furnished hereunder shall be designed for continuous industrial service. The system shall contain products of a single manufacturer, insofar as possible, and shall consist of equipment models that are currently in production.

E. The PLCs shall communicate between the HMI Server and field-mounted transducers, switches, controllers, and process actuators. Communications protocol shall be completely

transparent to process operators at the HMI.

F. All equipment furnished shall be designed and constructed so that in the event of power interruption the systems shall go through an orderly shutdown with no loss of memory and resume normal operation without manually resetting when power is restored.

G. The PLC shall be capable of stand-alone operation in the event of failure of the communication link to the HMI subsystem.

H. Remote Input/Output Units shall include input/output modules, interface modules, communication modules, and power supply to meet system input and output requirements.

I. Agency and Environmental Specifications

1. Electrical supply voltage to the PLC shall be 120 VAC, ±15 percent, 48-63Hz. PLC system power supplies shall be fused for overload protection.
2. Vibration: 3.5 mm Peak-to-Peak, 5-9Hz: 1.0G, 9-150\Hz. The method of testing is to be based upon IEC 68-2-6 and JIS C 0911 standards for vibration. The system is to be operational during and after testing. Vibration Rating of 2.0G maximum peak acceleration for 10 to 500Hz in accordance with at least one of the following:
    a. Installed Rating
        1) DIN rail mounted PLC: 10-57 Hz, amplitude 0.075 mm, acceleration 25-100 Hz.
        2) Panel- or plate-mounted PLC: 2-25 Hz, amplitude 1.6 mm, acceleration 25-200 Hz.
    b. In compliance with IEC 60068 and IEC 61131.
3. Shock: 15G, 11msec. The method of testing is to be based upon IEC 68-2-27 and JIS C 0912 standards for shock. The system is to be operational during and after testing.
4. Temperature: All PLC hardware shall operate at an ambient temperature of 0° to 55°C (32° to 140°F) with a storage ambient temperature rating of -25° to 70°C (-40° to 185°F).
5. Relative Humidity: The Programmable Controller hardware shall function continuously in the relative humidity range of 30 to 95 percent non-condensing.
6. Noise Immunity: The Programmable Controller system shall be designed and tested to operate in the high electrical noise environment of an industrial plant as governed by the following regulations: IEEE 472, IEC 801, MILSTD 461B, IEC 255-4, NEMA ICS 2-230.40, and ANSI/IEEE C-37.90A-1978.
7. Altitude
    a. Operation: 0-6,500 feet.
    b. Storage: 0-9,800 feet.
8. Degree of protection: NEMA 1 (IP20).
9. All products shall have corrosion protection.

J. All major assemblies and sub-assemblies, circuit boards, and devices shall be identified using permanent labels or markings indicating:

1. Modules product type such as analog or digital.

2. Modules catalog number.
3. Modules major revision number.
4. Modules minor revision number.
5. Modules manufacturer vendor.
6. Modules serial number.

K. All necessary cables shall be included. All cables and connectors shall be as specified by the manufacturer. Cables shall be assembled and installed per the manufacturer's recommendations.

2.03 CENTRAL PROCESSING UNIT (CPU)

A. The CPU shall be, at a minimum, a 16–bit microprocessor that provides system timing and is responsible for scheduling I/O updates with no user programming required to ensure discrete or analog update. It shall execute user relay ladder logic programs, communicate with intelligent I/O modules, and perform on-line diagnostics. The CPU shall consist of a single module which solves application logic, stores the application program, store numerical values related to the application processes and logic, and interface to the I/O.

B. The CPU shall sample all the discrete and analog inputs and outputs, including internal coils and registers, and service special function modules every scan. The CPU shall process the I/O with user program(s) stored in memory, then control the outputs based on the results of the logic operation.

C. Supply the CPU with a battery-backed time of day clock and calendar.

D. The CPU family shall allow for user program transportability from one CPU model to another.

E. The CPU shall contain a minimum of 8MB memory for functional capacity (logic programming). Calculations should be done by the PCSI to ensure the CPU contains enough memory to meet I/O, scan rate, and usage requirements.

F. Diagnostics

1. The CPU shall perform on-line diagnostics that monitor the internal operation of the PLC. If a failure is detected, the CPU shall initiate system shutdown and fail-over. The following, at a minimum, shall be monitored: memory failure, memory battery low, general fault, communications port failure, scan time over run, I/O failure, and analog or special function I/O module failure.
2. All diagnostic information shall be accessible to the host communications interfaces and to the PLC program.
3. The PLC shall have indicators and onboard status area to indicate the following conditions:
   a. CPU run.
   b. CPU error or fault.
   c. I/O failure or configuration fault.

d. Status of Battery or back-up power module.

e. Communications indicator.

G. Memory

1. The user program and data shall be contained in non-volatile battery backed memory of type CMOS RAM program memory or equivalent. CPUs shall be provided with maximum available memory for logic programming storage, including on-board CPU memory and provision of available separate memory card modules.

2. Memory Backup System: Lithium battery backup or equivalent capable of retaining all memory for a minimum of three months and a Flash memory system capable of reloading program in the event of memory loss.

   a. Backup Storage: The backup battery or module shall be capable of being replaced without disrupting memory integrity. Provide a visual indication of low battery voltage or module error and an alarm bit in the PLC program.

   b. SD Memory Card: Memory card storage capacity shall be greater than the processor memory capacity. Memory cards shall be installed in processors for factory testing.

   c. Flash Memory: Upon power loss, the PLC shall transfer internal memory to flash memory before the PLC powers down.

3. The operator should be able to backup volatile memory, including data and program logic, onto a personal computer storage disk.

4. The operating system shall be contained in non-volatile firmware. The memory containing the operating system shall be field updateable via a separate update tool.

H. Programming Environment

1. Programming port: The PLC shall utilize a serial USB or Ethernet port for programming.

2. On-Line programming: Application programs may be modified or stored while the CPU is running, with minimal impact on the scan time.

3. Online programming including runtime editing.

4. IEC 61131-3 programming languages supported: Ladder logic, function block, sequential function chart, and structure text.

5. Supply all hardware and software necessary to program the CPU in these languages.

I. Communication Ports

1. The CPU shall be expandable and supplied with additional modules to support the required communication interfaces.

J. Remote I/O Communications

1. The CPU shall be capable of communicating with up to 12 remote base locations at a combined distance of 2500 feet. The CPU shall automatically sample and update all local and remote I/O modules each scan cycle of the CPU.

2. The communication link between the CPU and any RIO chassis shall be as recommended by the PLC manufacturer. For racks located on a link of less than 2500 cable feet, the speed of the communications link shall be greater than 230 K baud with RIO scan rate of

less than 5 milliseconds per RIO.

3. Diagnostic and equipment status information shall be available from each RIO.
4. It shall be possible to communicate with remote I/O racks or other PLCs via fiber optic cable.
5. The remote I/O system shall have available a remote input/output arrangement capable of operation at locations physically separated from the PLC CPU by up to 5,000 feet as detailed on the drawings.
6. Communication with the remote I/O arrangement shall be through cable as recommended by the PLC manufacturer and provided by the PLC system supplier under this specification section.

K. CPU Redundancy

1. The PLC shall be supplied with all hardware and software required to produce a completely operational redundant system if specified and/or shown in the drawings. Redundancy shall be implemented using a minimum amount of user programming. Warm backup, which is not a standard offering from the PLC manufacturer, is not acceptable.
2. The backup system shall consist of redundant controllers located in separate chassis.
3. The back-up system shall provide bump-less, transparent switchover for system outputs. All remote I/O shall maintain their last position until either communications is re-established, or the remote I/O watchdog timer expires. Redundancy shall function regardless of which IEC 61131-3 programming language is used for programming.
4. Switchover between the on-line PLC and the back-up PLC shall occur within 100 milliseconds if any of the following conditions occurs in the on-line unit: Power failure, CPU fault, communications module fault, or change in the on-line unit’s mode from RUN to PROGRAM.
5. The switchover shall be transparent to any devices networked to the redundant controller chassis. Transparency shall include CPU IP address switching at the hardware-level and maintaining all network and serial communications upon switchover between the on-line PLC and the back-up PLC.
6. The system shall automatically cross-load the primary controller’s program to the secondary controller.
7. System diagnostics and debugging tools shall be provided to assist in troubleshooting all redundancy equipment.

2.04 POWER SUPPLIES

A. The PLC shall have chassis-mounted power supplies to power the chassis backplane and provide power for the processor and applicable modules.

B. Power supplies shall have a clearly visible LED to indicate that the incoming power is acceptable, and the output voltage is present.

C. Power supplies shall feature over-current and over-voltage protection and should be designed to operate in most industrial environments without the need for isolation transformers.

D. Power supplies shall be sized to accommodate the anticipated load plus 30%.

E. DC power supplies shall be capable of handling ripple up to 2.4V peak-to-peak.

F. AC Line Voltage rating of 85 to 265 VAC, 47-63Hz.

G. The power supplies shall allow for brown outs of at least ½ of a cycle, a harmonic rate of 10%, and will sustain continuous operation through momentary interruptions of AC line voltage of 10ms or less.

H. Automatically shut down the Programmable Controller system whenever its output power is detected as exceeding 125% of its rated power.

I. Provide surge protection, isolation, and outage carry-over up to two cycles of the AC line.

J. Redundant Power Supplies

1. The PLC shall be supplied with redundant power supplies if specified and/or shown in the drawings. Redundant power supplies will comply with all the requirements of non-redundant power supplies in addition to the features stated below.
2. The redundant power supplies shall be designed to share the current required by the chassis. In the event of a failure of one redundant power supply, the remaining supply will accommodate the entire load of the chassis without disruption to the chassis activity.
3. Provide a failsafe fuse that is not accessible by the customer.
4. Provide a solid-state relay connection to allow for failure annunciation when wired to an input module.
5. Diagnostic LED status indicators for power and redundancy.

2.05 PLC/RIO CHASSIS

A. All system and signal power to the CPU and support modules shall be distributed on the backplane. No interconnecting wiring between these modules via plug-terminated jumpers shall be acceptable.

B. All system modules, main, and expansion chassis shall be designed to provide free air flow convection cooling. No internal fans or other means of cooling, except heat sinks, shall be permitted.

C. All system modules including the processor shall be removable from the chassis or inserted into the chassis while power is being supplied to the chassis without faulting the processor or damaging the modules.

D. Modules shall be designed to plug into a chassis and to be keyed to allow installation in only one direction. The design must prohibit upside down insertion of the modules as well as safeguard against the insertion of a module into the wrong slot or chassis via an electronic method for identifying a module. Electronic keying shall perform an electronic check to ensure that the physical module is consistent with what was configured.

2.06 DISCRETE I/O MODULES

A. General

1. For existing system replacements, selection of discrete input and output module types shall be based on maintaining functionality and connection to existing PLC/RIO signals. For new systems, selection of discrete input and output module types shall be per OWNER/ENGINEER requirements included in this specification section.
2. Digital input and output modules shall provide ON/OFF detection and actuation.
3. The I/O count and type shall be as required to implement the functions specified plus an allowance for active spares.
4. Modules shall be designed to be hot-swappable, or installed or removed while chassis power is applied and the PLC continues to execute.
5. Modules shall have indicators to display the status of communication, module health, and input/output devices.
6. Each module shall have the following status indicators:
    a. The On/Off state of the field device.
    b. The module's communication status.
7. I/O modules shall contain a maximum of 16 points per module.
8. Discrete output modules shall be configurable to hold last value, turn on, or turn off upon failure or fault state.

B. Discrete Module Specifications

1. Compact 5000 Digital 16-point 120/240V AC Input Module
    a. 5069-IA16
2. Compact 5000 Digital 16-point 120/240V AC Output Module
    a. 5069-OA16

2.07 ANALOG I/O MODULES

A. General

1. For existing system replacements, selection of analog input and output module types shall be based on maintaining functionality and connection to existing PLC/RIO signals. For new systems, selection of analog input and output module types shall be per OWNER/ENGINEER requirements included in this specification section.
2. Analog input modules shall convert an analog signal that is connected to the module's screw terminals into a digital value. The digital value representing the magnitude of the analog signal shall be transmitted on the backplane. Analog output modules shall convert a digital value that is delivered to the module via the backplane into an analog signal on the module's screw terminals.
3. The I/O count and type shall be as required to implement the functions specified plus an allowance for active spares.
4. Modules shall be designed to be hot-swappable, or installed or removed while chassis power is applied, and the PLC continues to execute.
5. Modules shall have indicators to display the status of communication, module health, and input/output devices. Each analog module shall provide both hardware and software

indication when a module fault has occurred. Each module shall have an LED fault indicator and the programming software shall display the fault information.

6. Analog modules shall be software configurable through the I/O configuration portion of the programming software.
7. The following status shall be capable of being examined in programming logic:
   a. Module Fault Word: provides fault summary reporting.
   b. Channel Fault Word: provides under-range, over-range, and communications fault reporting.
   c. Channel Status Words: provides individual channel under-range and over-range fault reporting for process alarm, rate alarms, and calibration faults.
8. The 24 VDC power for analog instrument loops shall be provided as a part of the system. The 24 VDC power supply shall be derived from the 120 VAC input power circuit to the PLC. The field side of the 24 VDC power source(s) shall have individual or grouped (of logically associated circuits) fusing and be provided with a readily visible, labeled blown fuse indicator.

B. Analog Module Specifications
   1. Compact 5000 Analog 8-channel current/voltage Input module:
      a. 5069-IF8
   2. Compact 5000 Analog 4-channel current/voltage Output module
      a. 5069-OF4

2.08 COMMUNICATION INTERFACES

A. The PLC shall be capable of the following communication protocols as shown on the drawings:
   1. 10BASE-T/100BASE-TX Ethernet communication.
   2. Ethernet IP.
   3. Modbus (RTU and ASCII) for up to 247 slaves.
   4. Profibus DP for up to 126 slaves.
   5. Rockwell Automation’s RIO Protocol.
   6. DeviceNet.
   7. Asynchronous serial link capable of communicating up to 19.2Kbps.

B. Ports
   1. 100MB/1G Ethernet

C. When required, provide a Communications Interface Module mounted in the chassis or the equivalent port directly on the CPU.

2.09 PLC SOFTWARE

A. The PCSI shall provide a PLC configuration and application development software package complete with documentation and disks. The PLC software package and associated licensing and/or activation shall be installed on the computers shown on the Drawings.

B. The software package shall allow on-line/off-line program development, annotation, monitoring, debugging, uploading, and downloading of programs to the PLCs.

C. All required hardware (including cables, cable adapters, etc.) for connection to PLCs shall be furnished.

D. All software licenses required to achieve the functionality described in the Specifications shall be provided and shall be licensed to the OWNER.

E. All software shall be of the latest available revision.

F. The software package shall include a software license agreement allowing the OWNER the right to use the software as required for any current or future modification, documentation, or development of the PLCs furnished for this project.

G. The software provided shall be capable of the following IEC 61131-3 functions:

1. Ladder logic.
2. Function block.
3. Sequential function chart.
4. Structure text.

H. In addition to the above editors, an add-on instruction editor shall work with any of the above-mentioned editors to create custom reusable function blocks. This software shall allow any of the derived function blocks to be modified online.

I. The software shall be Microsoft Windows-based and run on the supplied computers.

J. The software shall include a security feature to prevent unauthorized personnel from modifying and downloading the programs.

K. Provide an I/O simulator that allows the PLC application load program to be tested on a PC with simulated analog and digital inputs and outputs, allowing I/O testing and debugging to be performed in a safe, isolated environment without the need for running the PLC CPU and process I/O boards.

2.10 OPERATOR INTERFACE TERMINALS (OIT)

A. OITs shall be mounted on control panels and shall run interface software separate from the HMI software.

B. Software

1. OITs shall be supplied with all configuration and programming software necessary to perform functions as shown on the drawings and within the specifications. The software shall be licensed to the OWNER.

2. OIT software shall have the following features:
    a. Trending.
    b. Data Logging.
    c. Alarms.
    d. Graphic Symbols.
    e. Animations.

C. Communications
1. OITs shall have an RJ-45 port dedicated to serial communications. The RJ-45 port shall support RS485 communications.
2. One (1) USB 2.0 high speed host port (type A) connector shall be provided that supports removable flash drives for storage and one (1) high speed 1.0 device port (type B) that supports connection to the host computer.
3. Provide an integral Ethernet port dedicated to 10/100BASE-T Ethernet TCP/IP communications.
4. OITs shall have a minimum of one (1) Serial RS232 port.
5. OITs relying on the same port for communications and downloading shall not be acceptable.

D. Display
1. The OITs shall have a viewable screen size of 12-inch, unless otherwise specified.
2. The OITs shall use a color active-matrix TFT screen.
3. The display resolution shall be a minimum of 1280 x 800 pixels for 12-inch displays.
4. The screen shall have 18-bit color graphics with a backlighting service life of 50,000 hours of continual usage.
5. The display shall have an embedded analog resistive touch screen with an actuation rating of 1 million presses and an operating force of 100 grams.

E. Primary Memory
1. The OITs shall have a 32Mb flash EPROM memory and a Compact Flash expansion memory slot. A Compact Flash card shall be provided with each OIT supplied.

F. RAM
1. The OIT shall be supplied with lithium batteries to back up 512Kb SRAM.

G. Environmental
1. The OIT shall be rated to maintain the rating of the control panel in which it will be mounted.
2. The operating temperature range of the OIT shall range 0-50°C.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

A. Maintain area free of dirt and dust during and after installation of programmable controller products.

B. Anchor PLCs within enclosures as recommended by the PLC manufacturer.

C. Ventilation slots shall not be blocked or obstructed by any means.

D. Examine areas, surface, and substrates to receive PLCs for compliance with requirements, installation tolerances, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

E. Install in accordance with manufacturer's instructions.

F. Unload, unpack, and transport equipment to prevent damage or loss.

G. Replace damaged components as directed by ENGINEER.

3.02 PANEL LAYOUT

A. Coordinate size and configuration of enclosure to meet project requirements. Drawings indicate maximum dimensions for PLCs and minimum clearances between PLCs, adjacent surfaces, and other items.

B. Comply with indicated maximum dimensions and clearances, or with PLC vendors required distances if they are greater than the distances indicated.

1. Provide spacing around the PLC as required by the PLC manufacturer to ensure adequate cooling. Ensure that the air surrounding the PLC has been conditioned to maintain the required temperature and humidity range.
2. Wires entering and exiting PLC components shall be sized to comply with the PLC manufacturer's requirements. Doors on all components shall be able to be fully closed when all the wires are installed.
3. For chassis-mounted PLCs, no wiring, wire ducts, or other devices shall obstruct the removal of cards from the rack.
4. PLC lights, keys, communication ports, and memory card slots shall be accessible at all times. Lights shall be visible at all times when the enclosure door is opened.
5. The control panel designer shall provide independent line fuses or circuit breakers, per the PLC manufacturer recommendation, for each power supply, input module, output module, and other modules with separately derived power requirements.
6. The control panel designer shall ensure that communication signals, 4-20 mA signals (including those with embedded HART), are properly conditioned for the PLC and protected from all sources of radiated energy or harmonics.
7. Each PLC (including all I/O) shall be powered from a UPS power conditioning system as specified in Section 40 67 63 – Uninterruptible Power Supply.

8. Where multiple mechanical components are provided for process redundancy, arrange their field connections to I/O modules such that the failure of a single module will not disable all mechanical components associated with the process (e.g., inputs and outputs for redundancy device 1 shall reside on different modules than the inputs and outputs for redundancy device 2, etc.), irrespective of the number of used points resulting from this configuration. This applies to all I/O types. The acceptability of the I/O arrangement shall be at the discretion of the ENGINEER.
9. Provide all required cables, cords, and connective devices for interface with other control system components.

END SECTION

SECTION 40 66 00

NETWORK AND COMMUNICATION EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the furnishing and installation of all hardware and software for network systems for the Process Control System as specified herein or as indicated on the drawings.

B. PCSI shall furnish all necessary equipment, interconnecting cables, accessories, and appurtenances for proper network operation and to meet the functional requirements indicated on the Drawings and specified herein. Some communication devices may be required for network operation which may not be explicitly shown on the Drawings.

C. Configuration of all hardware shall be provided by the Owner. Coordinate with the City of Chelan IT Department for network device configuration parameters.

1.02 NETWORK DESCRIPTION

A. A new telemetry panel will be installed at the City of Chelan Lift Station No. 1 as part of the rehabilitation project. All panel components will be interconnected and networked through an Ethernet switch, including the local Operator Interface Terminal (OIT), Variable Frequency Drives (VFDs), radio communication equipment, and the flow meter, to enable integration with the existing SCADA system.

1.03 GOVERNING CODES AND STANDARDS

A. All work performed covered by this section and all equipment, materials, and installation shall be in accordance with applicable Federal, State, and Local regulations and ordinances, and with the latest edition of the following codes and standards. (Note: Codes and standards are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition in effect at the time of bid opening shall apply.)

1. ANSI/TIA-568-D: Telecommunications Cabling Standard
2. TIA-758-B: Outside Plant Telecommunications Infrastructure
3. NIST 800-82: Guide to Industrial Control Systems Security
4. ISA/IEC 62443: Security for Industrial Automation and Control Systems
5. IEEE 802.3 – Ethernet

B. Refer to Section 40 61 13 – Process Control Systems General Provisions for other applicable standards.

1.04 SUBMITTALS

A. Refer to Section 40 61 20 – Process Control System Submittals for submittal requirements.

1.05 SHIPPING, STORAGE, AND HANDLING

A. Refer to Section 40 61 13 – Process Control Systems General Provisions for other applicable standards.

PART 2 - PRODUCTS

2.01 MANAGED INDUSTRIAL ETHERNET SWITCH

A. Manufacturers
   1. Cisco IE-3300, 5-year SmartNet next business day replacement.
   2. No Equal.

B. General
   1. Switch shall support the quantity of 100/1000 Mb/s RJ-45 ports and fiber ports to meet the functionality indicated in this specification and shown on the drawings. A minimum of 20% spare ports shall be provided for the installed system. Supply expansion modules as required.
   2. Extended service agreement with next business day response. Full access to vendor device images, technical support, and warranty.
   3. Switch shall support the quantity and power demand of IEEE 802.3 PoE+ devices shown on the drawings and indicated in their respective specifications.

C. Physical
   1. DIN rail mounting.
   2. Operating Temperature: -40 to 60 °C (-40…140 °F).

D. Power
   1. 24V Input Power.
   2. 30W PoE Budget per PoE port.

E. Function
   1. Layer 2 switching.
   2. Configuration backup capability.
   3. Lock port function for blocking unauthorized access based on MAC address.
   4. Auto negotiation and manual configurable speed and duplex.
   5. Forwarding rate and switching capacity meeting or exceeding wire capacity assuming an average packet size of 100 bytes.
   6. Simple Network Management Protocol (SNMPv3).
   7. Precision Time Protocol, IEEE 1588-2019.
   8. Rapid Spanning Tree Protocol (RSTP, IEEE 802.1W), Multiple Spanning Tree Protocol (MSTP, IEEE 802.1S).
   9. Link Aggregation Control Protocol (LACP, IEEE 802.3ad).

2.02 CATEGORY 6 SHIELDED CABLE

A. Manufacturers

1. Superior Essex CAT6 04-001-62.
2. Belden DataTuff 7953A.
3. Approved equal.

B. General

1. Shielded twisted pair cable shall be designed for use with a gigabit communications network.
2. Cable shall meet the requirements of the ANSI/TIA-568 specification for Category 6 (CAT6), Shielded Twisted Pair (STP) cable, tested up to 250MHz.

C. Physical

1. Constructed from 23AWG, solid, bare copper wire insulated. Two insulated conductors shall be twisted together to form a pair and four pairs shall be laid up to form the basic unit.
2. Jacketed in flame-retardant PVC.
3. Outer shield of aluminum tape (F/UTP, F/FTP, or SF/UTP).
4. Jacket color as indicated on the drawings.

2.03 CATEGORY 6 UNSHIELDED CABLE

A. Manufacturers

1. Superior Essex
2. Belden DataTuff 7940A.
3. Approved equal.

B. General

1. Unshielded twisted pair cable shall be designed for use with a gigabit communications network.
2. Cable shall meet the requirements of the ANSI/TIA-568 specification for Category 6 (CAT6), Unshielded Twisted Pair (UTP) cable, tested up to 250MHz.

C. Physical

1. Constructed from 23AWG, solid, bare copper wire insulated. Two insulated conductors shall be twisted together to form a pair and four pairs shall be laid up to form the basic unit.
2. Jacketed in flame-retardant PVC.
3. Jacket color as indicated on the drawings.

2.04 CATEGORY 6 UNSHIELDED PATCH CABLE

A. Manufacturers

1. Belden C6F110X00X.
2. Approved equal.

B. General

1. Twisted pair cable shall be designed for use with a gigabit communications network. Cable shall come pre-assembled with RJ-45 connectors.
2. Cable shall meet the requirements of the ANSI/TIA-568 specification for Category 6 (CAT6), Unshielded Twisted Pair (UTP) cable, tested up to 250MHz.

C. Physical

1. Constructed from 23AWG, solid, bare copper wire insulated. Two insulated conductors shall be twisted together to form a pair and four pairs shall be laid up to form the basic unit.
2. Length as required such that excess cable does not crowd the enclosure. Length shall not exceed 6.5 feet (2 meters).

2.05 RJ-45 SURGE ARRESTOR

A. Manufacturers

1. Transtector Systems CPX 1101-1137 and 1000-1117.
2. Approved Equal.

B. General

1. Lightning protection unit (LPU)/surge arrestor that protects end devices from overvoltage fault on a network cable.
2. Shielded RJ-45 connectors.

C. Physical

1. Wall or DIN rail mounting.
2. Operating Temperature: -40 to 80 °C (-40…176 °F).

D. Function

1. Data rate: 1 Gb/s.
2. Characteristic impendence: 100 Ohms.
3. PoE power: 56 W.
4. PoE current per pin: 800 mA.

2.06 RJ-45 DATA SURGE ARRESTOR SHIELDED MULTIPLE PORTS

A. Manufacturers
   1. Transtector Systems CPX 1101-1044 TSJ X6 GbE.
   2. Approved Equal.

B. General
   1. Lightning protection unit (LPU)/surge arrestor that protects end devices from overvoltage fault on a network cable.
   2. Shielded RJ-45 connectors.

C. Physical
   1. Wall or DIN rail mounting.
   2. Operating Temperature: -40 to 85 °C (-40…185 °F).

D. Function
   1. Ports: Six (6) protected ports
   2. Compatible Cables: Cat5/5e, UTP/STP, Cat6/6A STP
   3. Data rate: 1 Gb/s.
   4. Characteristic impendence: 100 Ohms.

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

A. Install and connect the equipment in accordance with the manufacturer's instructions.

B. Build/modify and install the network equipment as listed in this Section and locations identified in the Contract Drawings.

C. Provide a complete and operational system with all components and appurtenances necessary to ensure that the network is functional and meets the intent of this Specification.

D. Field-verify and obtain written approval from the Owner for the final locations of the network enclosures. The Owner reserves the right to relocate enclosures within 30 feet of the locations identified in the Contract Drawings at no additional cost to the Owner.

E. For each end device, the CONTRACTOR is to determine and provide the appropriate number and length of all patch cords.

3.02 CABLE INSTALLATION

A. Connect network cables to devices as shown on the contract drawings.

B. Install category 6 cables suitable to the application shown on the Drawings.
   1. Where network cabling is shown outside the building envelope (underneath or outside),

install outside plant-rated (OSP) cable.

2. Install shielded category 6 cables for connections that meet any of the following criteria:
   a. Cable connects within a panel that contains 480V devices or conductors.
   b. Cable is run in parallel with power conductors within 2 feet for more than 10 feet.
   c. Cable is run to a radio/antenna.
3. Where none of the above apply, install unshielded category 6 cables.

C. The bend radius for network cables shall not be less than the manufacturer's recommended minimum bend radius. Avoid any cable kinks and maintain proper bend radius control during cabling pulling. If any kinks should occur, kinked cable should be removed and replaced.

D. At a minimum, provide a two (2) foot service loop of all network cables (except patch cables) within all enclosures.

E. The cable shall not come in contact with any water or chemicals (ex. paint, lubricants) during or after installation.

F. Labeling
   1. Label both ends of the cable. Label each cable within pull boxes.
   2. Use durable non-fading sleeve-type wire markers to identify network cables. Labels shall be laser-printed, self-laminating, adhesive, polyester (indoor/outdoor).
   3. Lettering shall be black on a white background. Characters shall be a minimum of 5/32” in height. Handwritten labels will not be accepted.
   4. Cables shall be labeled per the following tagging convention:
      a. XXX:YYY
         1) XXX – the tagname of a device in which is the cable is terminated.
         2) YYY – the tagname of the other device in which is the cable is terminated. Where the connected devices on are different hierarchical layers of the network, the lowest layer device shall be listed second. The order of layer hierarchy from highest to lowest is as follows: routers, backbone switches, spur switches, multiplexers, hubs, end devices.
      b. Where labels would include building or facility codes that are common to both ends of the network cable, the building or facility codes may be omitted for simplicity.
      c. Example tags:
         1) ELEC_SW4:CF_SW2
         2) SW4:PQM1M1
         3) SW2:UPS01

3.03 CABLE ACCEPTANCE TESTING

A. This Section specifies the inspection, test, and acceptance requirements for the structured cabling of the Local Area network.

B. Provide test equipment required to conduct acceptance tests.

C. Submit acceptance documentation as defined in Section 40 61 20 – Process Control System Submittals.

D. All installed cabling must be tested and successfully pass test criteria.

E. CAT6 UTP cable shall meet or exceed the permanent link performance requirements specified in ANSI/TIA-568.2-D for Category 6, Unshielded Twisted Pair (UTP).

F. CAT6 STP cable shall meet or exceed the permanent link performance requirements specified in ANSI/TIA-568.2-D for Category 6, Shielded Twisted Pair (STP).

G. Test Equipment. Test equipment shall meet the following minimum criteria:

1. All test equipment of a given type shall be from the same manufacturer and have compatible electronic results output. Acceptable test equipment manufacturers are Fluke Corporation, Hewlett Packard Development Company, L.P (Hewlett Packard), and MicroTest Inc. (MicroTest).
2. Test adapters must be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.
3. Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.
4. Test equipment must be capable of certifying Category 6 STP to ANSI/TIA-568.2-D standards.
5. Test equipment must have a dynamic range of at least 200 dB to minimize measurement uncertainty.
6. Test equipment must be capable of storing full frequency sweep data for tests.
7. Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
8. Test equipment must be capable of running Wire Map, Length, Insertion Loss, NEXT Loss, PS NEXT Loss, ACR-F Loss, PS ACR-F Loss, Return Loss, Propagation Delay and Delay Skew tests. Individual tests increase productivity when diagnosing faults.
9. Test equipment must make swept frequency measurements in compliance with latest ANSI/TIA-568 standards.
10. The measurement reference plane of the test equipment shall start immediately at the output of the test equipment interface connector. There shall not be a time domain dead zone of any distance that excludes any part of the link from the measurement.

H. At a minimum, the following shall be tested and included in the testing acceptance documentation:

1. Wiremap results that indicate the cabling has no shorts, opens, mis-wires, split, reversed, or crossed pairs, and end-to-end connectivity is achieved.
2. Attenuation, NEXT, PSNEXT, Return Loss, ACR-F, and PS ACR-F data that indicate the worst-case result, the frequency at which it occurs, the limit at that point, and the margin. These tests shall be performed in a swept-frequency manner from 1 MHz to

highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information shall be provided for pairs or pair combinations and in both directions when required by the appropriate standards.

3. Length (in feet), propagation delay, and delay skew relative to the relevant limit.
4. Cable manufacturer, cable model number/type, and NVP.
5. Tester, manufacturer, model, serial number, hardware version, and software version.
6. Circuit ID number (Cable Tag Id).
7. Test criteria used.
8. Overall pass/fail indication.
9. Date and Time of test.

I. Any individual test that fails the relevant performance specification shall be marked as a FAIL.

3.04 NETWORK CONFIGURATION

A. Fully configure all network devices. All device configuration shall be fully coordinated with the Owner to ensure compatibility with existing systems and standards.

B. Configure redundancy protocol usage as required by the drawings, or as best suited to the selected network hardware where not stated on the drawings.

C. Configure virtual network segregation via VLAN and VRF as required by the drawings.

END SECTION

SECTION 40 66 53

RADIO EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the furnishing, installation, and configuration of radio hardware for the Process Control System as specified herein or as indicated on the drawings.

B. PCSI shall furnish all necessary equipment, interconnecting cables, gateways, antennas, accessories, and appurtenances for proper network operation and to meet the functional requirements indicated on the Drawings and specified herein. Some communication devices may be required for network operation which may not be explicitly shown on the Drawings.

C. Configuration of all radio hardware shall be provided by the Owner. Allow the Owner 15 business days for configuration of a radio.

1.02 RADIO SYSTEM DESCRIPTION

A. The utility operates a 5GHz unlicensed radio network to interconnect remote sites in the water distribution system. A new radio will be installed at the City of Chelan Lift Station No. 1. It will connect to an existing access point antenna installed at the existing **xxxxxxxx** access point site.

1.03 GOVERNING CODES AND STANDARDS

A. All work performed covered by this section and all equipment, materials, and installation shall be in accordance with applicable Federal, State, and Local regulations and ordinances, and with the latest edition of the following codes and standards. (Note: Codes and standards are referred to in the text by basic designation only. Where a date is given for reference standards, that edition shall be used. Where no date is given for reference standards, the latest edition in effect at the time of bid opening shall apply.)

1. FCC Rules, Part 90
2. ANSI/TIA-568-D: Telecommunications Cabling Standard
3. TIA-606-C: Administrative Standard for Telecommunications Infrastructure
4. TIA-569: Commercial Building Standards for Telecommunications Pathways and Spaces

1.04 RELATED WORK

A. Refer to Section 40 61 13 – Process Control System General Provisions.

1.05 SUBMITTALS

A. Refer to Section 40 61 20 – Process Control System Submittals for submittal requirements.

1.06 SHIPPING, STORAGE, AND HANDLING

A. Refer to Section 40 61 13 – Process Control Systems General Provisions for other applicable

standards.

PART 2 - PRODUCTS

2.01 BROADBAND REMOTE SUBSCRIBER INTEGRATED RADIO (ODU)

A. Description: 5 GHz point-to-point or point-to-multipoint integrated Ethernet radio based on Ubiquiti airMAX® AC technology. The radio shall meet the following minimum requirements:

1. Hardware

a. Networking interface:	(1) GbE RJ45 ports
b. Power method:	Passive PoE (Pairs 4, 5+; 7, 8 Return)
c. Power supply:	24V, 0.5A Gigabit PoE adapter (Included)
d. Max. power consumption:	8.5W
e. Salt fog test:	IEC 68-2-11 (ASTM B117) Equivalent: MIL-STD-810 G method 509.5
f. Vibration test:	IEC 68-2-6
g. Temperature shock test:	IEC 68-2-14
h. Certifications :	CE, FCC, IC

2. System

a. Gain:	14 dBi
b. Beamwidth:	45° (Default horn)
c. Channel sizes:	
1) PtP Mode:	10/20/30/40/50/60/80 MHz
d. Max. VSWR:	1.8:1
e. Polarization:	Dual linear

3. Operating Frequency (MHz)

a. Worldwide	5150-5875 MHz
b. USA	
1) U-NII-1	5150-5250 MHz
2) U-NII-2A	5250-5350 MHz
3) U-NII-2C	5240-5725 MHz
4) U-NII-3	5725-5850 MHz

4. Physical

a. Dimensions :	174 x 174 x 150 mm (6.9 x 6.9 x 5.9")
b. Weight :	725 g (1.6 lb)
c. Enclosure material:	Outdoor UV-stabilized plastic

d. Mounting: Pole mount (hardware shall be included)

e. Wind Survivability: 200 km/h (125 mph)

f. Ambient operating temperature: -40 to 70° C (-40 to 158° F)

g. Ambient operating humidity: 5 to 95% noncondensing

5. Compatibility: Fully compatible with Ubiquiti airMAX® AC Access Points and Stations. Support airMAX TDMA protocol for deterministic latency suitable for control systems.

B. Acceptable Products

1. Ubiquiti - airMAX IsoStation 5AC.
2. No equal.

PART 3 - EXECUTION

3.01 PRODUCT HANDLING

A. Preparation for Delivery: Wrap all final assemblies in protective material to provide adequate protection during shipment.

B. Shipping: Ship equipment to assure timely delivery and protection of materials. Repair or replace any equipment damaged during shipping or delivery, at the OWNER's discretion, at no cost to the OWNER.

C. Equipment: Upon receipt of each equipment item, visibly inspect the equipment for physical damage. No damaged equipment shall be installed. All costs to replace and reinstall damaged equipment shall be borne by the CONTRACTOR.

D. Protection: During the installation, and up to the date of final acceptance, protect the finished and unfinished work against damage and loss. In the event of such damage or loss, replace or repair such work at no cost to the OWNER.

3.02 RADIO SYSTEM INSTALLATION

A. Install the radio/router, antenna, coaxial cable or CAT6, grounding, lightning protection and all associated equipment at each site as specified herein and as shown in the Contract Drawings and per manufacturer guidelines.

B. The radio technician(s) shall have in possession all tools and test equipment required to test and troubleshoot all spread spectrum radio equipment, antenna and antenna feedline furnished and installed by the CONTRACTOR.

C. CONTRACTOR or subcontractor shall own and maintain tools and equipment necessary for successful installation and testing of wireless transmission cabling. The CONTRACTOR shall have personnel who are trained in the usage of such tools and equipment.

D. Cable Installation

1. Install cable so that the manufacturer specified minimum bending radius is not exceeded.

2. Seal all outside coaxial cable connections against the entrance of water with a waterproofing kit.
3. All installed cable connectors and grounding kits are to be watertight. Weatherproofing will be accomplished by wrapping two layers of rubber slicing tape over the entire connection extending 6 inches beyond the end of the connector. This weatherproofing will be in addition to any weatherproofing supplied by the manufacturer as part of the cable assembly or the connector kit.

E. Grounding

1. Follow Motorola Standards and Guidelines for Communications Sites, Chapter 4 – External Grounding and Chapter 5 – Internal Grounding, and the Contract Drawings for the grounding requirements at each radio site, focusing specifically on creating a single grounding electrode system, with all site grounds bonded together, as described in the Motorola Standards and Guidelines for Communications Sites, Section 4.3.
    a. If there is a discrepancy between the Contract Drawings and the Motorola Standards and Guidelines for Communications Sites, the Contract Drawings shall prevail.

F. Antenna Alignment

1. Follow these steps to align all remote site antennas for maximum RSSI from the access point radio:
    a. Using a compass, roughly align antenna using the known azimuth to the access point site.
    b. Verify the remote site radio has a connection to the access point radio, providing adequate signal level for the alignment to proceed. If the remote radio cannot establish a connection, rotate the antenna until a connection is established.
    c. Begin by slowly turning the antenna clockwise in small increments, stopping long enough to establish a connection and get an accurate RSSI reading. Document the RSSI at each point and continue on, looking for the point of maximum RSSI. When the point is reached where the signal is lost, reposition the antenna at the original starting point and repeat the process in the counterclockwise direction.
    d. From the recorded data, identify the position where maximum RSSI was achieved. Reposition the antenna to this point.
    e. Fine tune the RSSI from this point by moving the antenna slowly in very small increments, clockwise, then counterclockwise until finding the point of maximum RSSI. Secure the antenna at this position.
2. The antenna shall be considered properly aligned when an RSSI is achieved that is within +/- 10% of the RSSI listed in Section 1 of this specification.

3.03 RADIO SYSTEM TESTING

A. General

1. Test procedures and prior written notification of testing activities are required for all tests. Testing plan and testing result submittal requirements are described in Section 40 61 20 – Process Control System Submittals.
2. All testers must be factory-trained for the test equipment used.

3. Provide all test equipment, laptop computers and all other ancillary equipment required to perform the tests specified herein.
4. A copy of the radio configuration is to be provided with each test result.

B. Radio Path Tests

1. Link Acceptance Test
   a. Record the RSL (Received Signal Level) and SNR (Signal Noise Ratio) every 30 seconds and calculate the averages over a five-minute period.
   b. A successful test occurs when the average SNR > 20 dB and the RSSI is within +/- 10% of the RSSI listed in Section 1 of this specification.
2. Network Acceptance Testing (NAT)
   a. a. Generate Ethernet packets from the remote site radio to the master radio.
      1) Perform a latency test.
      2) Configure the test software to transmit 100 Ethernet packets. Record the round-trip time and packet loss.
      3) A successful test occurs when the radio link performance meets the expectations listed in Section 1 of this specification.

C. Failed Radio Paths

1. Perform the following procedure for all failed radio paths.
2. Perform all analysis and diagnostic testing required to determine why the path is not performing.
3. Make all repairs necessary to resolve any issues identified during the analysis and diagnostic testing.
4. Retest the path following the same procedure.
5. If the retest is successful, no further work is required for that path.
6. If the retest fails, document the results in the Test Report for review by the OWNER. Include in the Test Report what has resulted in a failed test.

3.04 COMPLETE SYSTEM TESTING

A. Refer to specification Section 40 61 21 for testing requirements associated with the complete control system.

END SECTION

SECTION 40 67 00

CONTROL PANEL ENCLOSURES AND PANEL EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The section covers the furnishing and installation of all control panel enclosures and panel equipment included in this project and as indicated on the Drawings and listed below.

Name	Location	Contents	Mounting	NEMA Rating	Minimum Size W" x H" x D"
LCP-100	CC-1	PLC, Ethernet switch, UPS, Flow transmitter	Wall mounting	4	24"x36"x12"

B. The Process Control System Integrator (PCSI) shall be responsible for furnishing any and all control panels shown in the Drawings but not included in the Control Panel Schedules.

C. The PCSI shall furnish all labor necessary for the design, fabrication, assembly, installation, and testing in full conformity with the Drawings, Specifications, schedules, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by the Engineer, to fully meet the required functionality of The Process Control System (PCS).

D. Installation and configuration of network infrastructure cabling and equipment shall be a cooperative and coordinated effort between the Contractor, the PCSI, and the Application Services Provider (ASP).

1.02 RELATED WORK

A. Refer to the following sections:

1. Section 40 61 13 – Process Control Systems General Provisions.
2. Section 40 61 21 – Process Control Systems Testing.
3. Section 40 63 43 - Programmable Logic Controllers.
4. Section 40 70 80 – Panel Mounted Instruments.

1.03 GENERAL

A. General Equipment Stipulations

1. The General Equipment Stipulations shall apply to all equipment and materials provided under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

1.04 GOVERNING CODES AND STANDARDS+

A. National Electrical Manufacturers Association (NEMA) ICS 6 Enclosures for Industrial

Controls and Systems.

B. NEMA Standards 250-2008 Enclosures for Electrical Equipment (1000 Volts Maximum).

C. NEMA ICS 4 Terminal Blocks for Industrial Use.

D. UL 1449 Third Edition Surge Protective Devices.

1.05 QUALITY ASSURANCE

A. The manufacturer of the control panel equipment shall have produced similar equipment for a minimum of five (5) years. When requested by the Owner or Engineer, an acceptable list of installations with similar equipment shall be provided demonstrating compliance with this requirement.

B. The control panels shall be assembled in an UL-certified panel shop, experienced in the assembly of control panels for water and wastewater treatment systems.

C. Equipment components and devices shall be UL-labeled wherever UL standards exist for such equipment. The completed control panel shall be UL-labeled in accordance with UL 508 and or 508A as applicable. The panel shall be UL-labeled for the environment in which it is to be placed. A UL label shall be affixed to the inside of the external door by the panel fabrication assembly shop.

1.06 SUBMITTALS

1. Submittals shall be made as specified in Section 40 61 13 – Process Control System General Provisions.
2. Provide documentation that certifies the panel fabrication shop is an UL-certified shop.
3. Provide facsimile of the UL label of each control panel.

1.07 DELIVERY, STORAGE, AND SHIPPING

A. Delivery, storage, and shipping shall be as per the Instrumentation and Control System section.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS

A. All panels furnished shall conform to the stipulations of NEMA ICS-6-1993 (R2001, R2006). Unless indicated otherwise on the Drawings, the following paragraphs describe general fabrication specifications for the Programmable Logic Controller (PLC) cabinets, instrument panels, consoles, enclosures, and subpanels.

B. Complete control panel and terminal cabinet assemblies shall be UL certified or carry a UL 508A listing for “Industrial Control Panels.” All equipment used in the construction of the control panel shall enable the control panel to meet UL certification requirements.

1. Refer to the Contract Drawings and specifications for schematics, location of equipment and components; current ratings of devices, bus bars, components; protective relays,

voltage ratings of devices, components and assemblies; and other required details.

C. Panel Sizing

1. Dimensions and device arrangements within this section and in the Contract Drawings are for general reference only. Enclosure sizing and panel arrangements shall accommodate all required equipment.
2. Control panels shall fit within the space shown on the Drawings. Equipment which does not fit within the space is not acceptable.
3. The PCSI shall be responsible for final sizing of enclosures to meet the clearance requirements of UL 508A, NFPA 79, the NEC, and as specified herein.
4. If the PCSI submits a panel size and layout that is, in the opinion of the Owner and/or Engineer, insufficient in size to meet these requirements, the submittal will not be approved and will be returned for revision and resubmission. The PCSI shall be required to revise the panel size and layout and resubmit for approval at no additional cost to the Owner.

D. Panels shall be completely fabricated with all instruments and devices installed and wired at the PCSI's facility.

1. Each enclosure shall incorporate a removable back panel, and side panels, on which control components shall be mounted. Sub panels shall be secured to the enclosure with collar studs and 316 SS hardware.
2. Side panel-mounted components shall only be permitted after review and approval of the Engineer.
3. All components shall be mounted in a manner that shall permit servicing, adjustment, testing, and removal without disconnecting, moving, or removing any other component.
4. Back panel shall be tapped to accept all mounting screws. Self-tapping screws shall not be used to mount any components.
5. Heat generating devices, such as power supplies, shall be located at or near the top of the panel.
6. Mounting shall be rigid and stable unless shock mounting is required otherwise by the manufacturer to protect equipment from vibration.
7. Component mounting shall be oriented in accordance with the manufacturer's recommendations.
8. The internal components shall be identified with suitable plastic or metal engraved nametags mounted adjacent to (not on) each component identifying the component in accordance with the Drawings, Specifications, and the PCSI's data.

E. Panel Power Supply and Instrument Signal

1. Power supply to all control system equipment will be 120 volts, 60 Hz, single phase.
2. The overall short circuit withstand, and interrupting rating of the equipment and devices, shall be equal to or greater than the overall short circuit withstand and interrupting rating of the feeder device immediately upstream of the Control Panel, but not less than 10,000 amperes RMS symmetrical at 120 volts single phase.
3. All Input/Output (I/O) and signal conditioning components shall be included within their

respective control panels.

4. For control panels that house motor starting equipment, the enclosure door shall be interlocked with the main circuit breaker by a panel mounted cable driven operating mechanism.
5. The PCSI shall be responsible for the distribution of power among the enclosures, consoles, peripherals, and other components of the system from the power supply receptacles and junction boxes indicated on the Drawings.
6. Power distribution hardware shall include cables and branch circuit overcurrent protection installed in accordance with the electrical section.
7. Unless otherwise indicated, power supply to the instrumentation will be unregulated 120 VAC.
8. Unless otherwise indicated, all transmitted electronic analog instrument signals shall be 4-20 mA DC and shall be linear with the measured variable.

F. Nameplates

1. Nameplates shall be provided on the face of the panel or on the individual device.
2. Panel nameplates shall have legends and approximate dimensions as indicated on the Drawings and shall be made of laminated phenolic material having engraved letters approximately 3/16 inch [5 mm] high extending through the black face into the white layer.
3. Nameplates shall be secured firmly to the panel.
4. Panel face nameplates do not replace the requirement for device identification tags as specified under the Device Tag Numbering System paragraph.

G. Panel-Mounted Instruments

1. Instruments, power supplies, pilot devices, and appurtenances mounted within or on the face of the panel shall meet the requirements specified in Section 40 78 00 – Panel Mounted Instruments, for those items unless noted otherwise herein, on the Drawings, or, if applicable, within the referring equipment specification section.

H. Indicating Light Color Designations

1. Indicating lights are specified in Section 40 78 00 – Panel Mounted Instruments. Indicating lights shall be colored as shown in the following table unless indicated otherwise on the Drawings, in other Specification Sections, or in the instrument device schedule (IDS).

Color	**Meaning**
Red	Associated equipment or device is “running”, “open,” or is in an “unsafe” state or position.
Green	Associated equipment or device is “stopped,” “closed,” or is in a “safe” state or position.
Yellow or Amber	Associated equipment or device has “failed” or a process alarm condition is present or imminent.

White	All other conditions not defined above.

I. Accessories and Features

1. Enclosures shall not have holes or knockouts.
2. All panel doors shall have a lock installed in the door handle, or a hasp and staple for padlocking. Coordinate with the Owner to provide locks for all panels to use their master keyset.
3. All enclosure doors shall have bonding studs. The enclosure interior shall have a bonding stud.
4. All Control Panels shall have an integral folding shelf on the exterior for service/maintenance personnel.
5. Control Panel Lighting and Receptacles
   a. Lighting
      1) Control Panels shall be equipped with interior lighting with permanent ceiling mounted lamp fixtures spaced at approximately 2’ 6" [760 mm] and near the door.
      2) Each panel shall have a single tube LED light fixture with a minimum of 450 lumens light output rating, mounted to the interior ceiling of the enclosure, with a common door actuated switch at the main door. Light fixtures shall be 120 VAC switched and shall be complete with the lamp.
      3) Multiple door enclosures shall have a light fixture and switch at each door and wired in parallel to a single circuit.
      4) The light should be affixed to the light holder using magnets.
      5) The light should swivel in a 90-degree range.
   b. Auxiliary Power Receptacles
      1) Each enclosure shall have one (1), UPS powered, 150 watt receptacle.
      2) Duplex-grounded receptacles shall be provided for service and maintenance tools at spacing not greater than 5 feet [1.52 m] throughout the length of a panel.
   c. The lighting and receptacle circuit shall be fused separately from the instrumentation systems.
6. Provide manufacturer’s window kits where shown on the Drawings.
7. Each enclosure shall be provided with a documentation pocket on the inner door.
8. A screened vent shall be provided in the bottom of enclosures that contain pneumatic devices.

J. Painting

1. All interior and exterior surfaces shall be descaled, degreased, filled, ground, and finished.
2. Interior and exterior surfaces of all carbon-steel panels shall be thoroughly cleaned and painted with rust inhibitive (universal) primer.
3. The panel interior shall be painted white with the manufacturer’s standard coating.

4. When the enclosure is fabricated from steel, it shall be finished with two (2) rust-resistant phosphate prime coats and two (2) coats of enamel, polyurethane, or lacquer finish which shall be applied by either the hot air spray or conventional cold spray methods.
5. Exterior surfaces shall be painted with one (1) or more finish coats of the manufacturer's standard coating. Finish coats shall have a dry film thickness of at least 4 mils [100 mm]. Color shall be ANSI 61 Gray.
6. Brushed anodized aluminum, stainless steel, and FRP panels will not require a paint finish.
7. One quart [1 liter] of touch-up paint shall be furnished with the panels.

2.02 CONTROL PANEL TYPES

A. Panels located indoors in dry, non-corrosive environments shall be NEMA 12 unless otherwise noted.

B. Panels located outdoors in wet, non-chemically corrosive environments shall be NEMA 4 unless otherwise noted.

C. Panels located in chemically corrosive environments shall be NEMA 4X unless otherwise noted.

D. Panels located in chemical rooms shall be NEMA 4X and be constructed from PVC or Fiberglass reinforced polyester. UV inhibitors shall be used for all non-metallic panels.

E. Panels located in classified areas shall be rated for the type of hazard (e.g., NEMA 7 for Class 1, Division 1).

F. Panels that will be submersed shall be rated for NEMA 6.

G. NEMA 1 or NEMA 1A boxes shall not be used.

H. Malleable iron boxes shall not be used.

2.03 PANEL MATERIAL AND CONSTRUCTION

A. Enclosure Construction

1. Panels shall be of continuous welded-steel or FRP construction as shown on the Panel Schedule.
2. Panels shall be free from sharp edges and welding flaws.
3. Panel structure shall be suitably braced and of sufficient strength to support all equipment mounted on or within, to withstand handling and shipment, to remain in proper alignment, and to be rigid and freestanding.
4. Internally, the panels shall be supplied with a structural framework for instrument support purposes and panel bracing.
5. Internal framework shall permit panel lifting without racking or distortion.
6. Provide removable lifting rings designed to facilitate simple, safe rigging, and lifting of the control panels during installation.

B. Panel Doors

1. Panel doors shall be full height, having turned back edges and additional bracing to ensure rigidity and prevent sagging.
2. Doors shall be mounted with strong, continuous, piano type hinges.
3. Equip doors with three-point positive latches, acting from a common door handle, which shall hold doors securely compressed at the top, side, and bottom against rubber gaskets. The door handle shall be a heavy-duty, stainless-steel locking handle.
4. Doors with mounted instruments or control devices shall be of sufficient width to permit door opening without interference from flush mounted instruments.

C. Dead Front Panels

1. The front panel shall be a hinged door, or doors, fabricated from USS 10 gage carbon steel sheet and suitably braced and supported to maintain alignment when instruments and control devices are installed.
2. Doors with mounted instruments or control devices shall be of sufficient width to permit door opening without interference from flush mounted instruments.

2.04 WALL AND UNISTRUT MOUNTED PANELS

A. Wall and Unistrut mounted panels shall meet the NEMA classification as shown in the panel schedules.

B. The enclosures shall be fabricated from USS 14 gage, or heavier, carbon steel, stainless steel, or fiberglass, suitably braced internally for structural rigidity and strength.

C. Floor stands shall be provided to support cabinets not fastened to a wall or other support. Floor stands shall be full-depth and shall have a minimum height of 12 inches. Floor stand material and finish shall match the cabinet.

2.05 ENVIRONMENTAL CONTROL

A. Corrosion Control

1. Provide corrosion protection in each control panel with a corrosion-Inhibiting vapor capsule as manufactured by Northern Technologies International Corporation, Zerust Excor VCI Emitters; Hoffman, Model A-HCI; or equal.

B. Enclosure Condensate Heaters

1. A self-contained enclosure condensation heater with thermostat and fan shall be mounted inside the control panel, if panel is to be installed outdoors or in a non-air-conditioned space:
   a. Enclosure heaters shall be energized from 120 volt, single-phase power supply and sized to prevent condensation within the enclosure.
   b. Locate enclosure heaters to avoid overheating electronic hardware or producing large temperature fluctuations on the hardware.
   c. Enclosure heaters shall have an internal fan for heat distribution and shall be controlled with adjustable thermostats. The thermostat shall have an adjustment range

of 40 degrees Fahrenheit to 90 degrees Fahrenheit. Provide a circuit breaker or fused disconnect switch within the enclosure.

d. Enclosure heaters shall be Hoffman type DAH.

2. Strip heaters may be provided if they are 240 volt rated, powered at 120 VAC and do not have a surface temperature higher than 60°C.

a. Strip heaters shall be Chromalox, Type OT, 1.5-in wide, 240 Volts, single phase, 150 watts, energized at 120 volts, with rust resisting iron sheath, Catalog No. OT-715, Product Code No. 129314. Provide sufficient wattage in heaters to prevent condensation should the interior temperature of the enclosure drop below the dew point.

b. A control thermostat mounted inside the control Panel shall be Chromalox, Type WR, single stage, Catalog No. WR-80, Product Code No.263177

c. The strip heater terminals shall be guarded by a protective terminal cover.

d. High temperature connecting lead wire shall be used between the thermostat and the heater terminals. Wire shall be No. 10 AWG stranded nickel-plated copper with Teflon glass insulation and shall be the product of Chromalox, Catalog No. 6-CFI-12, and Product Code No. 263783.

C. Enclosure Air Conditioner

1. Enclosures containing electronic devices or electrical equipment to be installed outdoors or in a non-air-conditioned space shall have air conditioners that will maintain the internal temperature at or below the equipment rating without violating the NEMA rating of the enclosure.

2. The panel builder shall provide panel internal heat rise calculations to show that the panel internal temperatures will be maintained below the maximum operating temperatures of the panel components:

a. For enclosures mounted indoors in non-air-conditioned spaces, include an ambient air temperature of 40 degree C and a humidity of 100% non-condensing.

b. For enclosures mounted in direct sunlight add the appropriate solar heat gain component to the calculation, and raise the ambient temperature to 60 degrees C.

c. The calculation shall show all the internal and external heat gain loads, the expected internal temperature rise in degrees C above the specified ambient without the air conditioner. Provide a calculation showing the expected temperature rise in degrees C above the specified ambient with the air conditioner running.

3. The air conditioner shall have the following features:

a. Use CFC-free R134a refrigerant.

b. Have fully gasket flanges on all four (4) mounting edges for a watertight seal that maintains NEMA rating of the panel.

c. Thermostatic low temperature control to provide energy efficient operation and prevents over-cooling.

d. EMI/RFI suppressor to minimize transient spikes during compressor on/off cycling.

e. Separated blower-driven evaporator and condenser air systems for closed loop cooling.

f. UL listed.

g. Stainless steel enclosure rated NEMA 4X.

h. viii. Internal corrosion resistant coating and/or galvanized steel components

i. Low ambient kit

j. Short cycle protector

4. Manufacturers:

a. Rittal

b. Cooper B-Line

c. ICE Cube

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION REQUIREMENTS

A. Installation requirements are specified in the Instrumentation and Control System section.

B. Equipment furnished under this section shall conform to the following manufacturing stipulations.

1. Piping

a. All tubing shall be run in horizontal and vertical planes and shall be rigidly supported to withstand handling and shipment.

b. Flexible polyethylene tubing shall be used to connect devices mounted on hinged doors.

C. Conduit Entrance

1. Conduits terminating at the control panel and originating from outside the room the control panel is located in shall be bottom entry only. Top entry shall not be permitted.

2. Control panels or enclosures installed outside shall not have any top panel penetrations. All penetrations shall be from the bottom or the side.

D. General Panel Wiring

1. All wiring shall be grouped or bundled and firmly supported inside the panel with nylon cable ties or routed in Panduit or similar nonmetallic slotted ducts.

2. Ducts shall be readily accessible within the panel, with removable covers, and with space equal to at least 40% of the depth of the duct remaining available for future use after completion of installation and field wiring. Sufficient space shall be provided between cable groups or ducts and terminal blocks for easy installation or removal of cables.

3. Each individual wire in power, control, and instrumentation circuits shall be provided with identification markers at each point of termination. The wire markers shall be positioned to be readily visible for inspection and the identification numbers shall match the identification on the supplier’s panel wiring drawings.

4. Wiring shall be free from kinks and sharp bends and shall be routed for easy access to other components for maintenance and inspection purposes.

5. Wiring between Panels
    a. The required circuit routing shall be where signal or loop wiring must be routed to more than one (1) panel or device, as indicated on the one-line diagrams.
    b. The panel fabricator shall provide such additional circuits as may be indicated on the electrical schematic Drawings.

E. Instrument Arrangement
1. Panel instruments and control devices shall be arranged in a logical configuration for the plant operators.
2. The centerline of recorders shall be within 3 feet and 5’-9" above the base of the panel for convenient reading and chart replacement.
3. Control switches shall be within 6 feet and 2’-6" above the base of the panel.
4. Indicators may be located within 2’-6" and 6’-6" above the base of the panels.
5. Annunciators and clocks may be mounted near the top of the panels.

F. Mounted Instruments
1. The front shall be stationary, with mounted instruments and control devices, fabricated from 3/16-inch carbon steel plate.
2. Panel fronts shall be suitably reinforced between mounting cutouts and drilling to support instruments and devices without deformation and shall be free from waves and other imperfections.
3. Panel fronts shall be recessed at the base.
4. Adjoining panel sections shall be accurately shop fitted to assure satisfactory assembly in the field.

3.02 CONTROL PANEL POWER AND WIRING

A. Power Entrance
1. The power entrance to each panel shall be provided with a surge protection device.
2. Refer to the Panel Mounted Instruments section for surge suppression requirements.

B. Power Wiring
1. Power distribution wiring on the line side of panel fuses shall be minimum 12 AWG.
2. Secondary power distribution wiring shall be minimum 14 AWG.
3. Wiring for AC power distribution, DC power distribution, intrinsically safe, and control circuits shall have different colors and shall agree with the color-coding legend on PCSI’s panel wiring diagrams.
4. With the exception of electronic circuits, all interconnecting wiring and wiring to terminals for external connection shall be stranded copper, insulated for not less than 600 volts, with a moisture resistant and flame-retardant covering rated for not less than 90°C.

C. Instrument and Control Wiring

1. All internal panel wiring shall be type stranded copper wiring rated not less than 600 volts.
2. Electronic analog circuits shall be twisted and shielded pairs rated not less than 300 volts. Analog circuits shall be separated from AC power circuits.
3. Intrinsically safe circuits shall be physically separated from other circuits in accordance with applicable codes.
4. Wires within the panel shall conform to the minimum size as shown in the table below.

Type	**Min. Wire Size**	**Color**
AC Control	16 AWG	Red
DC Control	16 AWG	Blue
Analog Circuits	18 AWG Twisted Pair	Brown

D. Terminal Blocks

1. Terminal blocks for external connections shall be suitable for 12 AWG wire and shall be rated 30 amperes at not less than 300 volts.
2. Terminal blocks shall be fabricated complete with marking strip, covers, and pressure connectors.
3. Terminals shall be labeled to agree with identification shown on the supplier's submittal drawings.
4. A terminal shall be provided for each conductor of external circuits, plus one ground for each shielded cable.
5. Not less than 8 inches of clearance shall be provided between the terminal strips and the base of vertical panels for conduit and wiring space.
6. Not less than 25% spare terminals shall be provided.
7. Each control loop or system shall be individually fused, and all fuses or circuit breakers shall be clearly labeled and located for easy maintenance.

3.03 FACTORY TEST

A. All panels shall be Factory Tested before shipping to project site. Refer to Section 40 61 21 – Process Control System Testing.

3.04 DEVICE TAG NUMBERING SYSTEM

A. All devices shall be provided with permanent identification tags. Panel, subpanel, and rack-mounted devices shall have laminated phenolic identification tags securely fastened to the device. Hand-lettered labels or tape labels will not be permitted.

3.05 SURGE WITHSTAND

A. All equipment shall meet all surge withstand capability tests as defined in ANSI C37.90 without damage to the equipment.

END OF SECTION

SECTION 40 67 63

UNINTERRUPTIBLE POWER SUPPLY

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the furnishing, installation, and services for Uninterruptible Power Supply (UPS) and accessories required for the Process Control System (PCS) as specified herein or as indicated on the Drawings.

B. Additional accessories and appurtenances shall be provided as specified herein to provide a complete and proper operating system.

C. The UPS shall supply PCS loads and other loads located in or external to the control room as indicated on Drawings.

D. The system shall convert incoming single phase, 60 Hz, power into DC power, maintain and charge backup batteries, and reconvert outgoing power into a sinusoidal single phase, 60 Hz, ac power source. The system shall consist of a rectifier, battery charger, batteries, inverter, integral static bypass switch, and maintenance bypass switch as required.

E. The exact UPS sizing and runtime calculations shall be performed by the Process Control System Integrator (PCSI), and submitted per Section 40 61 13 – Process Control System General Provisions.

1.02 ASSOCIATED SECTIONS

A. This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 13	Process Control System General Provisions
40 61 21	Process Control System Testing
40 61 26	Process Control System Training

1.03 GENERAL

A. Equipment furnished under the Uninterruptible Power Supply section shall be fabricated and assembled in full conformity with the Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by the Engineer.

B. The General Equipment Stipulations shall apply to all equipment and materials provided under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

C. Supplementing this section, the Drawings indicate locations and arrangement of enclosures and provide one-line diagrams regarding the connection and interaction with other equipment.

D. Each UPS shall be identified with a suitable engraved nameplate mounted on the top front. The nameplates shall be made of laminated black and white plastic. The lettering shall be bold, no less than 1/4 inch [6 mm] square, and engraved by cutting through the black outside layer so that the letters appear white.

1.04 DELIVERY, STORAGE, AND SHIPPING.

A. Delivery, storage, and shipping shall be as specified in the Instrumentation and Control System section.

1.05 SPARE PARTS

A. Spare parts shall be provided as indicated by the manufacturer.

PART 2 - PRODUCTS

2.01 GENERAL

A. Each UPS shall accept incoming 120 volts ac, 60Hz, single-phase utility power, apply surge protection, and supply power to the connected loads. The UPS shall be a double-conversion ("on-line") type to provide a breakless transfer to backup power. In the event of incoming power failure, the UPS shall provide 120 volts ac, 60 Hz, single-phase power to its connected loads by inverting power stored within integral storage batteries.

B. The UPS shall maintain a temperature-compensated, float charge voltage on the batteries when utility power is available. Overcurrent protection when utility power is available shall be from a circuit breaker internal to the UPS. The UPS shall be intrinsically current-limiting when the unit is on battery.

C. Static Inverter

1. The solid-state inverter shall employ silicon-controlled rectifiers (SCRs) and other devices for converting direct current power to essentially sinusoidal alternating current power. The static inverter shall conform to the following characteristics and requirements.

a. Automatic Synchronization: During normal operation, the inverter shall provide power to critical loads. The utility electric system will act as an alternate supply. Inverter equipment shall include stable solid-state devices designed to automatically maintain inverter output in phase with the utility electric system.

b. Overload, Short Circuit, and Load Loss: The inverter shall have input and output fuses and other equipment necessary to protect from overload, short circuit, and 100 percent loss of load. Current limiting features shall also be provided.

c. Loss of Supply Voltages: The inverter shall include protective devices to prevent damage resulting from excursion, loss, or restoration of its synchronization voltage and its dc input voltage and any inrush current occurrences associated with such conditions.

D. Static Transfer Switch

1. The static transfer switch shall use SCRs and other static devices to automatically transfer loads from the off-line (bypass) to the on-line operating condition and back again. In off

line mode, the static transfer switch shall connect clean filtered power to the load. The primary AC line shall be monitored and the load shall be transferred to the inverter if the voltage drops below 85 percent. During on line mode operation, any inverter problem shall cause an instantaneous transfer to the bypass mode.

2.02 DIN RAIL-MOUNTED UPS

A. Acceptable Manufacturers

1. Phoenix Contact QUINT4-UPS/1AC/1AC/1kVA/USB with Phoenix Contact batteries as required.
2. Approved Equal.

B. The UPS shall meet the following requirements.

1.	Capacity, minimum	1 kVA
2.	Filtering and surge Protection (on utility power)	Meets IEEE/ANSI C62.41 Category B (IEEE 587)
3.	Voltage, output (on battery)	120 volts ±3 percent
4.	Voltage, output (on-line)	Nominal ±3 percent
5.	Frequency and waveform, output (on battery)	60 ± 0.3 Hz, true sine-wave
6.	Efficiency, minimum (on-line)	90 percent
7.	Operating environment	0 to 40ºC; 0 to 95 percent relative humidity, non-condensing
8.	Backup time	14 minutes at full-load, 34 minutes at half-load.
9.	Recharge time, maximum to 90 percent of full charge	8 hours

C. The UPS shall have spare capacity of at least 30 percent based on actual connected loads. The System Supplier shall advise the Engineer if the UPS capacity needs to be higher than specified above to meet this requirement.

D. The UPS shall have a visual status indicator for low (or faulty) battery and incoming ac power failure. The UPS shall emit an audible signal when the UPS is operating on battery power. A relay shall be installed within the panel and its coil connected across the UPS input power as a means of providing a contact for remote indication of a power failure condition.

E. Batteries shall be sealed maintenance-free, gelled electrolyte lead-acid, or valve-regulated, maintenance-free, lead-acid. Flooded-electrolyte type batteries will not be acceptable.

F. Control, Indication, and Alarm

1. Remote Alarms. The UPS shall have the following provisions for remote alarms:
   a. An isolated, dry, alarm contact rated 3 amperes at 120 volts ac shall be provided with the UPS for remote indication of low battery and UPS fault.

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Installation requirements are specified in the Instrumentation and Control System section.

END OF SECTION

SECTION 40 70 00

INSTRUMENTS

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. This section covers the furnishing, installation, and services for all instruments and accessories required for the Process Control System (PCS) as specified herein or as indicated on the Drawings.

B. Equipment and services provided under this section shall be subject to all associated sections listed below.

C. This section shall be used and referenced only in conjunction with the Process Control System sections.

D. This section supplements the Process Control System section. Instrument data, special requirements, and options are indicated on the Drawings or the Instrument Device Schedule (IDS).

E. When multiple instruments of a particular type are specified, and each requires different features, the required features are described on the Drawings or the IDS.

1.02 ASSOCIATED SECTIONS

This section encompasses the equipment and services specified in the following sections:

SECTION	SPEC TITLE
40 61 13	Process Control System General Provisions
40 71 13	Magnetic Flow Meter
40 72 23	Radar Level Meter
40 72 76	Level Switches
40 73 13	Pressure and Differential Pressure Gauges
40 73 36	Pressure and Differential Pressure Switches
40 76 63	Diaphragm Seals
40 78 00	Panel Mounted Instruments

1.03 DESIGN CRITERIA

A. Each device shall be a pre-assembled, packaged unit. Upon delivery to the work site, each device or system shall be ready for installation with only minor piping and electrical connections required by the Contractor.

B. Primary elements shall derive any required power from the transmitter, unless otherwise indicated.

C. Provide surge protection on analog circuits that run outdoors.

D. The instruments shall be installed to measure, monitor, or display the specified process at the ranges and service conditions indicated on the Drawings or as indicated in the IDS. The instruments shall be installed at the locations indicated on the Drawings or in the IDS.

E. Instrument Calibrations

1. Where possible, each instrument shall be factory calibrated to the calibration ranges indicated in the Drawings or in the IDS. Flow meters shall be wet flow calibrated.
2. Transmitters or similar measurement instruments shall be calibrated using National Institute of Standards and Technology (NIST) approved bench calibration procedures, when such procedures exist for the instrument type.
3. Calibration data shall be stored digitally in each device, including the instrument tag designation indicated on the Drawings and/or IDS.

1.04 SUBMITTALS

A. Submittals shall be per Section 40 61 13 – Process Control System General Provisions section.

1.05 INSTRUMENT TAGS

A. All supplied instrument transmitters and instrument transmitter elements shall be provided with permanent 316 stainless steel identification tags attached to each transmitter and element. Hand-lettered labels or tape labels will not be permitted.

B. The tag shall be attached via stainless steel chain or stainless-steel wire (24 gauge minimum) to a non-removable part of the device.

C. The tag size shall be a minimum of 1.5 square inches.

D. The tag shall include the International Society of Automation (ISA) alphanumeric instrument number as indicated in the Piping and Instrumentation Diagram (P&ID), loop, and detail drawings.

E. The tag numbers shall agree with the Instrument Device Schedule and with the supplier's equipment drawings.

F. The alphanumeric instrument number shall be stamped into the tag and shall have a minimum of 3/16-inch high alphanumeric characters.

PART 2 - PRODUCTS

2.01 GENERAL

A. The associated sections listed above provide minimum device requirements. The Drawings or IDS shall be used to determine any additional instrument options, requirements, or service conditions.

2.02 INTERCONNECTING CABLE

A. For instruments where the primary element and transmitter are physically separated, the interconnecting cable from the element to the transmitter shall be provided.

B. The cable shall be the type approved by the instrument manufacturer for the intended purpose of interfacing the element to the transmitter.

C. The cable shall be provided in the length necessary for installation. Splices shall not be allowed in the installed cable.

D. The cable's minimum length shall be a minimum of three (3) meters or as indicated on the Drawings or in Section 40 70 93 – Attachment A – Instrument Device Schedule.

2.03 PROGRAMMING DEVICE

A. For instruments that require a dedicated programming device for calibration, maintenance, or troubleshooting, one such programming device shall be provided for each Owner facility.

B. The programming device shall be complete, newly purchased for this project, and shall be in like-new condition when turned over to the Owner at completion of startup.

C. The programming device shall include appropriate operation manuals and shall be included in the training requirements.

D. For systems that allow the programming device functions to be implemented in software and running on a laptop computer, the software shall be provided instead of the programming device.

2.04 CONFIGURATION SOFTWARE/SERIAL INTERFACE

A. Devices indicated as requiring a serial interface shall be provided with all accessories required to properly communicate over the serial link.

B. At a minimum, an appropriate cable shall be provided to allow the transmitter serial interface to be connected to a personal computer.

C. One (1) licensed copy of the diagnostic/interface software shall be provided for each Owner facility.

D. Software shall be capable of running under the Windows 10 operating system. If the software furnished performs the same functions as the programming device, specified elsewhere, then the programming device shall not be furnished.

PART 3 - EXECUTION

3.01 GENERAL

A. The manufacturer's field services shall be provided for installation, field calibration, startup, and training as specified in the Instrumentation and Control System section.

3.02 MANUFACTURER'S FIELD SERVICES

A. If indicated in the individual instrumentation sections, the instrument manufacturer or manufacturer's certified service representative shall provide start-up and training services. This work shall not be done by the Process Control System Integrator (PCSI) contractor.

B. The field services shall be to calibrate, oversee the installations of the sensor, and start-up the sensor/transmitter to provide reliable measurement at the instrument and to a remote system. The vendor shall work with the PCSI and Applications Services Provider (ASP) to verify the transmitter sends correct information to the remote system (i.e., that the scaling and units are the same at the instrument and on the remote operator interface).

3.03 INSTRUMENT SHIPPING

A. The PCSI shall be responsible for coordinating the installation schedule with the Installation Contractor.

B. Instruments shall not be shipped to the work site until two (2) weeks prior to the scheduled installation.

C. Each shipment shall contain a listing of protective measures required to maintain sensor operation, including a listing of any common construction or cleaning chemicals that may affect instrument operation.

3.04 INSTRUMENT INSTALLATION

A. Instrumentation and accessory equipment shall be installed in accordance with the manufacturer's instructions.

B. Instrumentation and control equipment and device locations shown on the Drawings are approximate. Exact locations shall be relatively close to the indicated location.

C. Instruments shall be mounted so that they can be easily read and serviced and so that all appurtenant devices can be easily operated.

D. Installation details for some instruments are indicated on the Drawings. Where specific installation details are not shown, the American Petroleum Institute (API) recommended practice 550 shall be followed.

E. In case of any interference with other work, proceed as directed by the Engineer.

F. All equipment used in classified areas shall be designed for the Class, Group, and Division as required for the locations as shown on the Drawings and specified in Division 26. All work shall be in strict accordance with codes and local rulings.

G. Provide brackets and hangers required for equipment mounting.

H. Provide sunshades for equipment mounted outdoors in direct sunlight. Sunshades shall include standoffs to allow air circulation around the cabinet. Orient equipment outdoors to face North or as required to minimize the impact of glare and ultraviolet exposure on digital readouts.

3.05 TRAINING

A. Training shall be in accordance with Section 40 61 26 – Process Control System Training.

B. While the instrument manufacturer or manufacturer's certified service representative is starting up the instrumentation, training shall be provided to the Owner's instrumentation technicians.

C. The training shall be on how to calibrate, install, troubleshoot, read the diagnostics, and maintain the sensor and transmitter.

3.06 INSTRUMENT DEVICE SCHEDULE

A. Section 40 70 93 – Attachment A - Instrument Device Schedule is included to provide further details and requirements for the instruments.

B. The Instrument Device Schedule contains only major plant instrumentation devices. Devices such as switches and indicating lights located on Motor Control Centers (MCCs) or local panels and gate/valve actuators are not included.

C. The Instrument Device Schedule includes the following information:

1. Item: An arbitrary sequential number that is for reference only.
2. System Code: The system code, which denotes the associated process.
3. Loop No.: The numeric (or alphanumeric) loop designation for the instrument.
4. Tag No.: The ISA alpha tag representing the function of the instrument.
5. Service Description: The description of the instrument service (Example: Fine Screen Level High).
6. Device Type: The instrument device type that should match the description as listed in the Specification.
7. Component Options: The instrument component options and indicates specific features and requirements, such as integral/remote mounted installations, valve manifolds, diaphragm seal, etc.
8. Size: The instrument device size (such as the diameter of flow meters).
9. Output Type: Output signal type, 4-20mA or "Dry Contact." It could also be a serial output for smart devices (such as HART or FLD-BUS) but only if the serial output is the primary Input/Output (I/O) interface.
10. Output Range/Setpoint: The calibrated range for the analog devices or the trip point(s) for the discrete devices.
11. Power: The instrument power requirements such as "2-wire" for loop powered devices, or "4-wire" for 120-volt powered devices.
12. Installation Details No.: The drawing number of the Installation Details Drawing where the device mounting instruction is provided.
13. Location Drawing No.: The drawing number of the Process/Mechanical Drawing where the device location is shown.

14. Drawing/P&ID No.: The drawing number of the Drawing or P&ID where the device is shown.
15. Specification Section No.: The section in the Specifications where the device is specified.
16. Remarks: A cross-reference to another Specification Section where applicable, or to a note which provides additional information.

END OF SECTION

Item	System Code	Loop No.	Tag No.	Service Description	Device Type	Component Options	Size	Output Type	Output Range/Setpoint	Power	Installation Details No.	Location Drawing No.	Drawing/P&ID No.	Specification Section No.	Remarks
1	INT	110	LSHH-110	LIFT STATION WETWELL HIGH-HIGH LEVEL	LEVEL SWITCH - FLOAT		N/A	DRY CONTACT	N/A	N/A	3	I005	I003	40 72 76	
2	INT	110	LSH-110	LIFT STATION WETWELL START LAG PUMP	LEVEL SWITCH - FLOAT		N/A	DRY CONTACT	N/A	N/A	3	I005	I003	40 72 76	
3	INT	110	LSM-110	LIFT STATION WETWELL START LEAD PUMP	LEVEL SWITCH - FLOAT		N/A	DRY CONTACT	N/A	N/A	3	I005	I003	40 72 76	
4	INT	110	LSL-110	LIFT STATION WETWELL STOP ALL PUMPS	LEVEL SWITCH - FLOAT		N/A	DRY CONTACT	N/A	N/A	3	I005	I003	40 72 76	
5	INT	110	LSLL-1110	LIFT STATION WETWELL LOW-LOW LEVEL	LEVEL SWITCH - FLOAT		N/A	DRY CONTACT	N/A	N/A	3	I005	I003	40 72 76	
6	INT	110	LIT-110	LIFT STATION WETWELL LEVEL	RADAR LEVEL TRANSMITTER		N/A	4-20mA	0-15 FT	2-WIRE	2	I005	I003	40 72 23	
7	INT	101	PG-120	LIFT STATION PUMP NO. 1 DISCHARGE PRESSURE GAUGE	PRESSURE GAUGE		N/A	N/A	N/A	N/A	5	I005	I003	40 73 13	
8	INT	101	PSH-120	LIFT STATION PUMP NO. 1 DISCHARGE HIGH PRESSURE SWITC	PRESSURE SWITCH		N/A	DRY CONTACT	TBD	N/A	5	I005	I003	40 73 36	
9	INT	120	PIT-120	LIFT STATION FORCE MAIN EFFLUENT PRESSURE	PRESSURE TRANSMITTER		N/A	4-20mA	0-100 PSIG	2-WIRE	6	I005	I003	40 73 26	
10	INT	120	FE/FIT-120	LIFT STATION FORCE MAIN EFFLUENT FLOW	MAGNETIC FLOWMETER		8"	ETHERNET/IP	0-2100 GPM	2-WIRE	1	I005	I003	40 71 13	

SECTION 40 71 13

MAGNETIC FLOW METER

PART 1 - GENERAL

1.01 SCOPE

A. Refer to Section 40 70 00 – Instruments.

PART 2 - PRODUCTS

2.01 IN-LINE MAGNETIC FLOWMETER

A. Manufacturer

1. Flow meters to be:

a. Endress+Hauser Promag W400.

b. No equal

B. Construction

1. The magnetic flow meter shall be a completely obstructionless, in-line device ensuring unrestricted fluid flow.
2. Consists of a metallic tube with flanged ends equipped with grounding rings or grounding electrodes as per application requirements.
3. Flange diameter and bolt drilling pattern shall adhere to ANSI/ASME B16.5 for line sizes ranging from one-half inch to 24 inches or AWWA C207 for sizes exceeding 24 inches. Flange class ratings and maximum pressure ratings must align with adjoining piping specifications.
4. For pipe sizes up to six (6) inches [150 mm], flangeless wafer insert style meters may be used provided compatibility with adjacent piping flanges.
5. Self-cleaning electrodes are mandatory for all meters designated for sludge metering.
6. Electrode and liner materials must be fully compatible with the process fluid, approved by the Engineer, and compliant with specified requirements in the instrument device schedules.
7. Each meter shall be factory wet flow calibrated, aligning with National Institute of Standards and Technology (NIST) or other standards acceptable to the Engineer. A copy of the calibration report shall be included in the operation and maintenance manual.
8. The flow meter shall be capable of standing empty for extended periods of time without damage to any components.
9. The meter housing shall be splash-proof and drip-proof, except when indicated on the Drawings or in the Instrument Device Schedule (IDS) that the flow meter is to be submersible.
10. Submersible flow meters shall be able to withstand submergence in 30 feet of water for 48 hours without damage.

C. Hazardous Area Suitability

1. Where designated on the Drawings or in the Instrument Device Schedule, the flow meter shall be suitable for use in a Class I, Division 2, hazardous area.

2.02 MAGNETIC FLOW METER SIGNAL CONVERTER

A. Manufacturer

1. Signal converters must be of the same brand as the magnetic flow meters.

B. Installation

1. Shall be separately mounted.

C. Functional Features

1. Signal converters shall be microprocessor-based.
2. The converters shall include:
    a. Output damping for stable readings.
    b. Self-testing and diagnostic capabilities to ensure proper functioning.
    c. Built-in Calibration for ease of maintenance.
3. Empty Pipe Zero Input for enhanced functionality.
4. Zero Up and Zero Down installation capabilities (0xDN)
5. Analog Output of 4-20 mA DC for transmission purposes
6. Communication: Ethernet TCP/IP.
7. Power: 24VDC
8. Additional Features (Optional per Drawings or Instrument Device Schedule):
    a. Where specified, the converter shall feature a pulse output designed to operate a remote seven-digit totalizer. This output will be scaled to ensure continuous operation of the totalizer for 60 days at 100% flow without repetition. The scaling factors should allow field adjustment and ensure a totalizer multiplier of a power of 10.
    b. Capable for bi-directional flow measurement.
    c. The converter may feature either a non-reset seven-digit or a manually reset six-digit totalizer on the enclosure face, as indicated.

D. Accuracy

1. The combined accuracy of the magnetic flow meter transmitter and signal converter shall be within ±0.5 percent of the actual flow rate for full-scale settings ranging from 3 to 30 fps [0.91 to 9.14 m/s].

E. Cabling

1. The manufacturer shall provide a continuous signal cable between the converter and the magnetic flow meter, ensuring no splicing along the length.

F. Construction

1. Housing shall be in a corrosion-resistant, weatherproof National Electrical Manufacturers Association (NEMA) Type 4X enclosure.
2. Signal converters shall be suitable for operation within an ambient temperature range of -30 to +140°F [-34 to +60°C] and a relative humidity range of 10 to 100 percent.
3. Transmitters specified as indicating type shall contain a local indicator with a minimum four-digit LCD display scaled to read engineering units of flow.
4. Magnetic flow meter systems shall provide zero flow stability by means of automatic zero adjustment of a DC excited metering circuit. Converters shall be capable of bi-directional flow measurement. Signal converters shall be of the same brand as the magnetic flow meters.

G. Maintenance and Calibration:

1. Utilization of a hand-held communicator/calibrator device for diagnosis and recalibration purposes. One such device shall be provided for all converters by a single manufacturer.

PART 3 - EXECUTION

3.01 GENERAL

A. See Section 40 70 00 – Instruments.

END OF SECTION

SECTION 40 72 23

RADAR LEVEL METER

PART 1 - GENERAL

1.01 SCOPE.

A. The Level Measurement Section covers the furnishing of level instruments and accessories required for the Process Control System (PCS) as specified herein or as indicated on the Drawings.

B. Refer to section 40 70 00 - Instruments for general requirements.

PART 2 - PRODUCTS

2.01 NON-CONTACT RADAR LEVEL TRANSMITTER

A. Type

1. Non-contact, microwave type level meter.
2. Low 6.3 GHz radar frequency for continuous level measurement of liquid, slurry and sludge processes in storage vessels that may be turbulent, have heavy vapors and foaming conditions in nominal pressure and temperature.
3. Antenna: Rod, Horn, Parabolic, or Encapsulated. The type chosen shall be based upon the type of process being measured and in what storage vessel is being used.

B. Function/Performance

1. Measuring Range: Range shall be suitable for the installation indicated,
2. Accuracy: Plus or minus 0.32 inches (8 mm).
3. Operating Temperature: –40 to 65 degrees C.
4. Output: Isolated 4-20 mA output.
5. Display: Digital indicator displaying level or volume in engineering units or percent, as indicated on the Drawings or in the Instrument Device Schedule.
6. Diagnostics: On-screen instructions and display of self-diagnostics.

C. Physical

1. Antenna shall be PVDF, Type 316 stainless steel, Hastelloy C or other material depending upon its compatibility to the process in which it is measuring. Transmitter and antenna shall be integral.
2. Instrument shall be provided with a minimum Class 150 pound (DN 80, PN16) mounting flange to match vessel flange size, material and class.
3. Housing shall be NEMA 4X (IP66). Where the instrument is installed in a hazardous area, the housing shall be explosion-proof, approved for Class I, Division 1, Groups C and D (EEx d IIB T4) installation. The instrument shall be certified for installation of the antenna in a Class I, Division 1, Groups C and D (Zone 0) environment.

4. Power Requirements: 12-35 VDC loop powered.
5. Remote Display: Digital indicator displaying level or volume in engineering units or percent, as indicated on the Drawings or in the Instrument List. Display unit shall also be used to remotely program the transmitter.

D. Accessories Required

1. Where required for calibration/programming, a hand-held programmer shall be provided.

E. Manufacturer Start-up and Training Services

1. Provide manufacturer's start-up and training services as specified in the start-up and training services paragraph.

F. Manufacturer

1. Endress & Hauser FMR30
2. No equal.

PART 3 - EXECUTION

3.01 GENERAL

A. See section 40 70 00 - Instruments.

END SECTION

SECTION 40 72 76

LEVEL SWITCHES

PART 1 - GENERAL

1.01 SCOPE

A. This section covers the furnishing of flow instruments and accessories required for the Process Control System (PCS) as specified herein or as indicated on the Drawings.

B. Refer to Section 40 70 00 – Instruments for general requirements.

PART 2 - PRODUCTS

2.01 FIXED-MOUNT FLOAT TYPE LEVEL SWITCHES

A. Manufacturer(s)
   1. Evoqua Water Technologies Model 9G-EF.
   2. Approved equal.

B. Type
   1. Mercury-free ball float.

C. Functionality
   1. Switch contacts shall be single pole, double throw.
   2. Contacts shall be rated 1-amp at 120 VAC.

D. Construction
   1. Nominal 5-1/2 inch diameter.
   2. Coated stainless steel float ball containing sealed switch assembly.
   3. Synthetic rubber hinge hosing the lead wires from the switch.
   4. Lead wires shall be a waterproof cable with the required length to terminate in a junction box without splicing.

E. Installation
   1. The float shall be supported by a flexible synthetic rubber hinge fastened to an adjustable mounting bracket.
   2. Stainless steel mounting hardware and accessories shall be provided as required.

PART 3 - EXECUTION

3.01 GENERAL

A. Refer to Section 40 70 00 – Instruments.

END OF SECTION

SECTION 40 73 13

PRESSURE AND DIFFERENTIAL PRESSURE GAUGES

PART 1 - GENERAL

1.01 SCOPE

A. Refer to Section 40 70 00 Instruments.

PART 2 - PRODUCTS

2.01 FIELD-MOUNT GAUGE PRESSURE

A. Manufacturer:
   1. Pressure gauges to be Ashcroft “1279 Duragauge,” or equal.

B. Construction:
   1. Type: Indicating dial.
   2. Bourdon tube: C type phosphor bronze.
   3. Movement: Stainless steel rotary geared.
   4. Case: Phenolic or polypropylene open front turret.
   5. Pointer: Adjustable.
   6. Ring: Stainless steel, phenolic, or polypropylene.
   7. Window: Acrylic plastic or shatterproof glass.

C. Gauge Dial Specifications:
   1. Size: 4 1/2 inch [114 mm].
   2. Background: White with black markings.
   3. Units: Clearly indicated on the dial face.
   4. Scale: Subdivisions conform to governing standard.
   5. Pointer Travel: Between 200 and 270 degrees of arc.

D. Connection Requirements:
   1. Surface-mounted gauges: 1/4 inch [6 mm] NPT connections.
   2. Stem-mounted gauges: 1/2 inch [12 mm] NPT connections.
   3. Adjustable viewing angle for stem-mounted gauges, as indicated.

E. Measurement and Accuracy:
   1. Measurement: Pressure gauges in psi [kPa], vacuum gauges in inches [mm] water.
   2. Normal conditions: Suitable range for mid-scale readings.
   3. Gauge accuracy: 0.5 percent of scale range.

F. Gauge Valve Specifications:

1. In-Line manifold: Shall have two-valve configuration for easy process isolation and draining/venting
2. Materials compatible with the measured process.
3. Unspecified process: AISI Type 316 stainless steel wetted parts and Teflon seals.
4. Multi-port valves: Unused ports plugged.

G. Optional Diaphragm Seal:

1. As per Drawings or Instrument Device Schedule requirements.
2. Thread-attached type with specific materials and features.
3. Factory assembled, filled with suitable fluid, and calibrated as a unit.

PART 3 - EXECUTION

3.01 GENERAL

A. See Section 40 70 00 – Instruments.

3.02 INSTALLATION REQUIREMENTS:

A. Install at specified locations indicated on the Drawings and conform to the installation details.

B. Install in the vertical, upright positioning for gauges, snubbers, and diaphragm seals.

C. Thread sealer suitable for use with the associated process to be used in assembly of threaded connections.

D. Connections shall be leak free. Lines shall be purged at gauge locations before installation of diaphragm or gauge.

E. Each gauge supplied with necessary mounting hardware.

F. Conforms to mounting requirements in the Drawings or Instrument Device Schedule (IDS).

G. Unless specified otherwise, mounting and installation hardware to be Type 316L stainless steel.

END OF SECTION

SECTION 40 73 26

PRESSURE TRANSMITTERS

PART 1 - GENERAL

1.01 SCOPE

A. Refer to Section 40 70 00 – Instruments.

PART 2 - PRODUCTS

2.01 PRESSURE TRANSMITTERS

A. Manufacturer:
   1. Endress+Hauser “Cerabar S” or “Deltabar S Series.”
   2. Rosemount “Model 3051.”
   3. No equal.

B. Construction:
   1. Type: All solid-state electronic, two-wire device requiring no direct power connection to the transmitter.
   2. Sensing Element: AISI Type 316 stainless steel, Hastelloy C, ceramic, or cobalt chromium nickel alloy diaphragms.
      a. The transducer shall be isolated from process fluid.
      b. The transducer may utilize silicone oil fluid fill for isolation.
   3. Housing: National Electrical Manufacturers Association (NEMA) Type 4X for environmental protection suitable for operating temperatures of 0°F to 180°F (-17°C to +82°C) and relative humidity of 5% to 100%.
   4. Parts: Cadmium plated carbon steel, stainless steel, or other corrosion-resistant materials.
   5. Not susceptible to damage by reverse polarity.

C. Functionality:
   1. Self-diagnostics.
   2. Electronically adjustable span, zero, and damping.
   3. Over-range protection up to maximum line pressure.
   4. Elevated or suppressed zero.
   5. Transmitter output: 4-20 mA DC without the need for external load adjustment.

D. Measurement and Accuracy:
   1. Accuracy: 0.075% of span.
   2. Turndown Ratio: 30:1 or higher.

2.02 MOUNTING AND CALIBRATION:

A. Mounting: Brackets provided for wall and pipe-stand mounting.

B. Calibration: Factory calibrated to the required range.

C. Manufacturer's standard handheld communications/calibration device provided for all transmitters by a single manufacturer.

2.03 ADDITIONAL FEATURES:

A. Indicating Type Transmitters: To be furnished with LCD-type digital indicators.

B. Differential Pressure Type: For calibrated spans less than 8 psig (55 kPa gauge), transmitters with side vents shall be used.

2.04 ACCESSORIES

A. In-Line manifold: Manifold shall assemble directly to in-line pressure transmitters for simple in-process calibration. Shall have two-valve configuration for easy process isolation and draining/venting.

PART 3 - EXECUTION

3.01 GENERAL

A. See Section 40 70 00 – Instruments.

3.02 INSTALLATION REQUIREMENTS:

A. Install at specified locations indicated on the Drawings and conform to the installation details.

B. Install in the vertical, upright positioning for gauges, snubbers, and diaphragm seals.

C. Thread sealer suitable for use with the associated process to be used in assembly of threaded connections.

D. Connections shall be leak free. Lines shall be purged at gauge locations before installation of diaphragm or gauge.

E. Each transmitter supplied with necessary mounting hardware.

F. Conforms to mounting requirements in the Drawings or Instrument Device Schedule (IDS).

G. Unless specified otherwise, mounting and installation hardware to be Type 316L stainless steel.

END OF SECTION

SECTION 40 73 36

PRESSURE AND DIFFERENTIAL PRESSURE SWITCHES

PART 1 - GENERAL

1.01 SCOPE

A. Refer to Section 40 70 00 – Instruments.

PART 2 - PRODUCTS

2.01 PRESSURE SWITCHES

A. Manufacturers:
   1. Ashcroft.
   2. Dwyer/Mercoid.
   3. ITT/NeoDyn.

B. Construction:
   1. Type: Diaphragm actuated switches.
   2. Adjustability: Field adjustable with trip point repeatability better than 1% of the actual pressure.
   3. Over-Range Protection: Capable of handling maximum process line pressure.
   4. Housing:
      A. Panel-mounted: National Electrical Manufacturers Association (NEMA) Type 1.
      B. Other switches: Weatherproof housings.
   5. Electrical Rating: Minimum SPDT, rated 10A at 120V AC.
   6. Compatibility: Wetted parts must match process fluid.
      a. Unspecified Process: Teflon-coated or Viton wetted parts; stainless steel connection port.

C. Switch Types:
   1. Differential Type: Where indicated in the Instrument Device Schedule (IDS).

D. Mounting and Connections:
   1. Panel and Surface-mounted: 1/4 inch [6 mm] NPT connections.
   2. Stem-mounted: 1/2-inch (12 mm) NPT connections.

E. Pressure and Vacuum Measurement:
   1. Pressure Switches: Ranged in psi (kPa).
   2. Vacuum Switches: Ranged in inches (mm) of water.
   3. Deadband: Fixed with auto-reset type (unless specified otherwise).

F. Shutoff Valves:

1. Each switch to have: Threaded end, ball-type shutoff valve.
2. Valve Materials: Compatible with process fluid.
3. Unspecified process: AISI Type 316 stainless steel wetted parts; Teflon seals.
4. Multi-Port Valves: Unused ports to be plugged.

G. Additional Components (Where Indicated):

1. Diaphragm Seals: Thread-attached type with specified materials and features for each switch.

PART 3 - EXECUTION

3.01 GENERAL

A. See Section 40 70 00 – Instruments.

3.02 INSTALLATION REQUIREMENTS:

A. Install at specified locations indicated on the Drawings and conform to the installation details.

B. Install in the vertical, upright positioning for gauges, snubbers, and diaphragm seals.

C. Thread sealer suitable for use with the associated process to be used in assembly of threaded connections.

D. Connections shall be leak free. Lines shall be purged at gauge locations before installation of diaphragm or gauge.

E. Each gauge supplied with necessary mounting hardware.

F. Conforms to mounting requirements in the Drawings or IDS.

G. Unless specified otherwise, mounting and installation hardware to be Type 316L stainless steel.

END OF SECTION

SECTION 40 73 63

DIAPHRAGM SEALS

PART 1 - GENERAL

1.01 SCOPE

A. Refer to Section 40 70 00 – Instruments.

PART 2 - PRODUCTS

2.01 DIAPHRAGM SEALS

A. Manufacturer
   1. Ashcroft.
   2. Or equal.

B. Type
   1. Thread-attached type.

C. Functionality
   1. Pressure rating range shall be vacuum to 1,500 psi at 100°F.
   2. Tolerance of ±0.5%.

D. Construction
   1. Wetted components
      a. Removable AISI Type 316 stainless steel diaphragm.
   2. Upper housing shall be:
      a. Zinc or cadmium plated carbon steel.
      b. Contoured to fit and provide a seat and seal for the diaphragm and shall be designed to permit removal of the switch with the system under pressure.
   3. Lower housing shall be:
      a. Stainless steel.
      b. Provided with a tapped and plugged 1/4-inch NPT flushing connection.

E. Installation
   1. Each diaphragm seal shall be factory assembled to the switch or transmitter, filled with a suitable fluid, and calibrated as a unit.
   2. All diaphragm seal (switch or transmitter) assemblies shall be installed in the vertical, upright position.
   3. Thread sealer, suitable for use with the associated process, shall be used in the assembly of threaded connections.

4. All connections shall be free from leaks.
5. Lines shall be purged of trapped air at switch or transmitter locations prior to the installation of the assembly.

PART 3 - EXECUTION

3.01 GENERAL

A. See Section 40 70 00 –Instruments.

END OF SECTION

SECTION 40 78 00

PANEL MOUNTED INSTRUMENTS

PART 1 - GENERAL

1.01 SCOPE

A. Refer to Section 40 70 00 – Instruments.

PART 2 - PRODUCTS

2.01 SELECTOR SWITCHES

A. Manufacturer:
   1. Allen Bradley “800T.”
   2. Eaton/Cutler-Hammer “10250T.”
   3. General Electric “CR104P.”

B. Type:
   1. Devices shall be 30.5-mm, heavy-duty, oil-tight type.

C. Construction:
   1. Switches shall be gloved hand or wing lever.
   2. Electric circuits shall have silver butting or sliding contacts, rated 10 amperes continuous at 120 V AC.
   3. Switches used in electronic signal circuits shall have contacts suitable for that duty.
   4. Contact configuration shall be as indicated on the Drawings or for the application.
   5. Position legends shall be engraved on the switch faceplate.

2.02 INDICATING LIGHTS

A. Manufacturer:
   1. Eaton/Cutler-Hammer “10250T.”
   2. General Electric “CR104P.”
   3. Allen Bradley “800T.”

B. Type:
   1. Devices shall be 30.5-mm, heavy-duty, oil-tight type.
   2. Full voltage LED lamps.
   3. Lights shall be push-to-test type.

C. Construction
   1. Legends shall be engraved on a pilot light faceplate.

2.03 PUSH BUTTONS

A. Manufacturer:
   1. Eaton/Cutler-Hammer “10250T.”
   2. General Electric “CR104P.”
   3. Allen Bradley “800T.”

B. Type:
   1. Devices shall be 30.5-mm, heavy-duty, oil-tight type.

C. Construction:
   1. Legends shall be engraved on the push-button faceplate.
   2. Contacts shall be rated 10 amperes continuous at 120 V AC.

2.04 POWER SUPPLIES

A. Manufacturer:
   1. Phoenix Contact.
   2. PULS.
   3. Or equal.

B. Type: DIN-Rail mounted

C. Functionality:
   1. Multiloop Power Supplies.
      a. Multiloop or multisystem power supplies will be acceptable if backup power supply units are provided, which will automatically supply the load upon failure of the primary supply. The backup supply systems shall be designed so either the primary or the backup supply can be removed, repaired, and returned to service without disrupting the instrument system operation.
      b. Connections shall be individually fused so a fault in one (1) instrument loop will be isolated from the other loops being fed from the same supply.
      c. Shall be oversized for an additional 10% future load.
      d. Failure of a multiloop supply shall be indicated on the respective instrument panel or enclosure.

D. Construction:
   1. Regulated DC power supplies for instrument loops shall be designed and arranged so that loss of one (1) supply does not affect more than one (1) instrument loop or system.
   2. Power supplies shall be suitable for an input voltage variation of ±10 percent, and the supply output shall be fused or short-circuit protected.
   3. Output voltage regulation shall be by the instrumentation equipment supplied.

4. Fuses shall be clearly labeled and shall be located for easy access.

2.05 RELAYS

A. Manufacturer:

1. Phoenix Contact
2. IDEC “Series RR.”
3. Potter & Brumfield “Series KRP, CB.”

B. Type:

1. Relays indicated to be provided in panels, enclosures, or systems furnished under this section shall be of the plug-in socket base type with dustproof plastic enclosures unless noted otherwise.

C. Functionality:

1. Time delay relays shall have dials or switch settings engraved in seconds and shall have timing repeatability of ±2 percent of setting.
2. Latching and special purpose relays shall be for the specific application.

D. Construction:

1. Control circuit relays shall have silver cadmium oxide contacts rated 10 amperes at 120 V AC.
2. Electronic switching-duty relays shall have gold-plated or gold alloy contacts suitable for use with low-level signals.
3. Relays used for computer input, alarm input, or indicating light service shall have contacts rated at least 3 amperes.
4. Relays shall be UL recognized and shall not have less than double-pole, double-throw contacts.
5. Unless otherwise indicated, all relays shall have an integral pilot light that illuminates to indicate an energized condition.

2.06 INTRINSICALLY SAFE RELAYS

A. Manufacturer:

1. Phoenix Contact
2. GEMS.
3. Eaton/MTL.

B. Type:

1. Relays shall be solid-state electronic type in which the energy level of the sensing or actuation circuit is low enough to allow safe use in hazardous areas.

C. Installation:

1. Relays shall be located in non-hazardous areas.

2.07 INTRINSICALLY SAFE BARRIERS

A. Manufacturer:

1. Phoenix Contact
2. MTL.
3. R. Stahl, Inc.

B. Type:

1. Barriers shall be solid-state electronic type in which the energy level of the sensing or actuation circuit is low enough to allow safe use in hazardous areas.

C. Installation:

1. Barriers shall be located in non-hazardous areas.

2.08 ELECTRONIC SIGNAL BOOSTER/ISOLATORS

A. Manufacturer:

1. Acromag.
2. Moore Industries-International, Inc.
3. Phoenix Contact.

B. Type:

C. Functionality:

1. Accuracy shall be ±0.15 percent of the signal circuit’s measurement span.

D. Construction:

1. Electronic signal boosters and isolators shall have all solid-state circuitry and complete electrical isolation between the power supply and the input and output signals.

2.09 INTEGRATORS

A. Manufacturer:

1. Acromag.
2. Ametek Power Instruments.
3. Moore Industries-International, Inc.

B. Functionality:

1. The integrator shall be calibrated so that at 100% input signal, the totalizer will operate for 60 days without repeating.
2. The output pulse rate shall be field adjustable.

3. The integrator shall accept a linear input signal.
4. The integrator output shall be coordinated with the totalizer supplied.
5. Accuracy of the integrator shall be ±0.15 percent of the signal circuit's measurement span.
6. The integrators shall have an adjustable dropout feature that cuts off the output at input signals below 2 to 10 percent.

C. Construction:

1. Electronic integrators shall have all solid-state circuitry and shall be suitable for mounting in the back of the panel.

PART 3 - EXECUTION

3.01 GENERAL

A. The manufacturer's field services shall be provided for installation, field calibration, startup, and training as specified in the Instrumentation and Control System section.

B. Instruments shall not be shipped to the Work Site until two (2) weeks prior to the scheduled installation.

C. The system supplier shall be responsible for coordinating the installation schedule with the Installation Contractor.

D. Each shipment shall contain a listing of protective measures required to maintain sensor operation, including a listing of any common construction or cleaning chemicals that may affect instrument operation.

END OF SECTION

SECTION 432513 - SUBMERSIBLE CENTRIFUGAL PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Submersible centrifugal pumps.

1.2 REFERENCE STANDARDS

A. ASTM International:

1. ASTM A48 - Standard Specification for Gray Iron Castings.
2. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes.

B. National Electrical Manufacturers Association:

1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

1.3 COORDINATION

A. Section 013000 - Administrative Requirements: Requirements for coordination.

1. Coordinate Work of this Section with installation of process piping.

1.4 SCHEDULING

A. Section 013000 - Administrative Requirements and/or 013216 - Construction Progress Schedule: Requirements for scheduling.

B. Schedule Work of this Section prior to connecting piping work.

1.5 SEQUENCING

A. Section 011000 - Summary: Requirements for sequencing.

B. Sequence Work of this Section to prevent interference with system operations.

1.6 SUBMITTALS

A. Section 013300 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit information concerning materials of construction, fabrication, and protective coatings.

C. Shop Drawings:

1. Submit detailed dimensions for materials and equipment, including wiring and control diagrams, performance charts and curves, installation and anchoring requirements, fasteners, and other details.
2. Include manufacturer's specified displacement tolerances for vibration at operational speed specified for pumps.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Instructions: Submit detailed instructions on installation requirements, including storage and handling procedures.

F. Source Quality-Control Submittals: Indicate results of shop and/or factory tests and inspections.

G. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.

H. Manufacturer Reports: Indicate that equipment has been installed according to manufacturer's instructions.

I. Warranty: The contractor shall submit manufacturer’s standard warranty and a performance affidavit for equipment to be furnished in accordance with this section. The warranty for workmanship and materials shall be manufacturer's standard, which shall be a minimum of one year from owner acceptance of installed equipment.

J. Clog Free Guarantee: Pump supplier shall provide a 1-Year Clog Free Guarantee for operation in standard sewage. If clogging occurs in standard sewage the pump manufacturer shall pay to pull and unclog the pump in the first year of operation.

K. Submit qualifications for manufacturer.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Spare Parts:
1. Process pumps:
   a. 1 set for each size and type of pump:
      1) Impeller, and
      2) Insert ring.
   b. Manufacturer recommended spare parts.

C. Tools: Furnish special wrenches or other devices required for Owner to maintain and calibrate equipment.

1.8 CLOSEOUT SUBMITTALS

A. Section 017000 - Execution and Closeout Requirements: Requirements for closeout procedures.

B. Project Record Documents: Record actual locations and final orientation of equipment and accessories.

1.9 QUALIFICATIONS

A. Manufacturer:
1. The pump manufacturer shall have a minimum of 10,000 heavy-duty submersible wastewater pumps installed and operating for no less than five years in the United States.
2. Shall have a factory authorized service center in the region of the project installation.

1.10 WARRANTY

A. Section 017000 - Execution and Closeout Requirements: Requirements for warranties.

B. The warranty for workmanship and materials shall be manufacturer's standard for one year from startup, not to exceed 18 months from factory shipment.

C. Clog Free Guarantee: Pump supplier shall provide a 1-Year Clog Free Guarantee for operation in standard sewage. If clogging occurs in standard sewage the pump manufacturer shall pay to pull and unclog the pump in the first year of operation. Further, if clogging occurs more than 5 times due to typical wastewater constituents in the first year , the manufacturer shall refund the cost of the pumps to the Owner and any associated accessories specific to the pump system.

PART 2 - PRODUCTS

2.1 General

A. All metal surfaces coming into contact with the pumpage, other than stainless steel or brass, shall be protected by a factory applied spray coating of acrylic dispersion zinc phosphate primer with a polyester resin paint finish on the exterior of the pump.

B. All Process Pumps, regardless of manufacturer, shall be provided by the same manufacturer.

C. Motor shall comply with Section 260584 – Motors

2.2 PROCESS PUMPS

A. Manufacturers:
1. Flygt.
2. No equal.
a. Substitutions: Not permitted to provide consistency with city pump stations.

B. Description:

1. Submersible non-clog pumps, each equipped with submersible electric motor.
2. It is the intent of these specifications that the pump supplier also supply compatible motor, suction elbow, and related and required accessories.

3. Pumps must be suitable for pumping raw wastewater with solids up to three inches in diameter.
4. There shall be no need for personnel to enter the wet-well.
5. Pump manufacturer shall furnish the pump control panel, including variable frequency drive, control devices, protection devices, wiring, and all accessories necessary to operate the pump as intended. The pump control panel shall be coordinated with the pump motor characteristics, pump operating requirements, and project electrical requirements.

C. Impeller and Volute:

1. Impeller:

   a. Hard iron, ASTM A532.
   b. Dynamically balanced.
   c. The impeller shall be semi-open, back swept, screw-shaped, non-clog design.
   d. Multi-vane design, must include minimum of 1-year clog free guarantee in sewage.
   e. Capable of handling solids, fibrous materials, sludge, and other matter found in normal sewage applications.
   f. Impeller vane leading edges shall be mechanically self-cleaned upon each rotation as they pass across a spiral groove located on a replaceable insert ring.
   g. The impeller shall be capable of momentarily moving axially upwards a distance of 15mm/0.6-in. to allow larger debris to pass through and immediately return to normal operating position.

2. Volute:
   a. Grey cast iron ASTM A-48, Class 35B.
   b. Single piece.
   c. Non-concentric design.
   d. Smooth fluid passages capable of passing solids through impeller.

3. Wear Ring:

   a. Hard iron, ASTM A532, 25% chrome cast iron
   b. Use for sealing between volute and impeller.

D. Mechanical Seal System:
1. Inner Seal: Carbon/Aluminum Oxide.
2. Outer Seal: Tungsten carbide.
3. Oil: The shaft shall rotate on two bearings. The motor bearings shall be sealed and permanently grease lubricated with high temperature grease.
4. The minimum L10 bearing life shall be 50,000 hours at any usable portion of the pump curve.

E. Shaft:
1. Pump and motor shaft shall be the same unit.
2. The shaft shall be stainless steel ASTM A479 S43100-T

F. Guides, and Fittings:

1. Sliding nut rails to attach accessories.
2. Integral lower guide bar holders with discharge connections.

3. Guide Bars: For wet-mounted pumps only.
   a. Double rail.
   b. Standard weight stainless-steel pipe.
   c. Size: As recommended by pump manufacturer.
   d. Pumps shall be fitted with stainless steel lifting chain and/or stainless-steel cable.
4. Covers: Skid-proof design.
5. Fittings:
   a. Seal fittings by metal-to-metal contact between machined surfaces.
6. Discharge Connection Elbow: Permanently installed in chamber with discharge piping.
7. Connection: Automatic to discharge connection elbows when lowered into place, and easily removed for inspection or service.
8. Guide Bracket:
   a. Integral part of pump unit.
   b. Entire weight of pump unit guided by not less than two guide bars, and pressed tightly against discharge connection elbow with metal-to-metal contact.
9. Discharge Interface Seal: metal to metal contact.
10. Do not permit any portion of pump to bear directly on floor of sump.
11. Capable of continuous submergence underwater without loss of watertight integrity to depth of 65 feet.

G. Performance and Design Criteria:
   1. See attached pump schedule.

H. Operation:

   1. Electrical Characteristics: As specified in attached Pump Schedule.
   2. Pump Motor:
      a. Housed in air-filled, watertight chambers.
      b. Non-overloading throughout entire pump performance range based on 1.0 service factor.
      c. Continuous duty, capable of sustaining minimum of 30 starts per hour.
      d. Inverter duty rated for operation with VFD motor control.
      e. Moisture detection probe shall be provided in a seal sensing chamber to detect seal failure.
      f. Provide thermal sensors embedded in the stator windings to prevent motor overheating.
      g. Pump motor power cord to be designed for flexibility and serviceability under conditions of extra hard usage.
      h. Ground Fault Interruption protection shall be provided.
      i. Terminal fittings to be corrosion-resistant, prevent entry of moisture, include strain relief, and are designed to facilitate field connection
      j. Motor shall comply with Section 260584 – Motors

I. Accessories:
   1. Discharge Connection Elbow:

      a. Material: Mating cast iron.
      b. Size: See Drawings.

   2. Lifting Chain:

a. Minimum Length: Sufficient to permit raising and lowering of pump without requiring entry into wet well/dry pit.
b. Material: Stainless steel.
c. Strength: Sufficient for raising and lowering of pump.

3. Discharge Connection Elbow:

a. Material: Mating cast iron.
b. Size: See Drawings.

4. Pump Control Panel:
a. Pump manufacturer shall furnish the pump control panel, including variable frequency drive, control devices, protection devices, wiring, and all accessories necessary to operate the pump as intended. The pump control panel shall be coordinated with the pump motor characteristics, pump operating requirements, and project electrical requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 017000 – Execution and Closeout Requirements: Requirements for installation examination.

B. Verify layout and orientation of pumps, accessories, and piping connections.

3.2 INSTALLATION

A. Install pumps and accessories where indicated on Drawings and according to manufacturer's instructions.

B. Provide and connect piping, accessories, and power and control conduit and wiring to make system operational, ready for startup.

C. Flush piping with clean water.

3.3 FIELD QUALITY CONTROL

A. Section 017000 – Execution and Closeout Requirements: Requirements for testing, adjusting, and balancing.

B. Section 019100 – Commissioning.

C. Pre-operational Checks:

1. Check pump and motor alignment.
2. Check for proper motor rotation.
3. Check pump and drive units for proper lubrication.

D. Startup and Performance Testing:

1. Operate pump using clean water at design point for continuous period of 48 hours, under supervision of manufacturer's representative and in presence of Engineer.
2. Perform hydraulic testing for each pump verifying performance on the pump curve. Data shall include flow measurement and discharge pressure at three different operation points for each pump. Data shall also include voltage, amperage and motor speed for each pump taken at each of the recorded operating points.
3. Contractor is responsible for any necessary bypass pumping and all associated tie-in work during start-up.
4. Verify pump performance by performing time-drawdown test or time-fill test.

E. Check pump and motor for high bearing temperature and excessive vibration. The pump manufacturer shall analyze the complete pump and piping system and recommend such supports and modifications as necessary to eliminate harmonics and vibration in the system when operated over the operational speed range. Pump bases and foundations, as well as piping and shaft supports as shown on the plans shall be modified and enlarged as necessary to provide adequate support and vibration control. Vibration amplitude shall not exceed Hydraulic Institute limits, at any operating point along pump curve.

F. Check for motor overload by taking ampere readings.

G. Perform a “run dry” test to ensure motor does not overheat.

H. Equipment Acceptance:

1. Adjust, repair, modify, or replace system components that fail to perform as specified, and rerun tests.
2. Make final adjustments to equipment under direction of manufacturer's representative.
3. Document adjustments, repairs, and replacements in manufacturer's field services certification.

I. Manufacturer Services: Furnish services of manufacturer's representative experienced in installation of products furnished under this Section for not less than 3 days on-Site for installation, inspection, field testing, and instructing Owner's personnel in maintenance of equipment.

J. Furnish installation certificate from equipment manufacturer's representative attesting equipment has been properly installed and is ready for startup and testing.

K. The Contractor shall furnish all necessary oils, lubricants, grease guns, or other necessary applicators and shall lubricate the mechanical equipment prior to initial operation. The grade of oil and grease furnished by the Contractor shall be in accordance with the recommendation of the equipment manufacturer. The Contractor shall supply a 12-month supply of each lubricant.

3.4 DEMONSTRATION

A. Section 017000 – Execution and Closeout Requirements: Requirements for demonstration and training.

B. Demonstrate equipment startup, shutdown, routine maintenance, and emergency repair procedures to Owner's personnel.

3.5 ATTACHMENTS

A. Process Pump Schedule:

1. P101 & P102:

a. Service: Raw Wastewater Lift Station
b. Location: CC-1, Wet Well
c. Design Flow Rate: 1209 gpm.
d. Design Flow Total Dynamic Head: 47.97feet.
e. Service Liquid: Domestic Raw Wastewater
f. Rated Motor Speed: 1760 rpm
g. Horse Power: 20 HP
h. Voltage: 460V, 3 PH, 60 Hz.
i. Suggested equipment: Flygt NP 3153 MT 3~ 433

END OF SECTION 432513

SECTION 438500 - ODOR CONTROL SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: This item shall consist of the work necessary to install an odor control system. This section specifies a carbon odor control system for treatment of air from a wastewater lift station. This section describes work required to install carbon cannisters, blowers, a motor, and a sound attenuation enclosure.

1.02 SUBMITTALS

A. Shop Drawings: Submit, in accordance with Section 013300, for approval the following:

1. Product literature.
2. Complete description.
3. Dimensions and required clearances.
4. Weights.
5. Motor data sheet.
6. Performance curves.
7. Layout drawing for all equipment showing installation details.
8. Manufacturers' Warranty.

B. Maintenance and Operating Instructions: Two (2) copies of each manufacturer's maintenance and operating instructions manual shall be provided with the equipment at the time of delivery. Any revisions during start-up or operating instructions shall be made in each of the three (3) final copies of the Operation and Maintenance Manuals.

1.03 QUALITY ASSURANCE

B. Reference Standards: Comply with all applicable provisions and recommendations of the following or equivalent IEC standards, except as otherwise shown or specified.

1. National Electrical Code (NEC)
2. National Electrical Manufacturers Association (NEMA)
3. Occupational Safety and Health Act (OSHA)
4. American Society of Testing and Materials (ASTM)
5. American Welding Society (AWS)

6. American Institute of Steel Construction (AISC)

PART 2 - PRODUCTS

2.01 MANUFACTURERS REQUIREMENTS

A. ACCEPTABLE MANUFACTURERS:

1. Carbtrol Corporation, Model GC2-3B450 or approved equal by Engineer.

2.02 DESIGN CRITERIA:

A. Capacity: 450 CFM

C. Maximum Motor Horsepower: 3/4 HP

D. Electrical Characteristics: 115 Volt, 1 Phase, 60 Hz

2.03 ODOR CONTROL EQUIPMENT

A. BLOWER:

1. Blower shall be a centrifugal with a flanged suction and direct drive

2. Blower shall be cast with commercial grade cast aluminum with rounded inlets and outlets. Blowers shall be equipped with an explosion-proof 3/4 HP, 1-phase, 115-volt 3450 RPM rated motor.

2. Blower fans shall be a minimum of 12-gauge steel.

3. Blower orientation shall be horizontally mounted with a cast aluminum backward curve wheel.

4. Blower shall be Cincinnati Fan and Ventilating Co. or approved equal.

B. CARBON:

1. The carbon within the cannisters shall be vapor phase catalytic activated carbon with sieve size of 4 x 8 mesh.

2. The vapor catalytic carbon shall include high activity H2S capacity of 0.20 g H2S / cc carbon with an apparent density of 0.40 g/cc.

3. Vapor phase catalytic carbon shall be Carbtrol Type CAT2 or approved equal.

4. Provide two backup carbon canisters for a total of three carbon canisters including the canister installed with the system. Carbon canisters shall be Model GC2-3B or approved equal.

C. CANISTERS:

1. The odor control system shall include one Polyethylene canister. Each canister shall be a Carbtrol Model GC2-3B carbon canister or approved equal.

2. Each canister shall be equipped with a 4-inch diameter air inlet connection furnished with a 4-inch diameter 8'-0" long suction hose. A 2-inch drain connection shall be bung and plug.

3. Canisters shall carry 150 lbs. of vapor phase catalytic activated carbon.

4. Each canister shall be equipped with a 4-inch diameter air discharge stub with a 4-inch diameter screen.

D. SOUND ATTENUATION:

1. A weather shroud/enclosure housing made of 20-gauge galvanized steel construction shall be installed over the blower and canister.

2. The weather shroud shall include 1" thick polyurethane sound attenuation foam encasing the interior of the enclosure.

2.05 CORROSION PROTECTION

A. Exposure: All odor control system elements shall be appropriate for outdoor installation with full exposure to all possible weather conditions.

B. Motor: Coated with original manufacturer's standard machinery enamel.

C. Sound Enclosure: Receives one (1) shop prime coat of chromate free primer followed by two (2) finish coats of white enamel.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Blower: Blower installation shall be to manufacturer's standard and requirements.

B. Canister: Canisters shall be placed in the designated location according to the construction plans. Two canisters shall be placed side by side in assigned location.

C. Sound Attenuation Enclosure: Enclosure installation shall be to manufacturer's standard and requirements.

END OF SECTION 432513

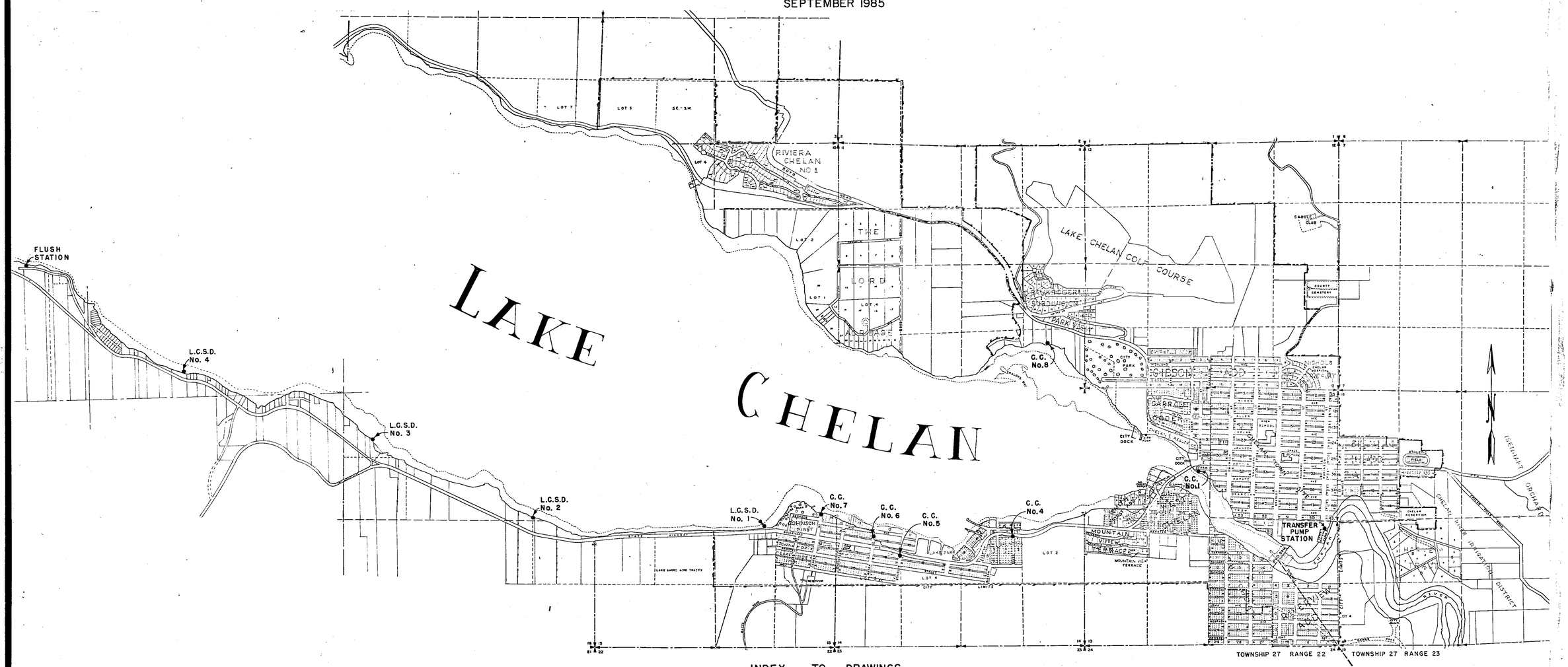
ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

CITY OF CHELAN

WASTEWATER TREATMENT PLANT IMPROVEMENTS

SCHEDULE IC

SEPTEMBER 1985



INDEX TO DRAWINGS

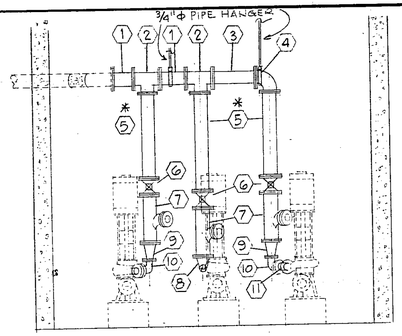
1. CITY PUMP STATION NO. 1 - PLAN AND DETAILS
1A. CITY PUMP STATION NO. 1 - GENERATOR AND STRUCTURE DETAILS
2. CITY PUMP STATION NO. 1 - GENERATOR AND STRUCTURE DETAILS
3. CITY PUMP STATION NO. 4 - PLAN AND DETAILS
4. CITY PUMP STATION NO. 5 - DEMOLITION AND SALVAGE
5. CITY PUMP STATION NO. 5 - MECHANICAL/STRUCTURAL
6. CITY PUMP STATION NO. 7 - PLAN AND DETAILS
7. CITY PUMP STATION NO. 8 - MECHANICAL/STRUCTURAL
8. CITY PUMP STATION NO. 8 - SITE PLAN/VAULT DETAILS
9. LAKE CHELAN SEWER DISTRICT PUMP STATION NO. 1 - MECHANICAL/STRUCTURAL
10. LAKE CHELAN SEWER DISTRICT PUMP STATION NO. 1 - LIFT STATION DETAILS
11. LAKE CHELAN SEWER DISTRICT PUMP STATION NO. 2, 3, AND 4 - MECHANICAL/STRUCTURAL
12. CITY OF CHELAN PUMP STATION NO. 3, 4, AND 8/LAKE CHELAN SEWER DISTRICT PUMP STATION NO. 1 AND 2 - ELECTRICAL SITE PLANS
13. ELECTRICAL - CITY LIFT STATION NO.1 - PLAN/SCHEDULE/ ONE-LINE DIAGRAM
14. ELECTRICAL - CITY PUMP STATION NO. 1 - CONTROL DIAGRAMS
15. ELECTRICAL - CITY LIFT STATION NO. 4
16. ELECTRICAL - CITY LIFT STATION NO. 5
17. ELECTRICAL - CITY LIFT STATION NO. 7
18. ELECTRICAL - CITY LIFT STATION NO. 8 - SPADER BAY
19. ELECTRICAL - LAKE CHELAN SEWER DISTRICT NO. 1 - LIFT STATION NO. 1
20. ELECTRICAL - LAKE CHELAN SEWER DISTRICT NO. 1 - LIFT STATION NO. 2
21. ELECTRICAL - LAKE CHELAN SEWER DISTRICT NO. 1 - LIFT STATION NO. 3
22. ELECTRICAL - LAKE CHELAN SEWER DISTRICT NO. 1 - LIFT STATION NO. 4

PIPE & FITTING LIST

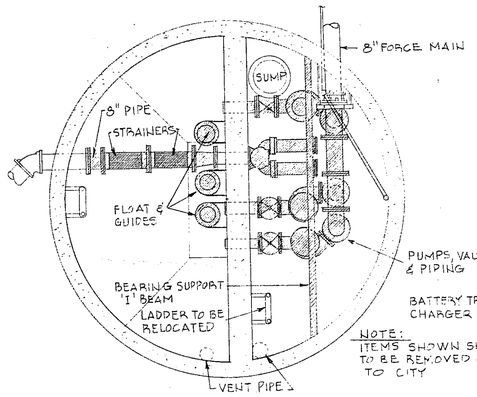
NO.	ITEM
1	8" D.I. PIPE, FL.
2	8"x8"x8" C.I. TEE, G.E.
3	8" D.I. PIPE, G.E.
4	8"-90° C.I. ELL, G.E.
5	8" D.I. PIPE, G.E. - *
6	8" PLUG VALVE, G.E.
7	8" 'FLYGT' BALL CHECK VALVE, OR EQUAL
8	8"x4"-90° C.I. REDUCING ELL, G.E.
9	8"x4" C.I. REDUCER, G.E.
10	4"-90° C.I. ELL, G.E.
11	4"-45° C.I. ELL, G.E.
12	4" D.I. PIPE, FLxG.E.
13	6" PLUG VALVE, FL.
14	6" D.I. PIPE, FL.
15	6"-90° C.I. FLARE FITTING, FL.x FLARE
16	10"x10"x8" C.I. TEE, FL.
17	10" D.I. PIPE, FL. x P.E.
18	6" C.I. BLIND FLANGE
19	

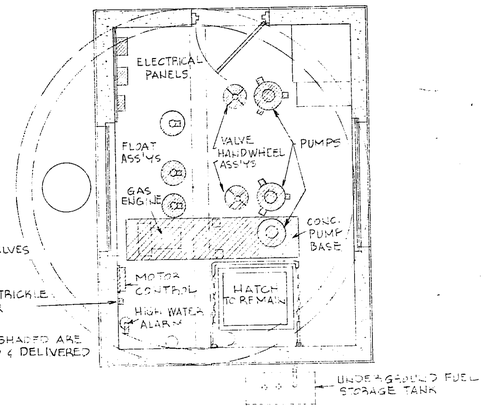
CONTRACTOR SHALL VERIFY ALL PIPING & EQUIPMENT DIMENSIONS PRIOR TO ORDERING FITTINGS.

* - LENGTH OF PIPE TO BE DETERMINED IN FIELD
G.E. = GROOVED END



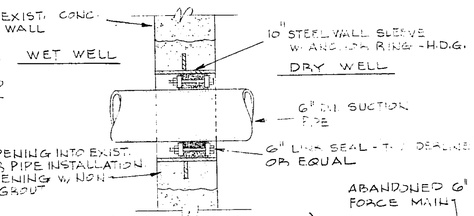
SECTION B/1
SCALE: 1/4"=1'-0"





PLAN - WET & DRY WELL EXIST. LIFT STATION

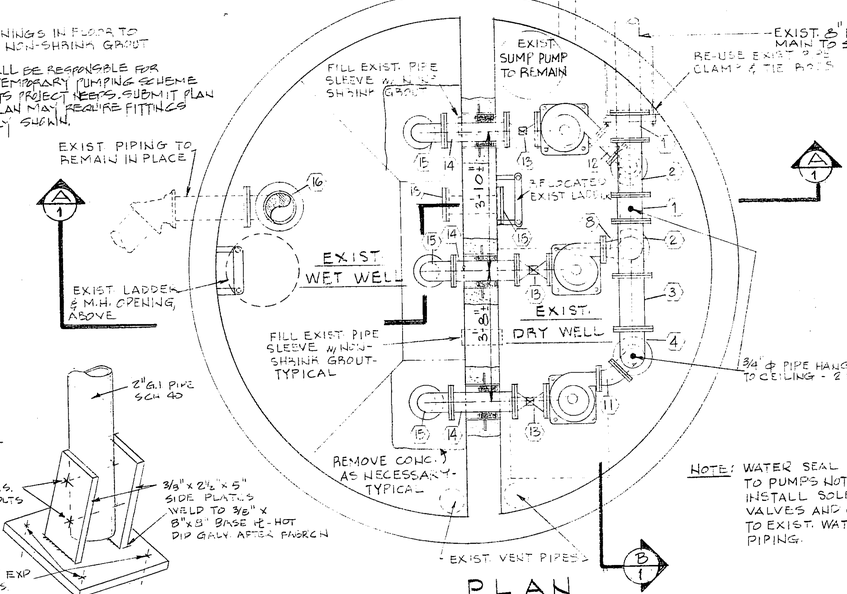
PLAN - MOTOR ROOM FLOOR EXIST LIFT STATION



PIPE PENETRATION DETAIL
NO SCALE

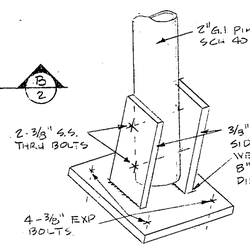
NOTE:
ALL EXIST. OPENINGS IN FLOOR TO BE SEALED W/ NON-SHRINK GROUT

CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING TEMPORARY PUMPING SCHEME THAT BEST SUITS PROJECT NEEDS. SUBMIT PLAN TO ENGINEER. PLAN MAY REQUIRE FITTINGS NOT PRESENTLY SHOWN.

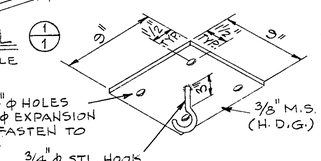


NOTE: WATER SEAL PIPING TO PUMPS NOT SHOWN. INSTALL SOLENOID VALVES AND CONNECT TO EXIST. WATER SEAL PIPING.

PLAN
WET WELL & DRY WELL MODIFICATIONS
SCALE: 1/2" = 1'-0"



DETAIL 1/1
NO SCALE

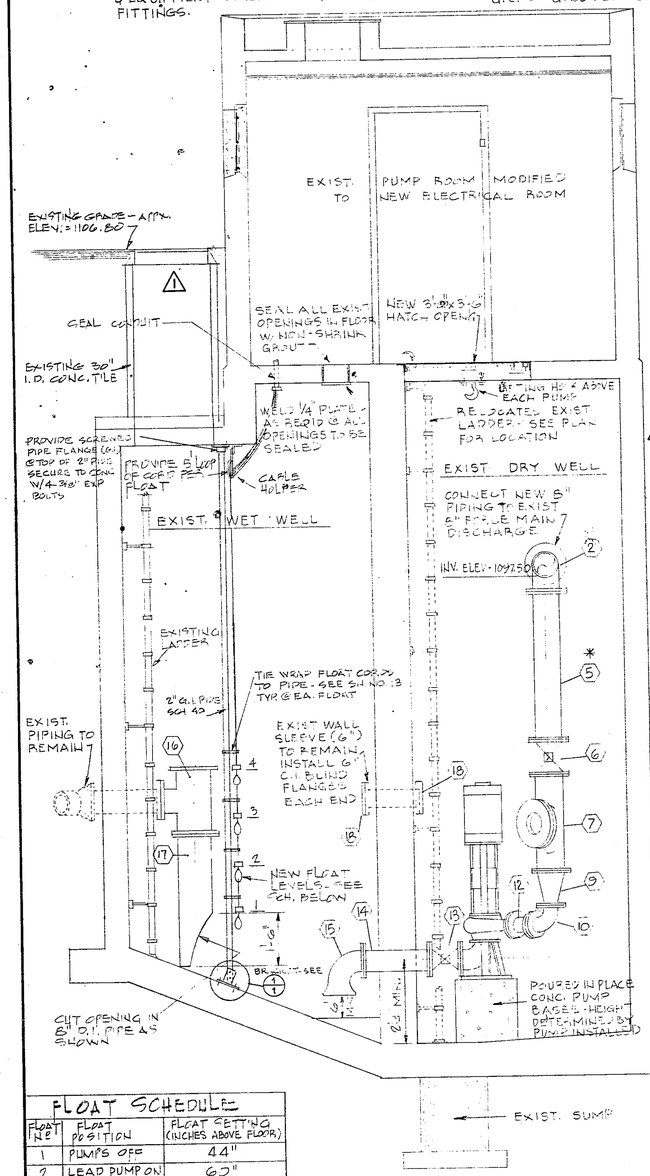


LIFTING HOOK DETAIL
NO SCALE

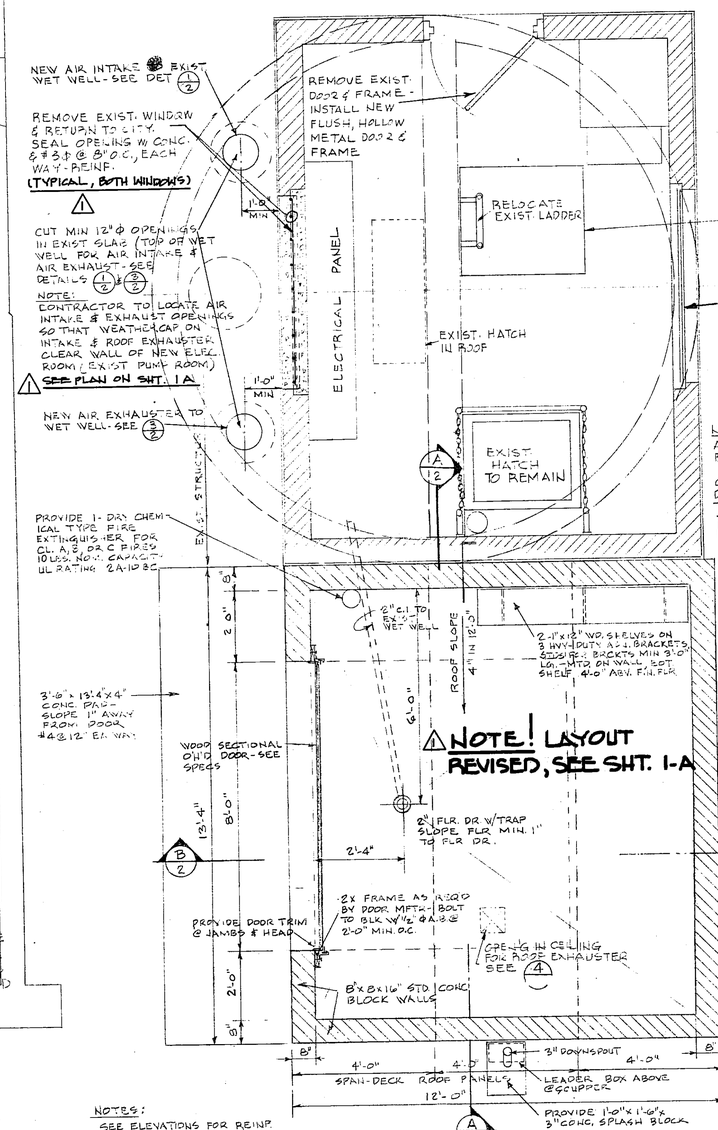
PAINTING INFORMATION:
1. PAINT EXTERIOR & INTERIOR OF ABOVE GROUND STRUCTURES.
2. CLEAN & PAINT PUMP ROOM INTERIOR.
3. PAINT PIPING & PUMP EQUIPMENT.
4. COLORS TO BE SELECTED BY ENGINEER.

FLOAT SCHEDULE

FLOAT Nº	FLOAT POSITION	FLOAT SETTING (INCHES ABOVE FLOOR)
1	PUMPS OFF	44"
2	LEAD PUMP ON	60"
3	LAG PUMP OFF	74"
4	HIGH WATER ALARM	88"



SECTION A/1
SCALE: 1/2" = 1'-0"



NOTES:
SEE ELEVATIONS FOR REINF.

BLOCK WALLS SHALL HAVE FLUSH JOINTS ON EXT. & SHALL BE RACKED TO PROVIDE A SMOOTH SURFACE - INT. JOINTS TOOLED CONCAVE.

PLAN A/2
ELECTRICAL & GENERATOR BUILDING
SCALE: 1/2" = 1'-0"

DATE	NOV. 1984
SCALE	AS NOTED
DRAWN	JHH
CHECKED	DMT
APPROVED	JSD

No.	REVISION	DATE	BY	APPD
1	ADD NOTES & PLAN EXIST. M.H. HEIGHT	10/85	HLA	DMT

Gray + Osborne Inc, P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

S. DOWNING
REGISTERED PROFESSIONAL ENGINEER
STATE OF WASHINGTON

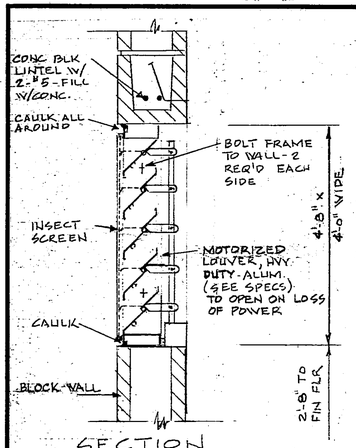
M. TULLOCH
REGISTERED PROFESSIONAL ENGINEER
STATE OF WASHINGTON

SCHEDULE IC

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY PUMP STATION NO. 1
PLAN & DETAILS

SHEET 1
OF 22
B 561
JOB No. 79036

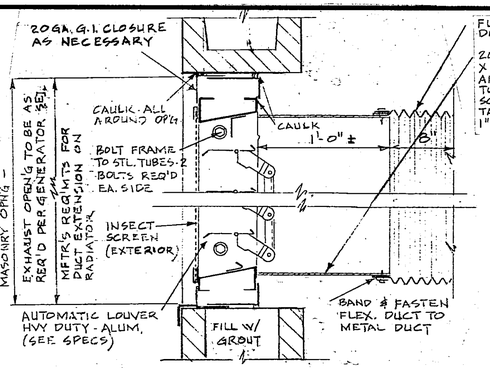
ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



SECTION

AIR INLET DETAIL (1/1A)

SCALE 1½" = 1'-0"



SECTION

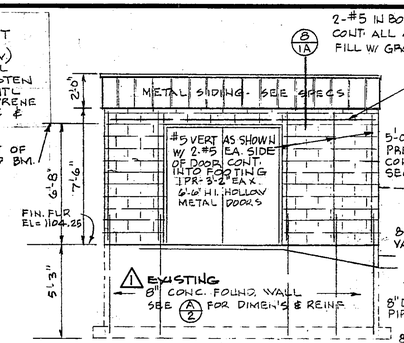
LOUVER & DUCT DETAIL GENERATOR SET EXHAUST (2/1A)

NO SCALE

TYP CONC. BLK. WALL CONST.

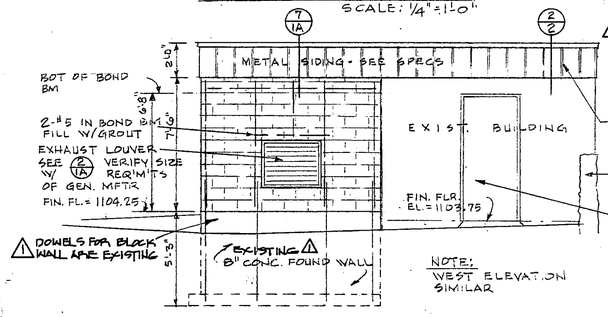
8" x 8" x 16" STD CONC. BLK W/ HORIZ. REINF EVERY OTHER COURSE - SACK TO SMOOTH SURFACE - FLUSH JOINTS EXT.

INTERIOR WALL SIMILAR. CONST INCL. BOND BM & #5 VERT @ 2'-0" O.C.



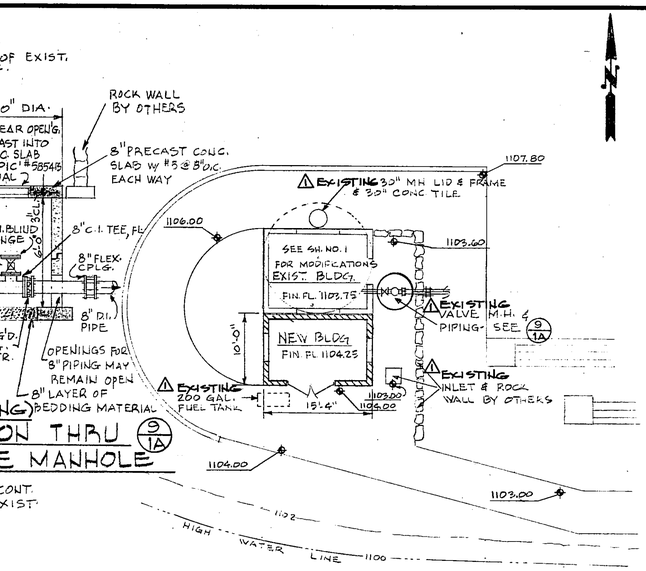
SOUTH ELEV.

SCALE: 1/4" = 1'-0"



NOTE:
WEST ELEVATION SIMILAR

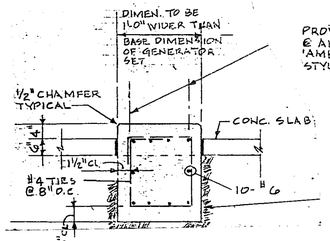
EAST ELEVATION SCALE 1/4" = 1'-0"



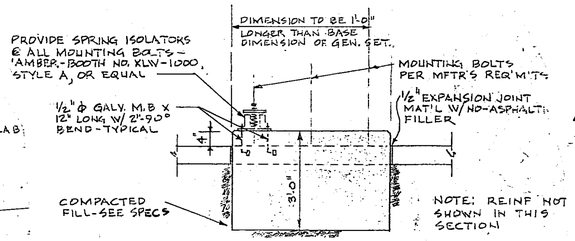
(EXISTING) SECTION THRU VALVE MANHOLE (9/1A)

SITE PLAN

SCALE 1" = 10'



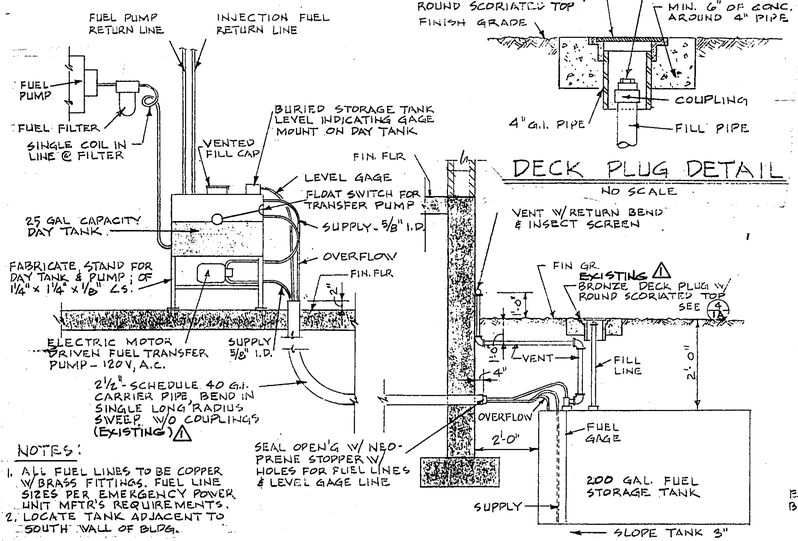
CROSS-SECTION



LONG. SECTION

EMERGENCY GENERATOR FOUNDATION DETAILS (3/1A)

NO SCALE



NOTES:

1. ALL FUEL LINES TO BE COPPER W/ BRASS FITTINGS. FUEL LINE SIZES PER EMERGENCY POWER UNIT MFTR'S REQUIREMENTS.
2. LOCATE TANK ADJACENT TO SOUTH WALL OF BLDG.

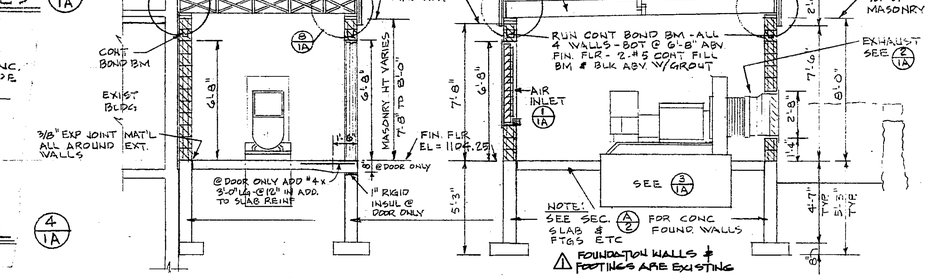
SECTION

EMERGENCY POWER FUEL SYSTEM (5/1A)

NO SCALE

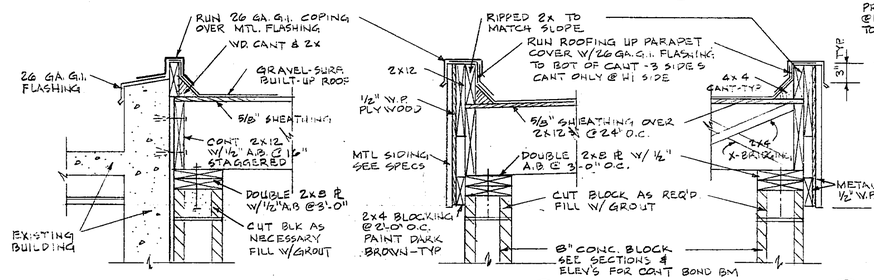
DECK PLUG DETAIL (4/1A)

NO SCALE



SECTION A/1A SCALE 1/4" = 1'-0"

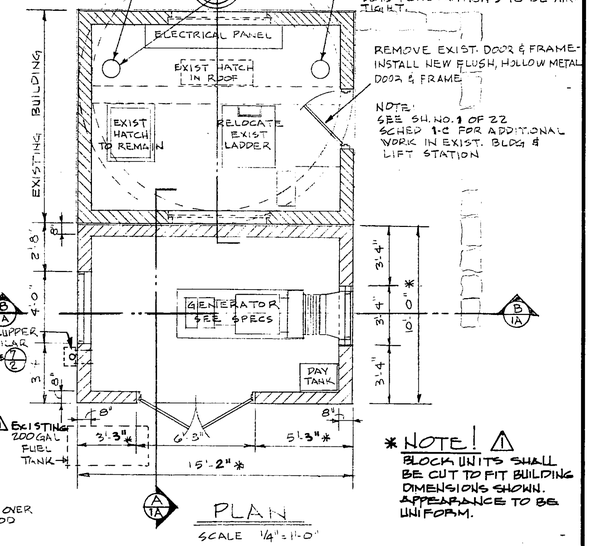
SECTION B/1A SCALE 1/4" = 1'-0"



DETAIL (6/1A) SCALE 1" = 1'-0"

DETAIL (7/1A)

DETAIL (8/1A)



PLAN

SCALE 1/4" = 1'-0"

NOTE!
BLOCK UNITS SHALL BE CUT TO FIT BUILDING DIMENSIONS SHOWN. APPEARANCE TO BE UNIFORM.

NOTES

1. DOOR TO BE 1¾" HOLLOW METAL W/ 2" x 3¾" FRAME. DOOR SIZE 6'-4 WIDE (PR @ 3'-2") X 6'-6" HIGH
2. PROVIDE ALUM THRESHOLD WEATHERSTRIPPING & HARDWARE AS FOLLOWS:
   3 PR BUTTS 6" x 4½" BALL BRG NRP - US 26 D
   1 LOCKSET - FED NO. 161-D - US 26 D
   RIGHT HAND LEAF ACTIVE
   1 SET SURFACE BOLTS
   2 STOP & HOLDER - US 26 D

NOTE!
THIS SHEET SHOWS THE NECESSARY REVISIONS TO THE LIFT STATION PLAN, ELEVATIONS & DETAILS WHICH WILL REPLACE THE SIMILAR PLANS, ELEVATIONS & DETAILS SHOWN ON SHEETS NO. 1 & NO. 2

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA
WASHINGTON

DATE: JAN 1985
SCALE: NOTED
DRAWN: MMH
CHECKED: TC
APPROVED: JSD

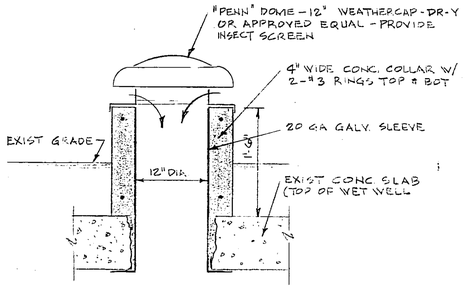
No.	REVISION	DATE	APPD
1	ADD NOTES	10/25	TC

City of Chelan
Washington
Chelan County
Wastewater Treatment Facilities
CITY PUMP STATION NO. 1
GENERATOR & STRUCTURE DETAILS

SCHEDULE 1C

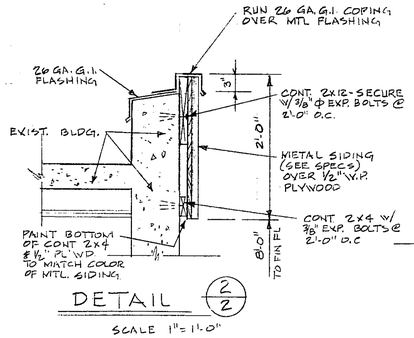
SHEET: 1A
OF: 22
FILE No. B560 A
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



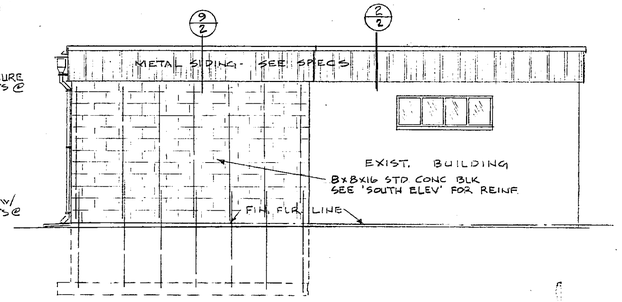
AIR INTAKE TO WET WELL - DETAIL (1/2)

SCALE 1"=1'-0"



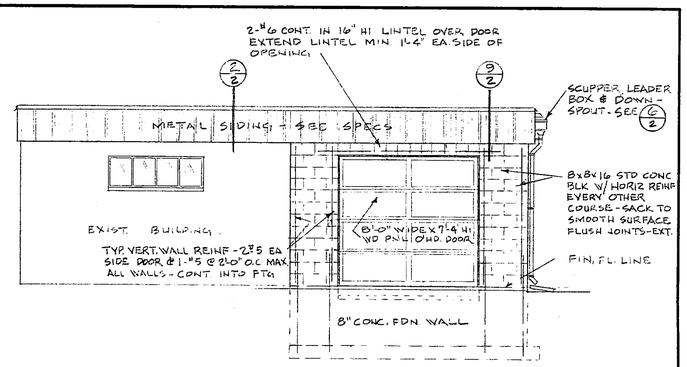
DETAIL (2/2)

SCALE 1"=1'-0"



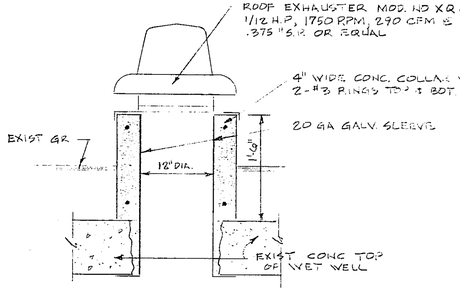
NORTH ELEVATION

SCALE 1/4"=1'-0"



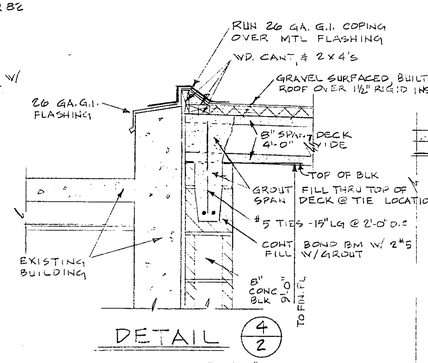
SOUTH ELEVATION

SCALE 1/4"=1'-0"



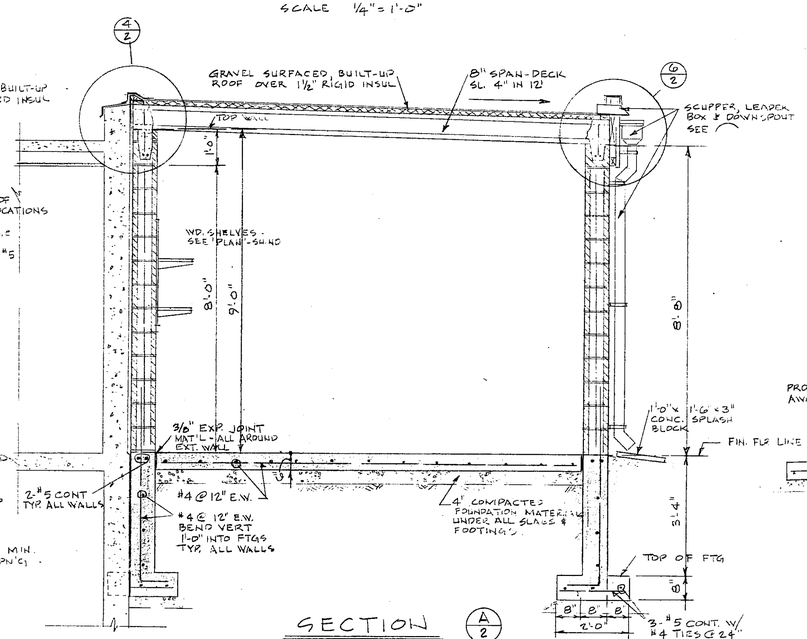
AIR EXHAUST DUCT & FAN TO WET WELL - DETAIL (3/2)

SCALE 1"=1'-0"



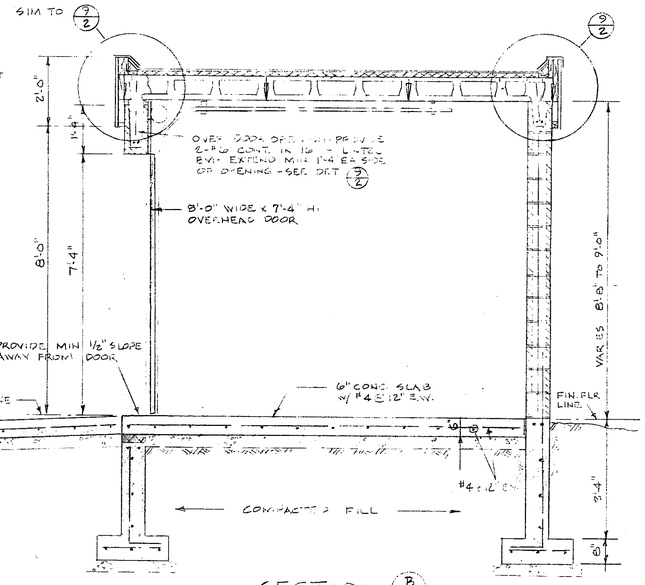
DETAIL (4/2)

SCALE 1"=1'-0"



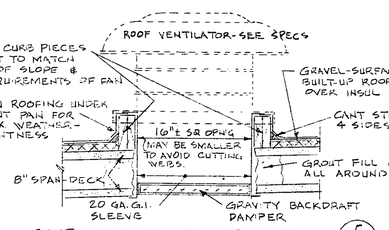
SECTION (A/2)

SCALE 1/2"=1'-0"



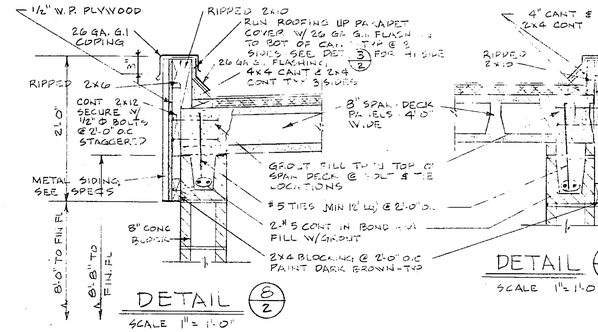
SECTION (B/2)

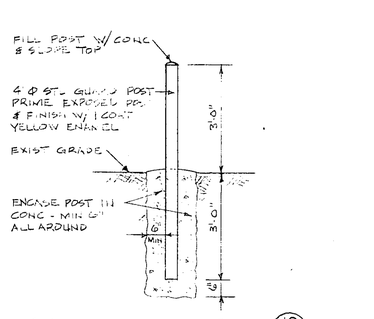
SCALE 1/2"=1'-0"



TYP. ROOF VENTILATOR (5/2)

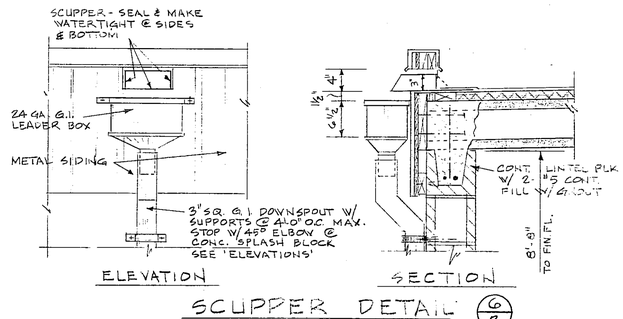
NO SCALE

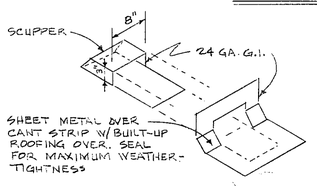




GUARD POST DETAIL (10/2)

SCALE 1/2"=1'-0"





SCUPPER DETAIL (7/2)

NO SCALE

NOTES! ⚠

A. Elevations and sections are no longer applicable, with the exception of floor slab and foundation wall dimensions and reinforcing steel. The dimension shown as 3'4" from top floor slab to top of footing pad is now 4'7", see new Sheet 1A.

B. On Details 1/2 and 3/2, make the following changes:

1. Change notes reading "existing conc. slab (top of wet well)" and "Exist. conc. top of wet well" to read:

   "Existing concrete top of Pump Room roof slab".

2. Delete all references to "Exist. Gr." and to "20 Ga. galv. sleeve".

3. Change the 1'6" dimension to 6".

4. Add the following note to both details:

   "12" PVC pipe to extend, in one solid piece, from ceiling of existing wet well to top of concrete curb at roof of Pump Room. Provide gas-tight seal where ventilation pipes penetrate the existing floor slab."

C. Delete the following details:

   4, 5, 6, 8, 9 and 10.

Gray + Osborne Inc., P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DATE ..... NOV., 1984
SCALE ... AS NOTED
DRAWN .... MMM
CHECKED .... DMT
APPROVED ... JSD

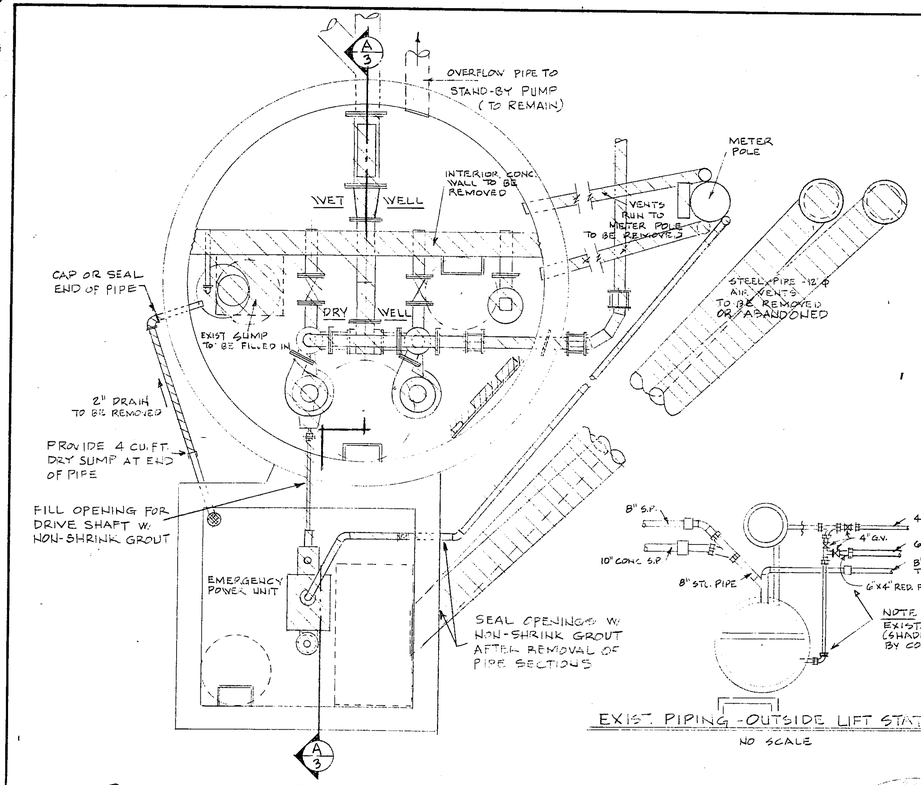
No.	REVISION	DATE	BY	APPD
4	ADD NOTES	12/86	HLP	DMT

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY PUMP STATION NO 1
GENERATOR & STRUCTURE DETAILS

SCHEDULE IC

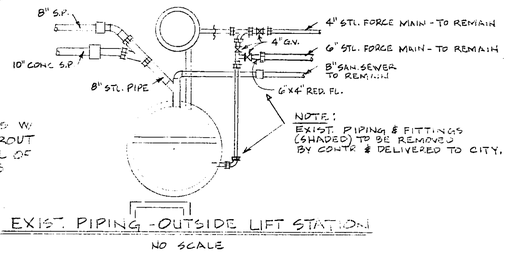
SHEET 2
OF 22
B 560
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



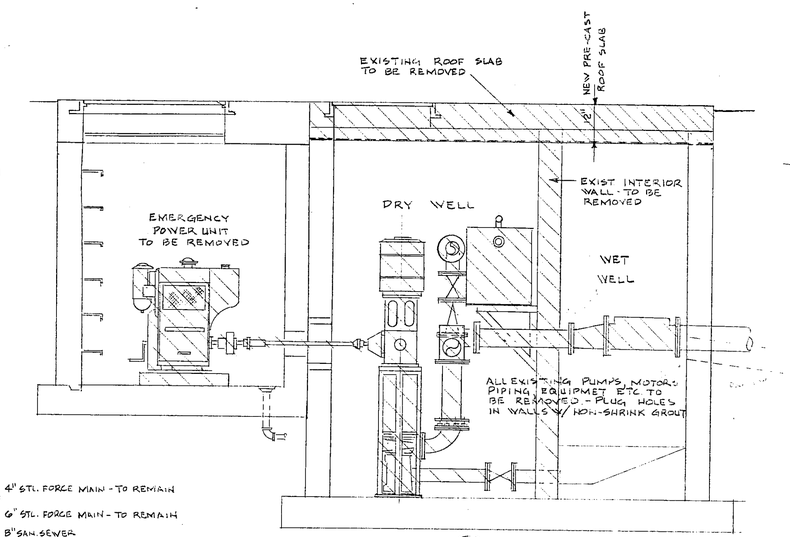
PLAN OF EXIST. PIPING - LIFT STA. NO 4

SCALE ½" = 1'-0"



EXIST. PIPING - OUTSIDE LIFT STATION

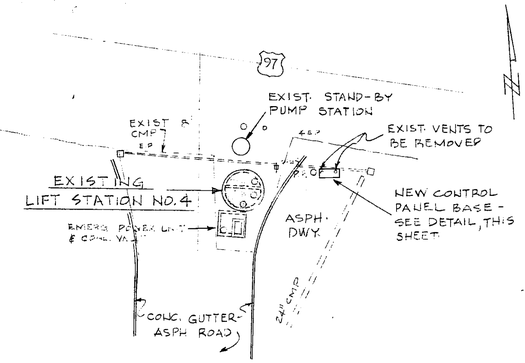
NO SCALE



SECTION A/3

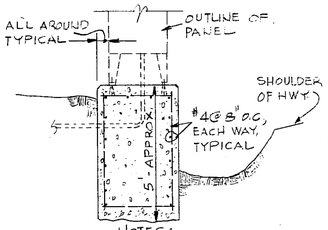
SCALE ½" = 1'-0"

NOTE: ① CONTRACTOR TO VERIFY EXIST. PIPING & LOCATIONS PRIOR TO ORDERING NEW PIPING & FITTINGS TO MAKE CONNECTIONS AS REQ'D.



SITE PLAN

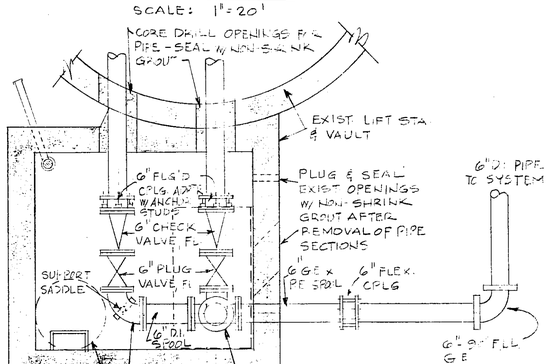
SCALE: 1" = 20'



NOTES:
① REMOVE EXIST. STEEL VENT LINES.
② SEE ELECTRICAL SHEETS FOR DETAILS OF EMBEDDED COPPER GROUND.

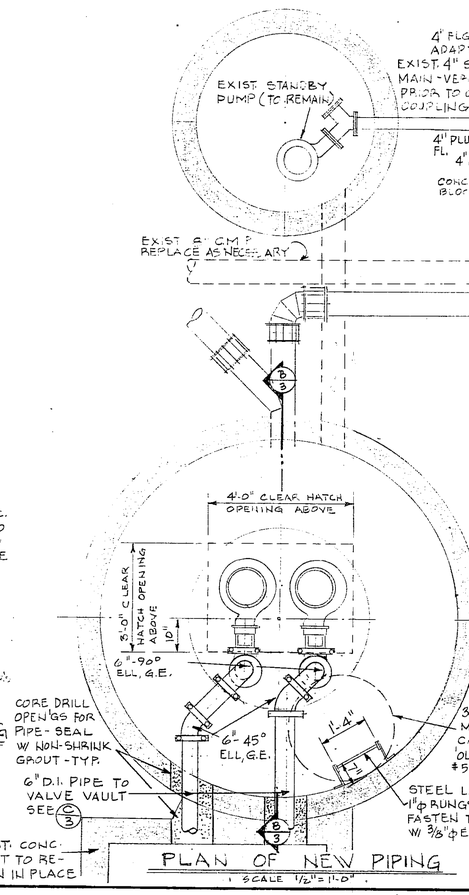
CONTROL PANEL BASE DETAIL

NO SCALE



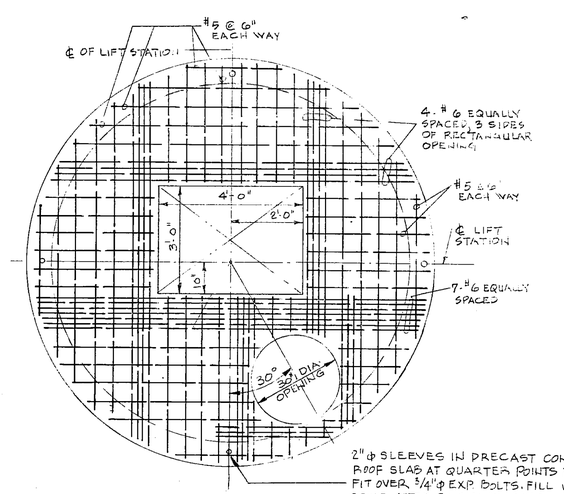
PLAN VALVE VAULT - NEW PIPING C/3

SCALE: ½" = 1'-0"



PLAN OF NEW PIPING

SCALE ½" = 1'-0"



2" ϕ SLEEVES IN PRECAST CONC. ROOF SLAB AT QUARTER POINTS TO FIT OVER ¾" ϕ EXP. BOLTS. FILL W/ GROUT AFTER ROOF SLAB IS IN PLACE

CLEARANCE @ TOP FACE

BARS THIS DIRECTION TO BE 1½" CLEAR FROM TOP FACE

BARS THIS DIRECTION TO BE IMMEDIATELY BELOW BARS IN OPPOSITE DIRECTION

CLEARANCE @ BOTTOM FACE

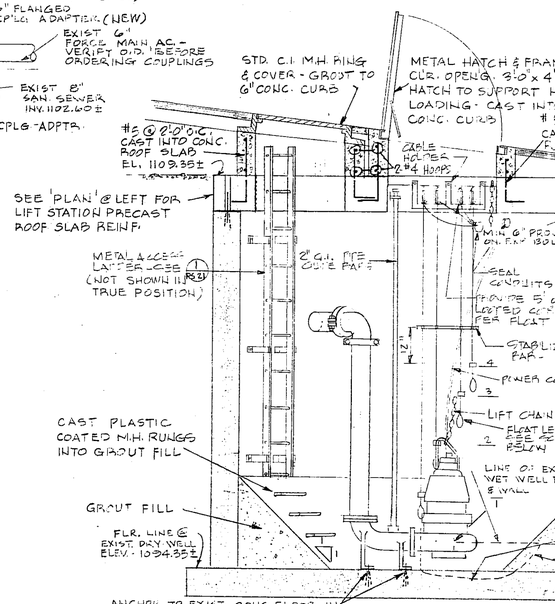
BARS THIS DIRECTION SHALL BE 2" CLEAR FROM BOTTOM FACE

BARS THIS DIRECTION TO BE ON TOP OF BARS IN OPPOSITE DIRECTION

NOTES:
1. 'PLAN' ABOVE SHOWS REINF. STEEL FOR ONE FACE ONLY. STEEL FOR OPPOSITE FACE TO BE SIMILAR - SEE NOTES @ LEFT FOR CLEARANCES
2. DETAILS, NOTES ETC ARE FOR PRE-CAST ROOF SLAB. POURED IN PLACE SLAB IS AT CONTRACTOR'S OPTION. IF SLAB IS POURED IN PLACE, 2" ϕ SLEEVES DELETED

PLAN - LIFT STATION ROOF SLAB REINFORCING

SCALE ½" = 1'-0"



SECTION B/3

SCALE ½" = 1'-0"

FLOAT SCHEDULE

FLOAT NO.	FLOAT FUNCTION	FLOAT SETTING (INCHES ABOVE FLOOR)
1	PUMPS OFF	24"
2	LEAD PUMP ON	42"
3	LAG PUMP OFF	58"

SCHEDULE 1C

Gray + Osborne Inc, P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

REVISION	DATE	BY	APPD.

DATE.....NOV. 1984
SCALE...AS NOTED
DRAWN...MMH
CHECKED...DMT
APPROVED...JSD

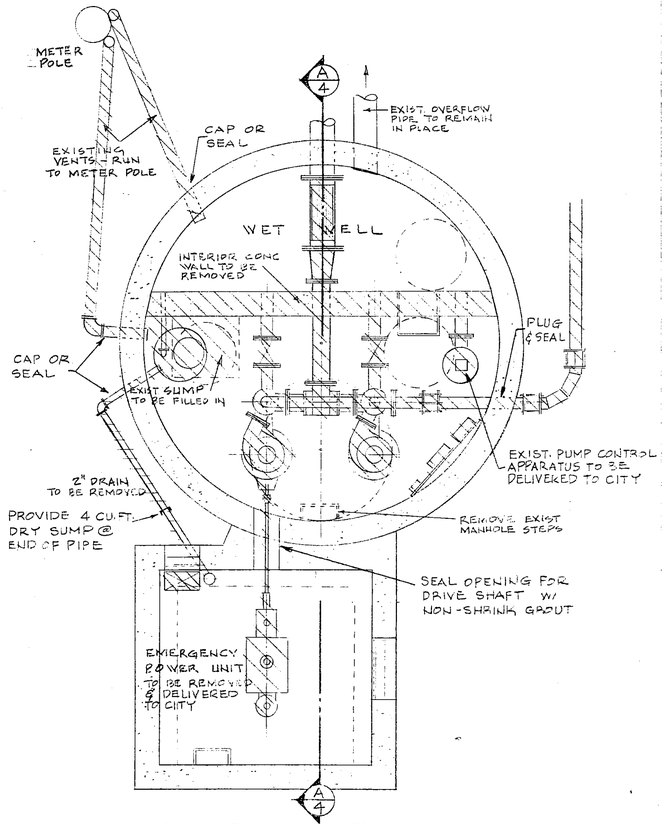
NO.

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY PUMP STATION NO. 4
PLAN & DETAILS

SHEET 3
OF 22

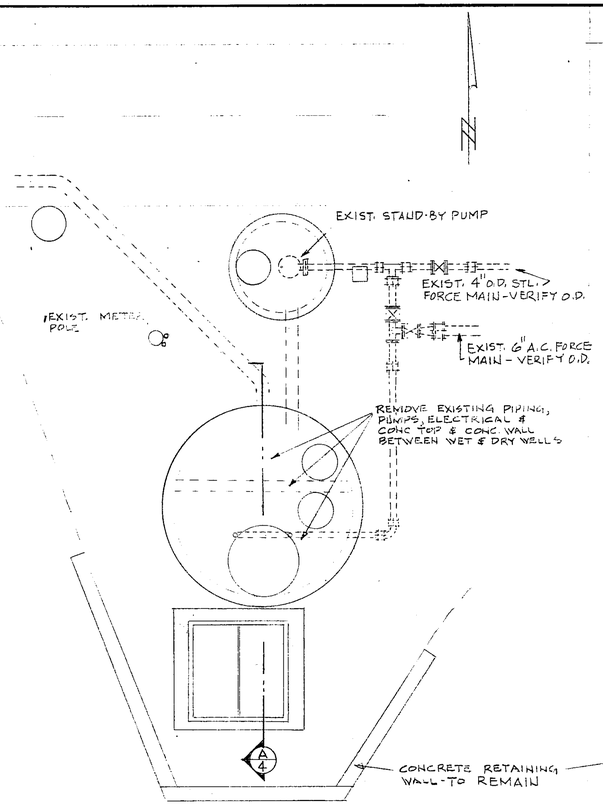
B,553

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



EXISTING PLAN

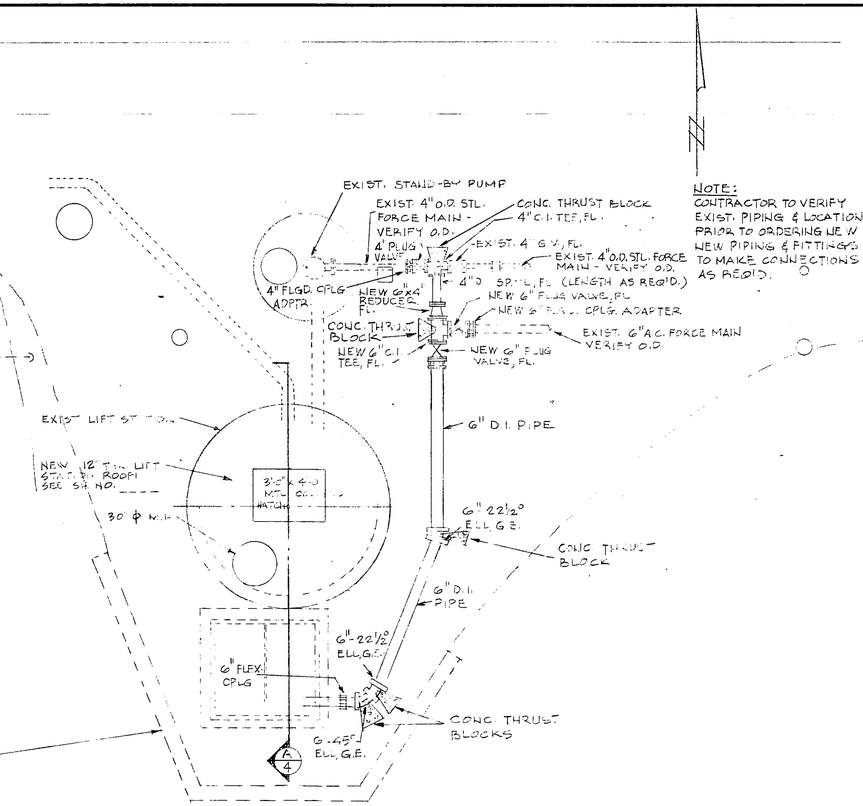
SCALE : 1/2" = 1'-0"



SITE PLAN

EXISTING FACILITIES

SCALE 1/4" = 1'-0"

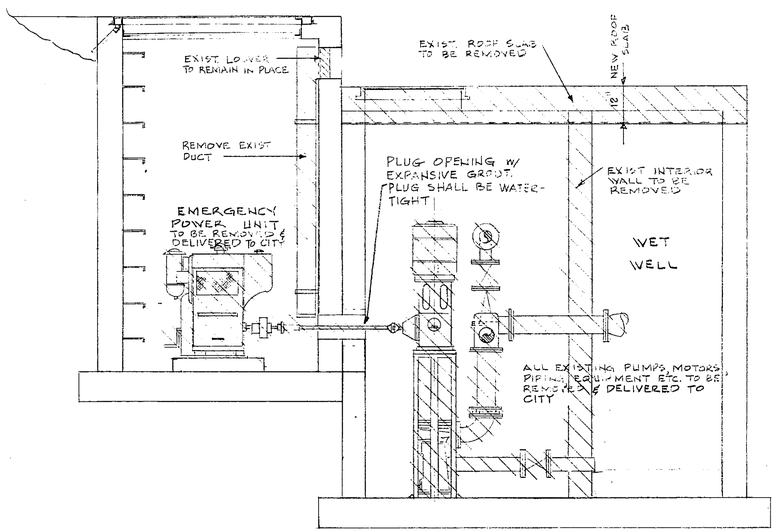


NOTE:
CONTRACTOR TO VERIFY EXIST. PIPING & LOCATIONS PRIOR TO ORDERING NEW PIPING & FITTINGS TO MAKE CONNECTIONS AS REQ'D.

SITE PLAN

NEW CONSTRUCTION

SCALE 1/4" = 1'-0"



SECTION A/4

SCALE 1/2" = 1'-0"

Gray + Osborne Inc, P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DATE NOV. 1984
SCALE AS NOTED
DRAWN M.M.H.
CHECKED D.M.T.

No.	REVISION	DATE	BY	APPD.

APPROVED J.S.O.

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY PUMP STATION NO. 5
DEMOLITION & SALVAGE

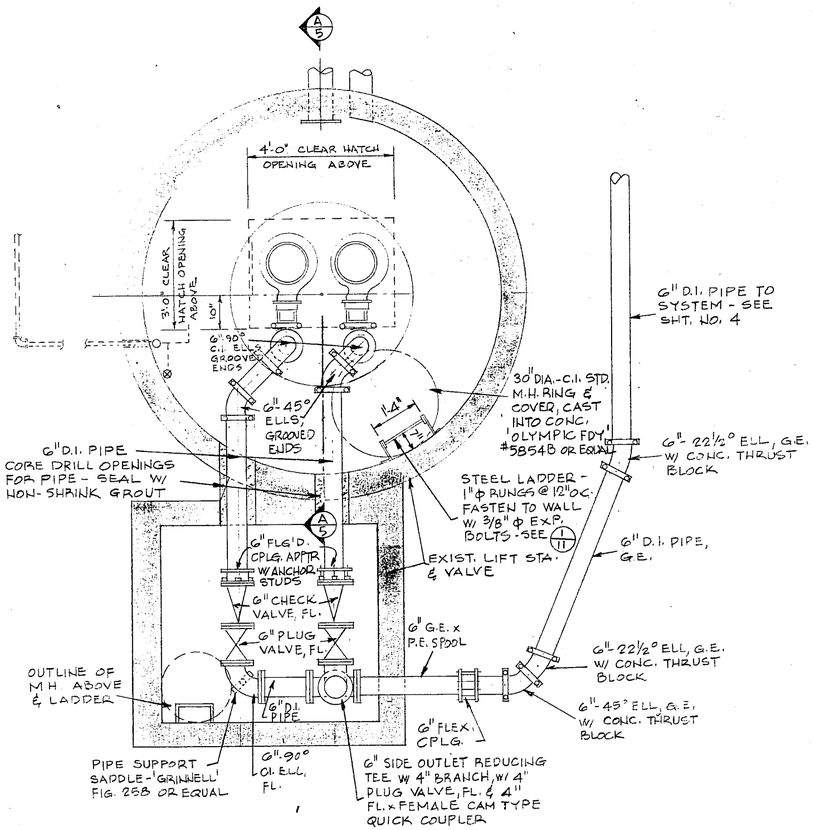
SCHEDULE C

SHEET 4
OF 22

B 558

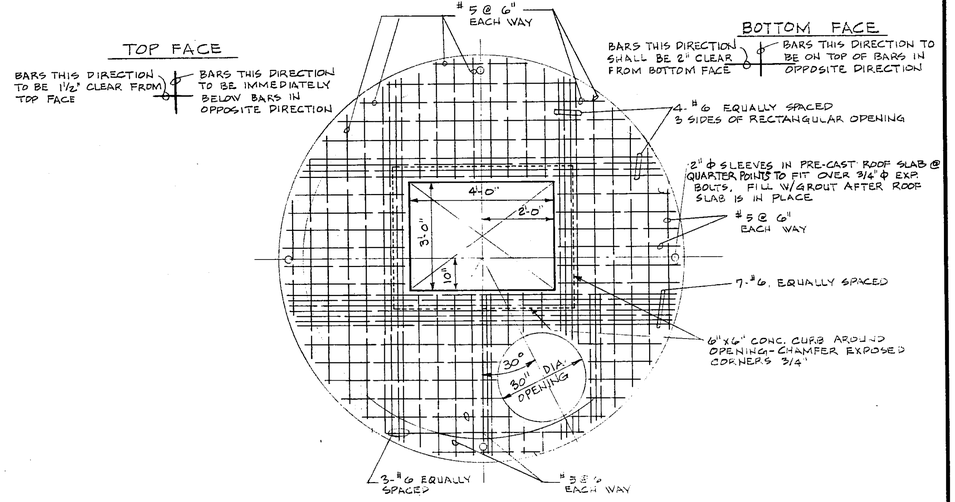
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



PLAN OF NEW PIPING

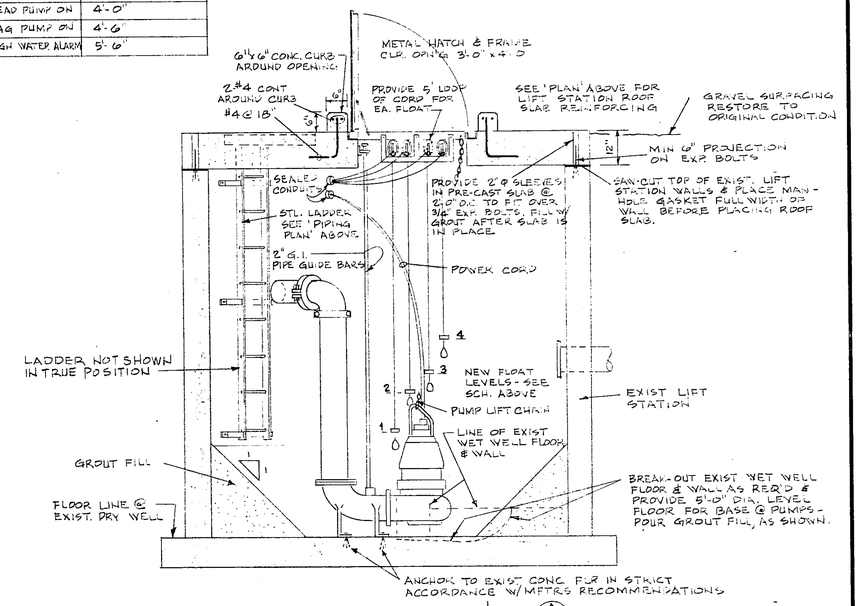
NO SCALE



PLAN - LIFT STATION ROOF SLAB REINF.

SCALE 1/2" = 1'-0"

FLOAT SCHEDULE		
FLOAT NO.	FLOAT POSITION	FLOAT SETTING IN FT. & IN. ABOVE FLOOR
1	PUMPS OFF	3'-0"
2	LEAD PUMP ON	4'-0"
3	LAG PUMP ON	4'-6"
4	HIGH WATER ALARM	5'-6"



SECTION A/5

NO SCALE

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE: NOV. 1984
SCALE: AS NOTED
DRAWN: MMH
CHECKED: DMT
APPROVED: JSD

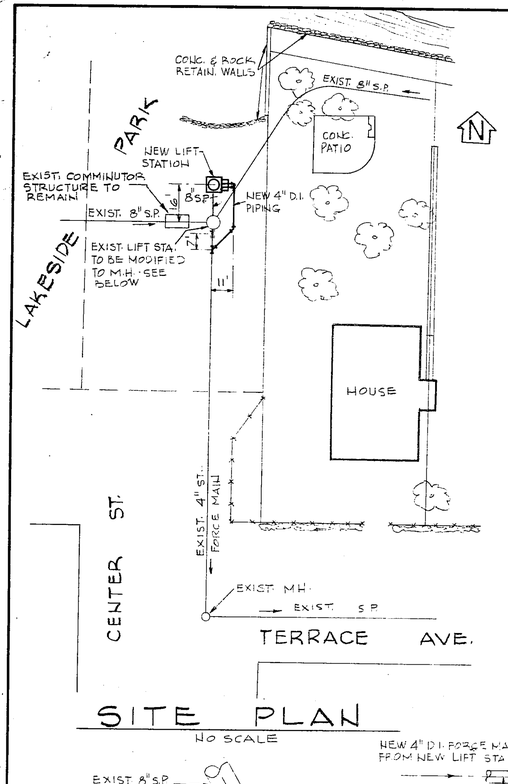
No.	REVISION	DATE	APPD

City of Chelan
Chelan County
Wastewater Treatment Facilities
CITY PUMP STATION NO. 5
MECHANICAL / STRUCTURAL

SCHEDULE IC

SHEET: 5
OF: 22
FILE No. B 557
JOB No. 79036

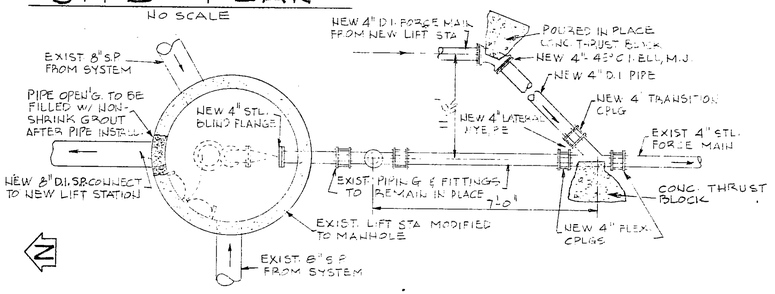
ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



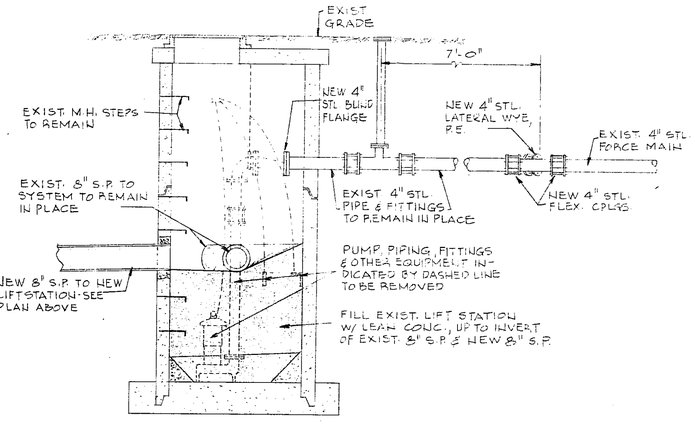
SITE PLAN

NO SCALE

NOTE:
SURFACE RESTORATION SHALL BE SOD. ALL COSTS FOR SURFACE RESTORATION AT PUMP STATION NO 7 SHALL BE INCLUDED IN THE LUMP SUM BID ITEM TITLED "PUMP STATION EARTHWORK"

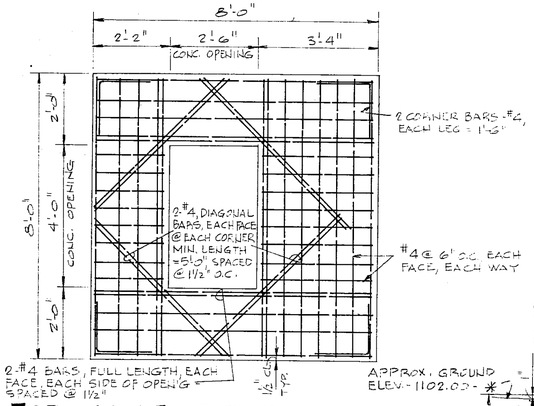


PLAN



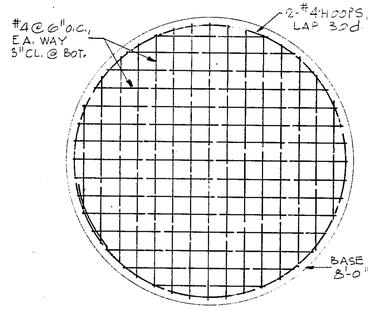
SECTION
EXIST. LIFT STATION MODIFIED TO MANHOLE

NO SCALE



TOP SLAB REINFORCING

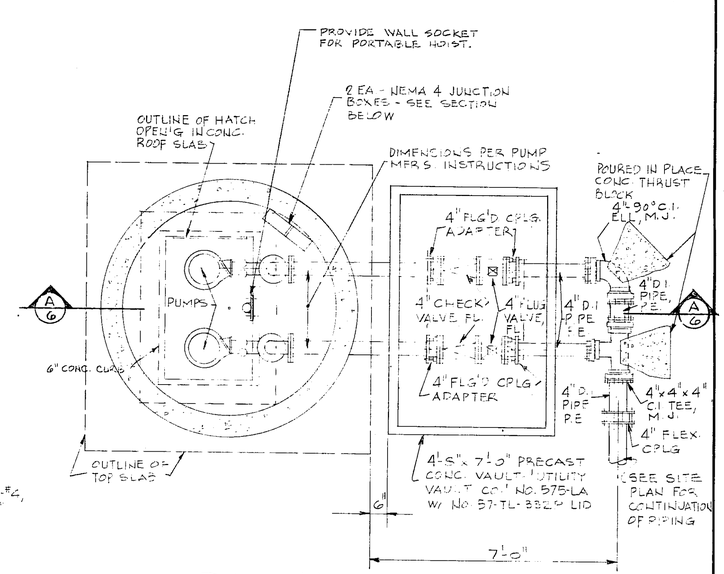
SCALE : ½" = 1'-0"



BASE SECTION REINF.

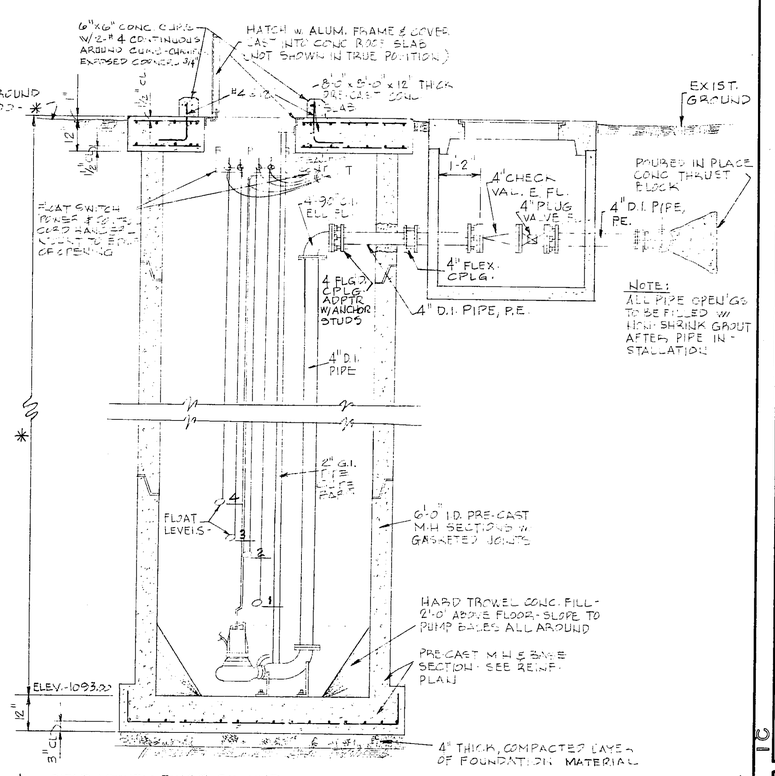
SCALE : ½" = 1'-0"

FLOAT SCHEDULE		
FLOAT NO.	FLOAT POSITION	FLOAT SETTING IN FT. & IN. ABOVE FLOOR
1	PUMPS OFF	2'-6"
2	LEAD PUMP ON	3'-10"
3	LAG PUMP ON	4'-4"
4	HIGH WATER ALARM	5'-4"



PLAN

SCALE : ½" = 1'-0"



* - FIELD VERIFY EXIST. GROUND ELEVATION BEFORE ORDERING PRECAST M.H. SECTIONS.

SECTION (A/6) THRU LIFT STATION

SCALE : ½" = 1'-0"

Gray + Osborne, Inc., P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

REVISION	DATE	BY	APP'D
No.			

DATE....NOV., 1984
SCALE....AS NOTED
DRAWN....MH
CHECKED....DMT
APPROVED....JSD

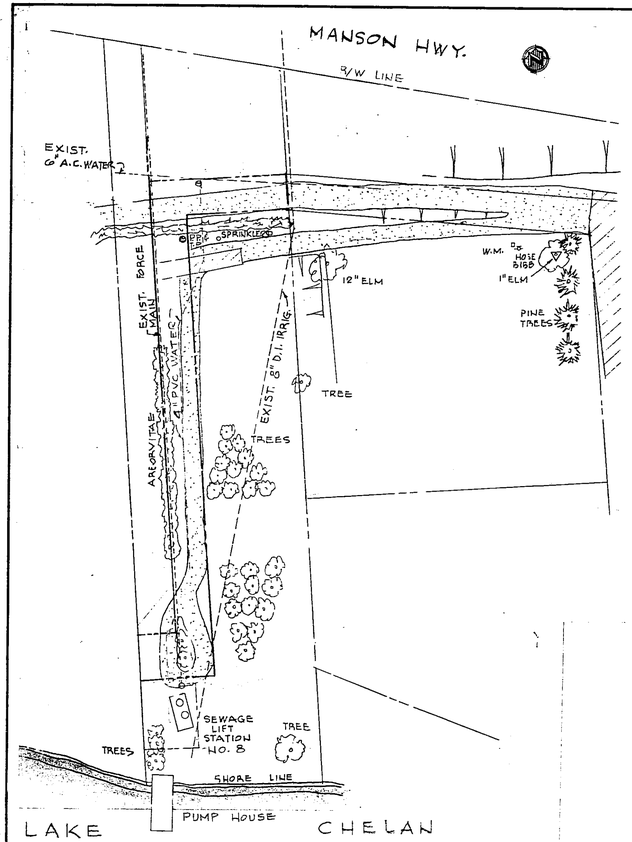
CHELAN 16

City of Chelan
Chelan County Wastewater Treatment Facilities
CITY PUMP STATION NO. 7
PLAN & DETAILS

SHEET 6
OF 22

B 556

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

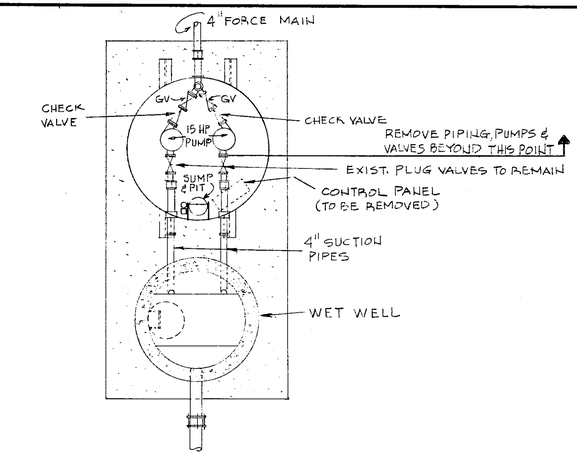


SITE PLAN

SCALE: 1"=40'

PAINTING INFORMATION

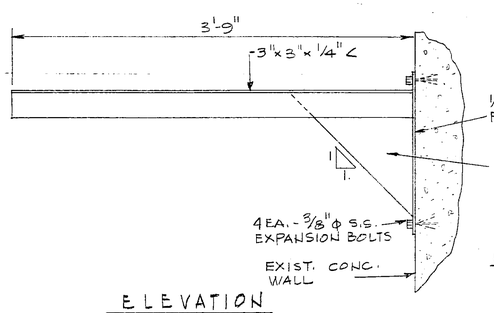
1. PAINT INTERIOR OF DRY WELL INCLUDING ACCESS TUBE.
2. REMOVE ALL RUST PRIOR TO PAINTING.
3. COLOR TO BE SELECTED BY ENGINEER



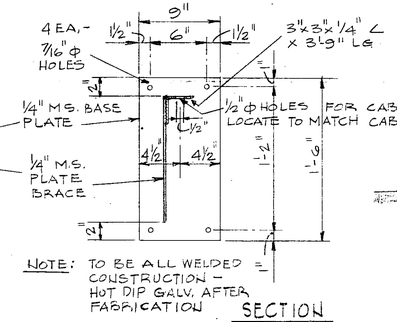
PLAN
EXIST. LIFT STATION

NO SCALE

BACKFILL OF ENTIRE EXCAVATED AREA SHALL CONSIST OF CRUSHED ROCK (3/4"-), COMPACTED TO 95% OF MAX. DRY DENSITY.



ELEVATION



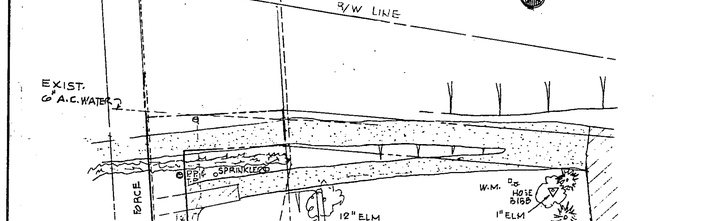
NOTE: TO BE ALL WELDED CONSTRUCTION - HOT DIP GALV. AFTER FABRICATION

SECTION

FLOAT CABLE STABILIZER DETAILS

NO SCALE

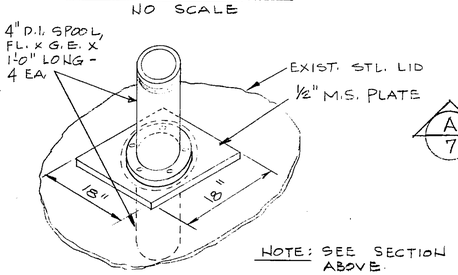
FLOAT SCHEDULE		
FLOAT NO.	FLOAT POSITION	FLOAT SETTING (FT. & IN. ABOVE FLOOR
1	PUMPS OFF	1'-6"
2	LEAD PUMP ON	4'-0"
3	LAG PUMP ON	4'-6"
4	HIGH WATER ALARM	5'-0"



NOTE: DRILL 1/2" M.S. PLATE, AS REQ'D, TO ACCOMMODATE BOLTS OF 4" D.I. FLANGES

SECTION

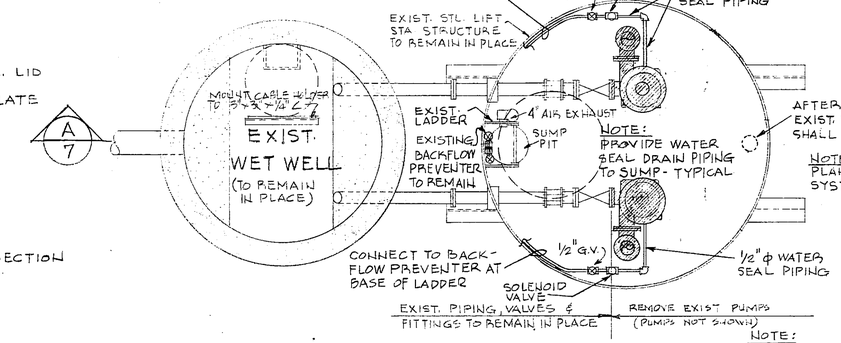
NO SCALE



NOTE: SEE SECTION ABOVE.

PIPE PENETRATION DETAIL (1/7)

NO SCALE



NOTE: FURNISH & INSTALL NEW SUMP PUMP W/ CAPACITY SIMILAR TO EXISTING SUMP PUMP

NOTE: PROVIDE WATER SEAL DRAIN PIPING TO SUMP - TYPICAL

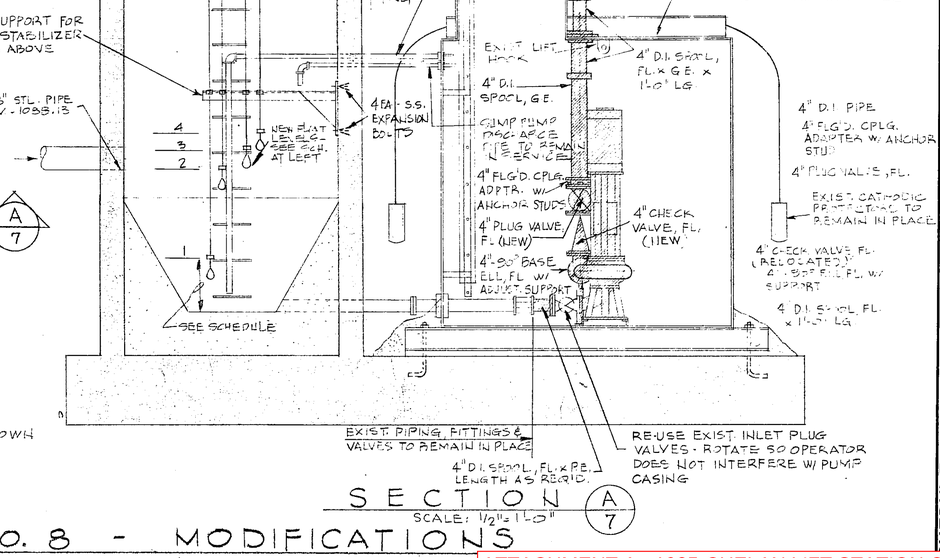
AFTER REMOVAL OF EXIST. PIPE, OPENING SHALL BE SEALED

NOTE: SEE (1/8) FOR PLAN OF PIPING TO SYSTEM

NOTE: PIPING & EQUIPMENT SHOWN SHADED ARE NEW.

PLAN

SCALE: 1/2"=1'-0"



SECTION (A 7)

SCALE: 1/2"=1'-0"

SPADER BAY LIFT STATION NO. 8 - MODIFICATIONS

Gray + Osborne, Inc., P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DATE NOV. 1984
SCALE NOTED
DRAWN JHH
CHECKED DMT
APPD. J.S.O.

No.	REVISION	DATE	BY	APPD.

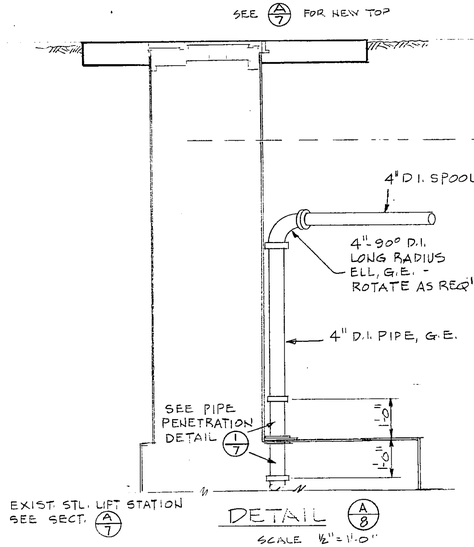
JOHN S. LOWE, JR. 9783 REGISTERED PROFESSIONAL ENGINEER STATE OF WASHINGTON
M. TULLOCH 12666 REGISTERED STRUCTURAL ENGINEER STATE OF WASHINGTON

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY PUMP STATION NO. 8
MECHANICAL / STRUCTURAL

SCHEDULE IC

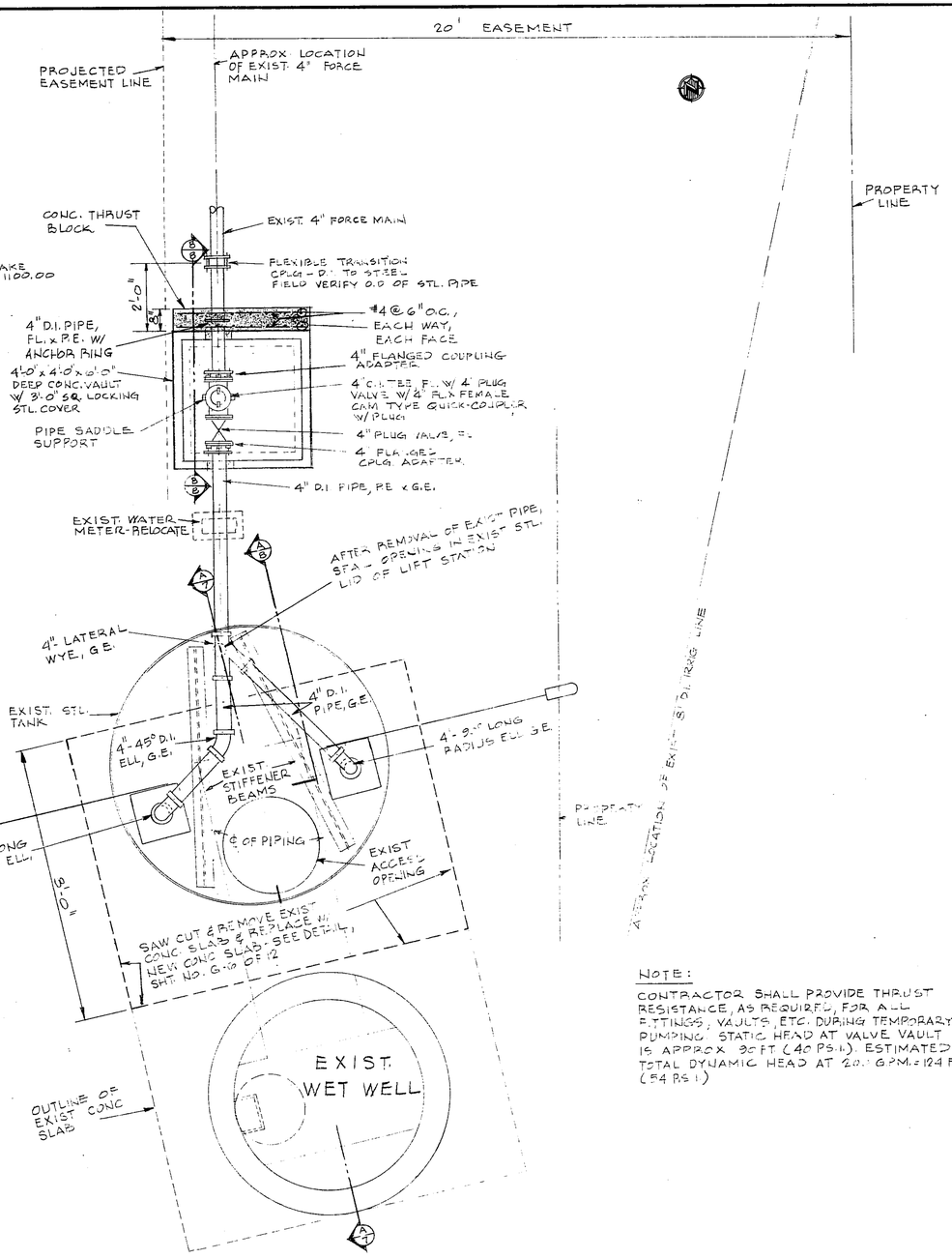
SHEET 7
OF 22
B555

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES
Page 107 of 113



DETAIL A/8

SCALE ½"=1'-0"



SITE PLAN

SPADER BAY LIFT STATION NO. 8 — 1/8

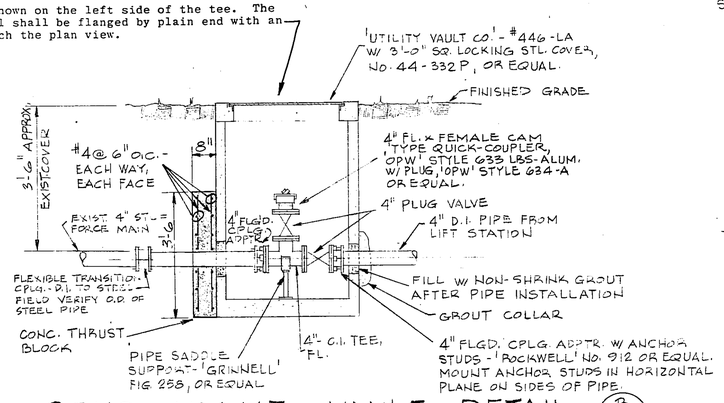
SCALE: ½"=1'-0"

NOTE:

CONTRACTOR SHALL PROVIDE THRUST RESISTANCE, AS REQUIRED, FOR ALL FITTINGS, VAULTS, ETC. DURING TEMPORARY PUMPING. STATIC HEAD AT VALVE VAULT IS APPROX. 95 FT (40 P.S.I.). ESTIMATED TOTAL DYNAMIC HEAD AT 200 G.P.M. = 124 FT (54 P.S.I.)

⚠ NOTE!

Delete the flanged coupling adapter shown on the left side of the tee. The incoming pipe spool shall be flanged by plain end with an anchor ring to match the plan view.



CONC. VALVE VAULT DETAIL — 8/8

SCALE: ½"=1'-0"

Gray + Osborne, Inc., P.S.
CONSULTING ENGINEERS
SEATTLE & TACOMA
WASHINGTON

DATE	NOV. 1984				
SCALE	AS NOTED				
DRAWN	J.H.H.	CHECKED	D.M.T.		

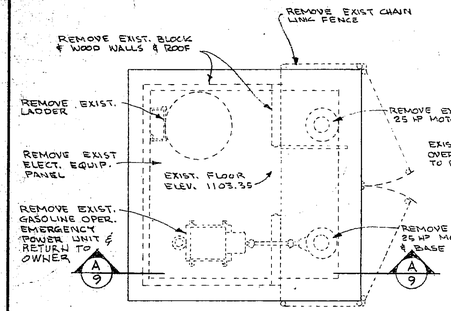
No.	REVISION	DATE	BY	APPD.
1	ADD NOTE	12/85	HLA	DMT

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY PUMP STATION NO. 8
SITE PLAN / VAULT DETAILS

SCHEDULE IC

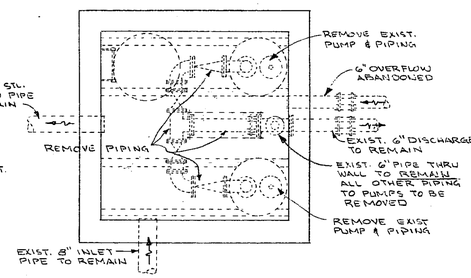
SHEET 8
OF 22
B 554
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES
Page 1026 of 1129



EXIST. LIFT STA. MAIN FLOOR

NO SCALE

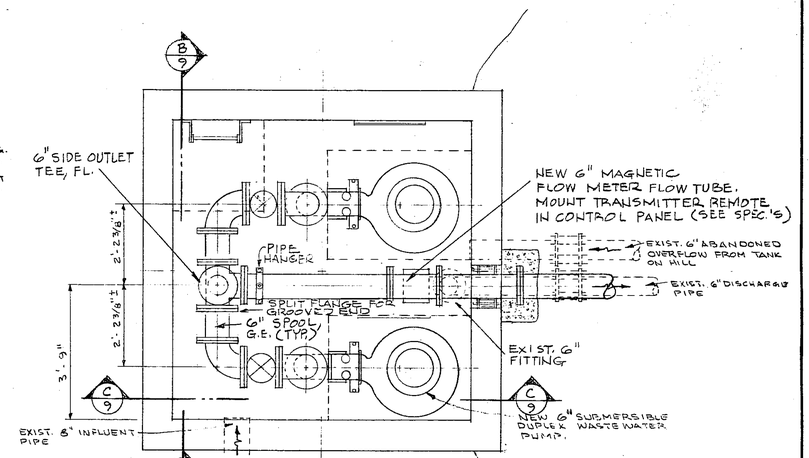


EXIST. PIPING PLAN

NO SCALE

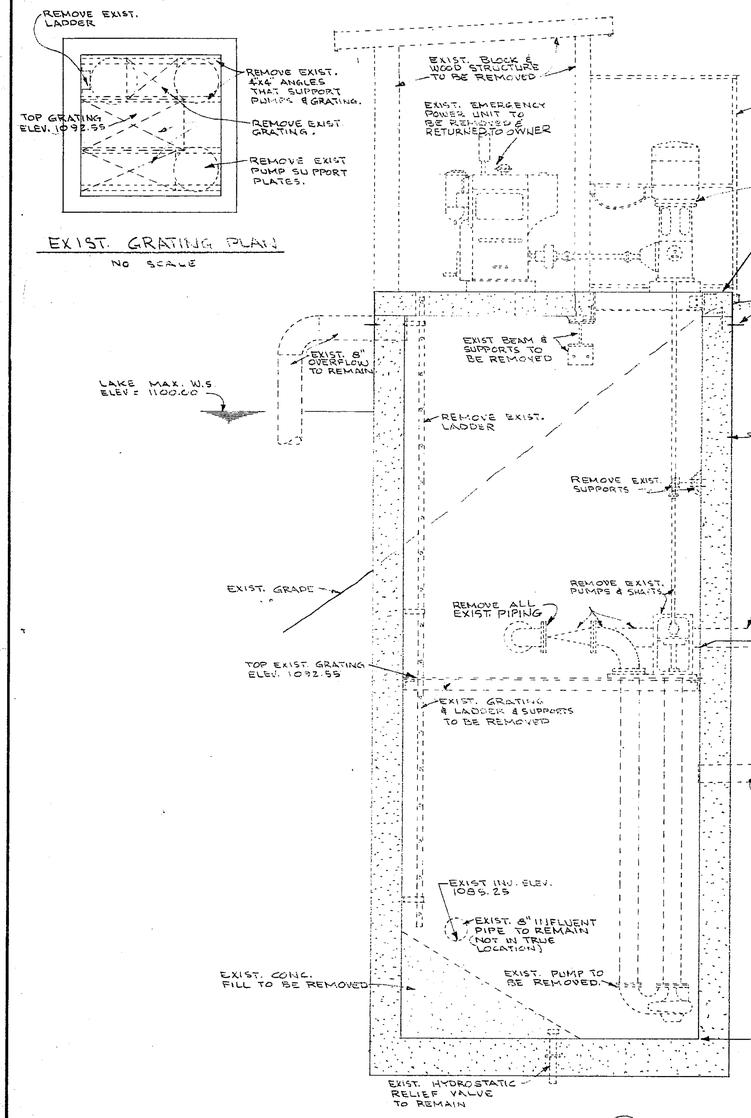
GRATING PLAN AT EL: 1089.95

SCALE : 1/2" = 1'-0"



PLAN

SCALE: 1/2"=1'-0"

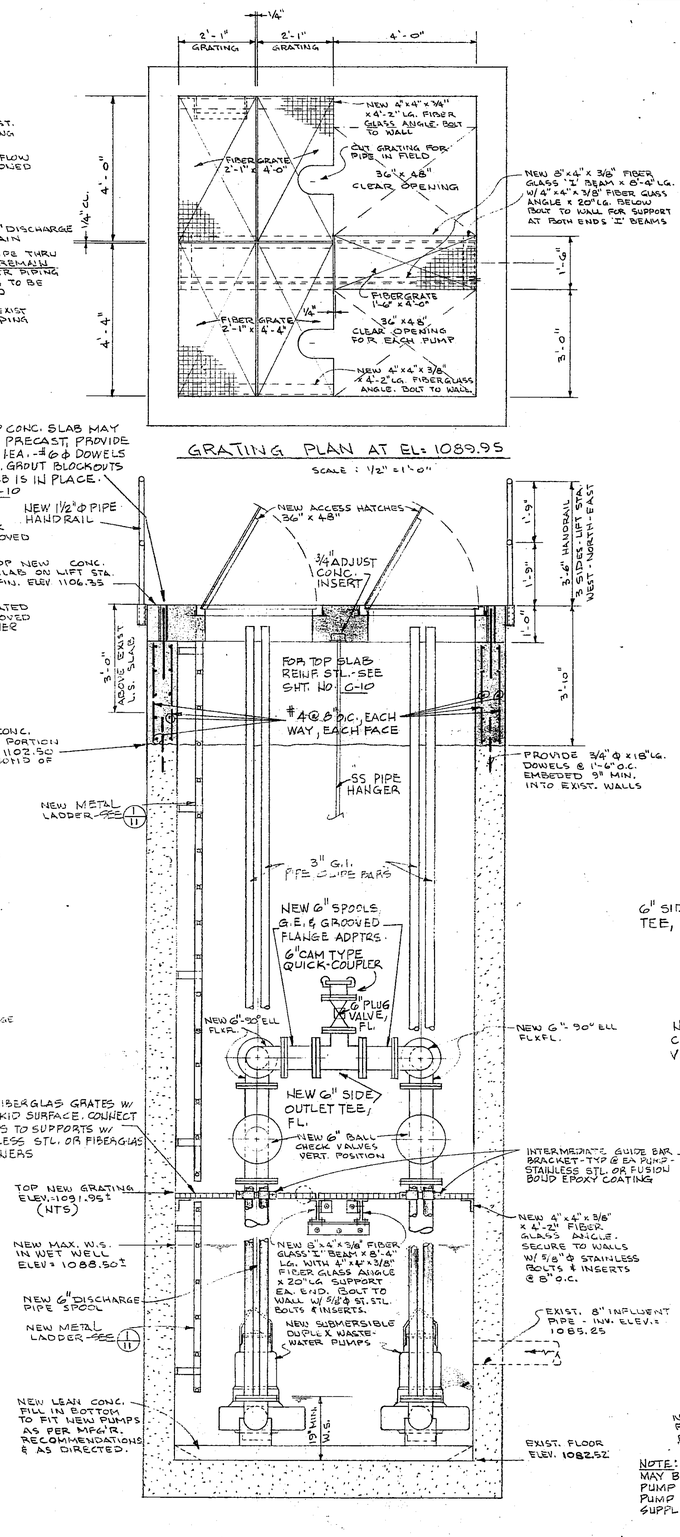


EXIST. GRATING PLAN

NO SCALE

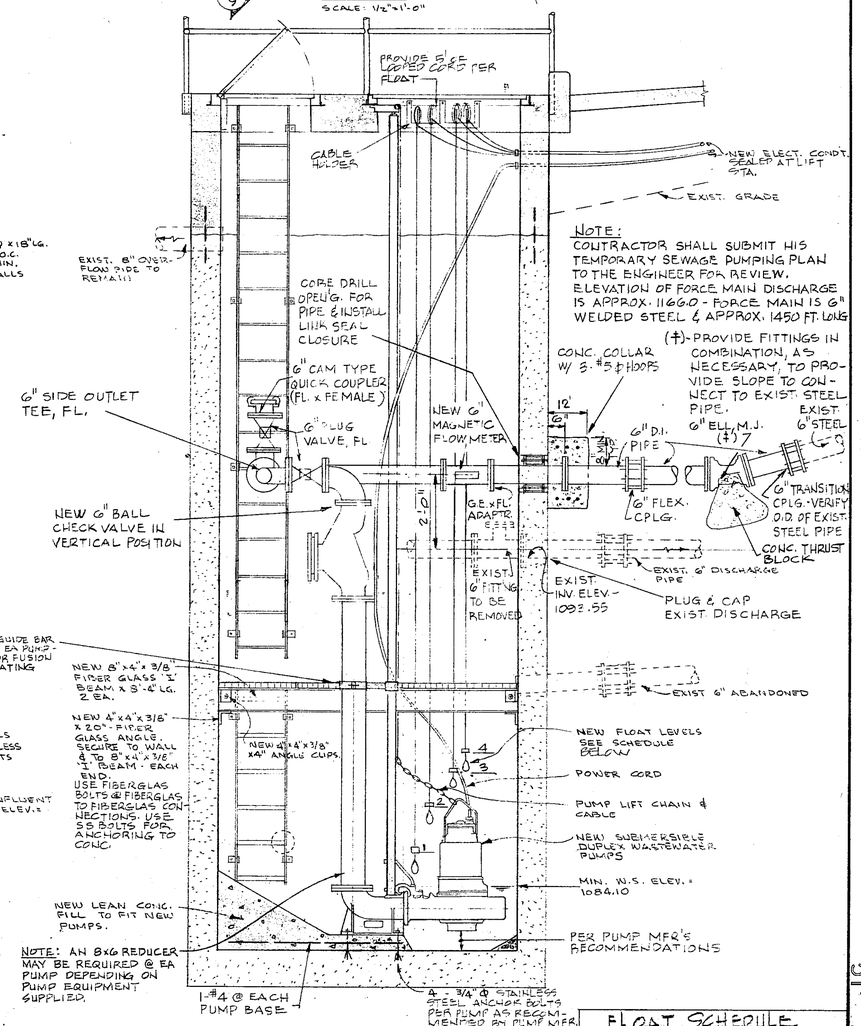
SECTION A/9

SCALE : 1/2" = 1'-0"



SECTION B/9

SCALE = 1/2" = 1'-0"



SECTION C/9

SCALE : 1/2" = 1'-0"

FLOAT SCHEDULE

FLOAT NO.	FLOAT POSITION	FLOAT SETTING (IN FT. & IN. FROM FLOOR)
1	PUMPS OFF	2'-9"
2	LEAD PUMP ON	4'-0"
3	LAG PUMP OFF	5'-0"
4	HIGH WATER ALARM	5'-6"

Gray + Osborne Inc, P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DATE ..... NOV. 1984
SCALE .. AS NOTED
DRAWN ... H.W.M.
CHECKED ... D.M.T.
APPROVED ... J.S.D.

No.	REVISION	DATE	BY	APPD.

JAMES S. DOME — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

JAMES W. OSBORNE — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

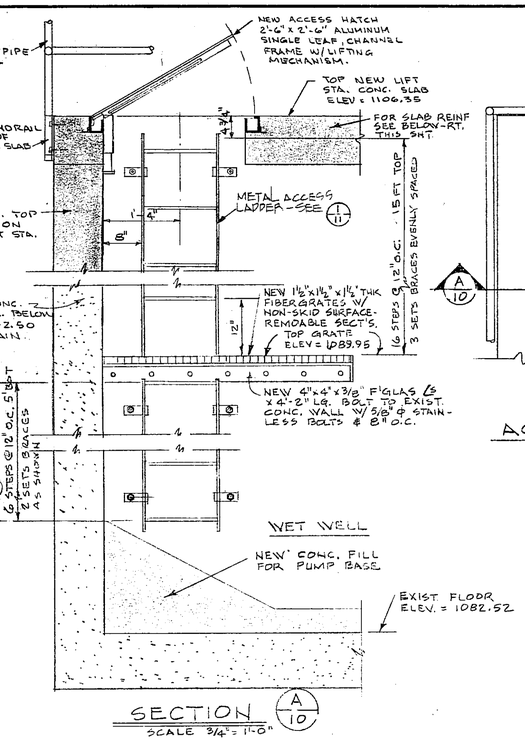
City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
LAKE CHELAN SEWER DISTRICT
PUMP STATION NO. 1
MECHANICAL / STRUCTURAL

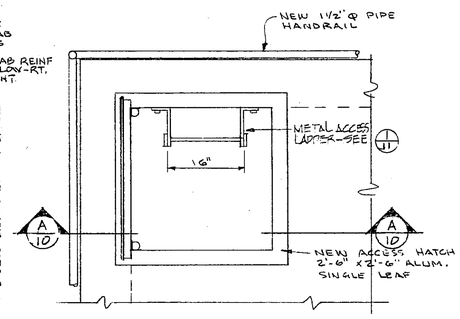
SCHEDULE J.C.

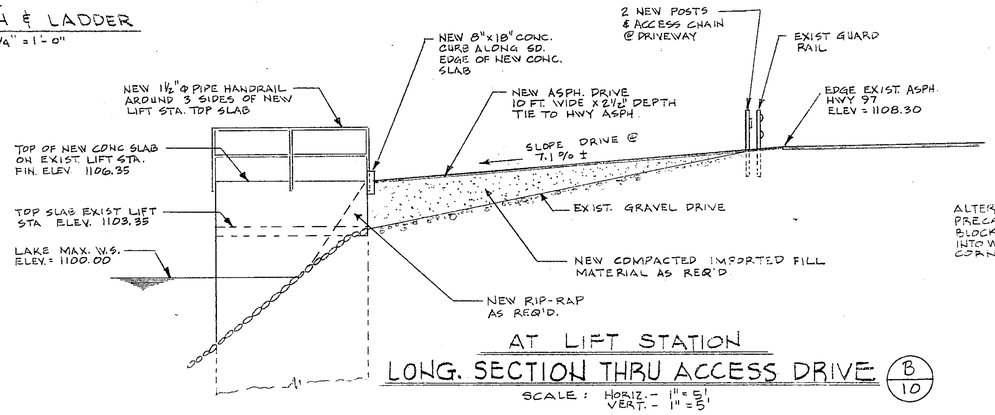
SHEET 9
OF 22
B553

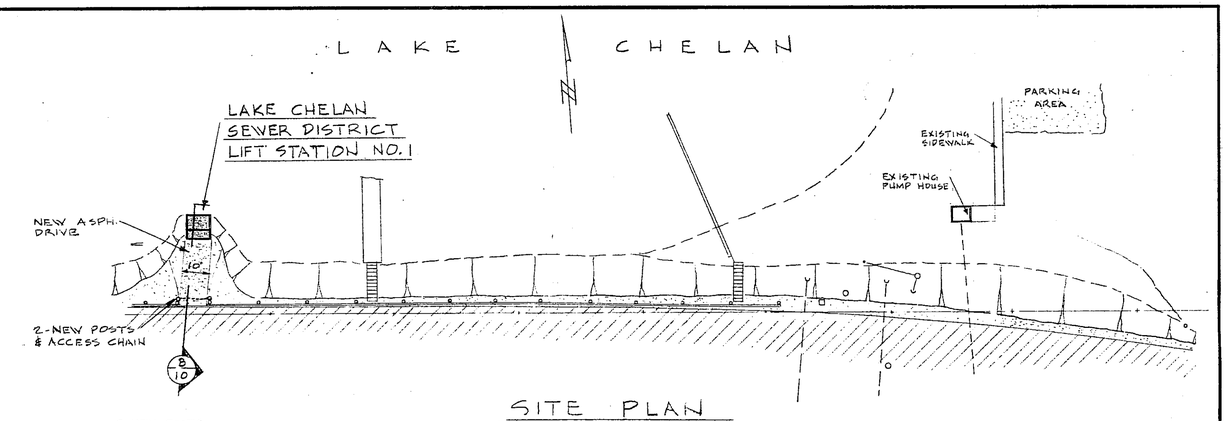
JOB NO. 79036

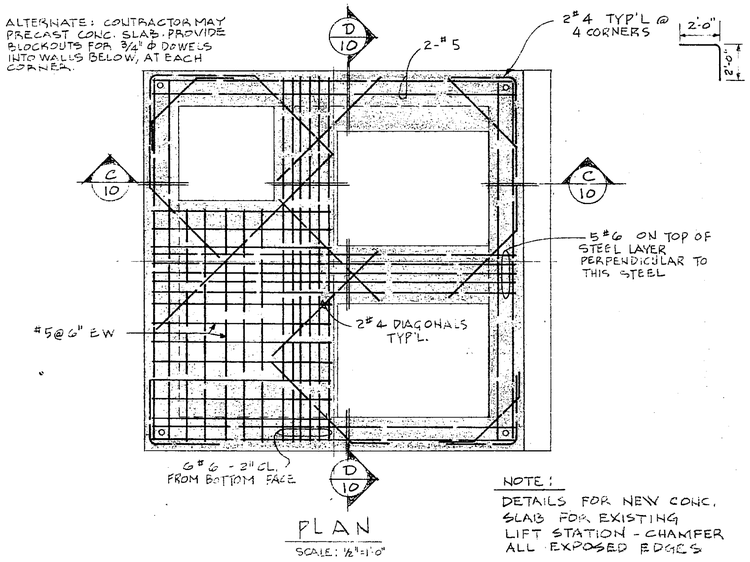
ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

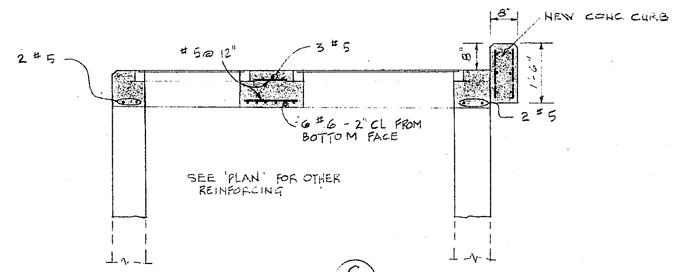


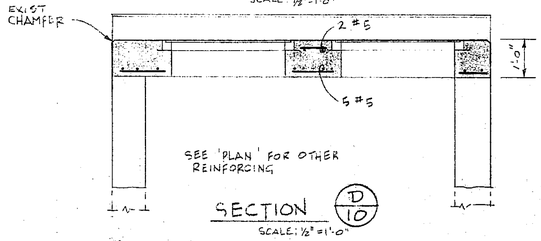












Guy + Osborne Inc., P.S.
CONSULTING ENGINEERS
WENATCHEE WASHINGTON

DATE NOV. 1984
SCALE AS NOTED
DRAWN J.H.H.
CHECKED D.M.T.
APPD. J.S.D.

No.	REVISION	DATE	BY	APPD.

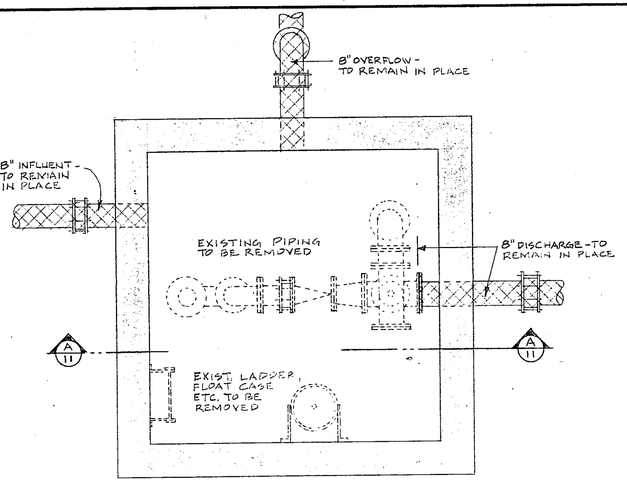
JAMES S. DOWE, JR. STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER
DON M. TULLOCH STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER

City of Chelan
Chelan County
Washington
Wastewater Treatment Facilities
LAKE CHELAN SEWER DISTRICT
PUMP STATION NO. 1
LIFT STATION DETAILS

SCHEDULE 1C

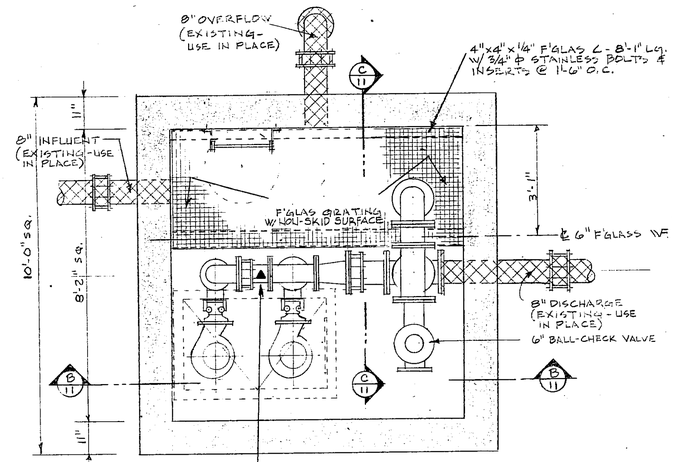
SHEET 10
OF 22
B552
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



PLAN - EXISTING PIPING

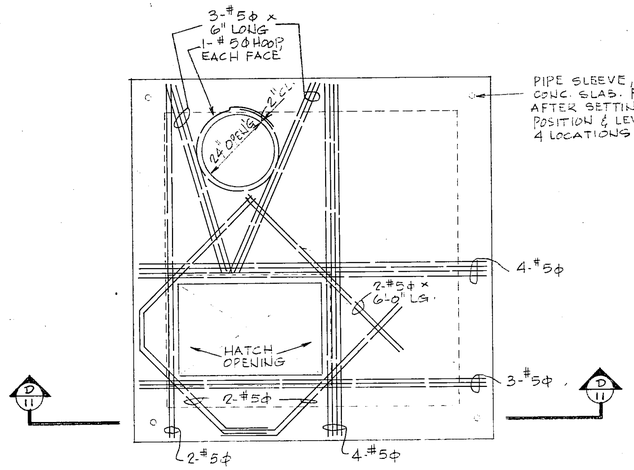
SCALE ½"=1'-0"



PIPE HANGER - 'GRINNELL' FIG. 590 OR EQUAL, W/ FUSION BOND EPOXY COATING. USE S.S. ROD AND FIG. 282 INSERT

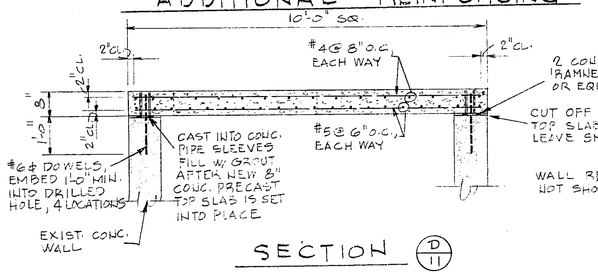
PLAN

SCALE ½"=1'-0"



PLAN

ADDITIONAL REINFORCING



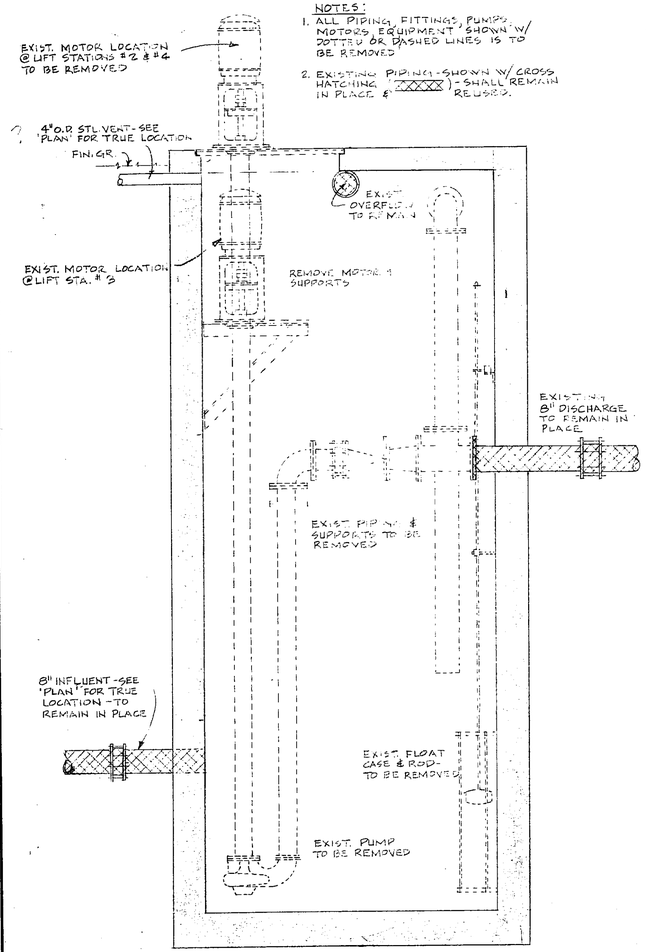
SECTION D/11

PRECAST CONC. - TOP SLAB

SCALE : ½"=1'-0"

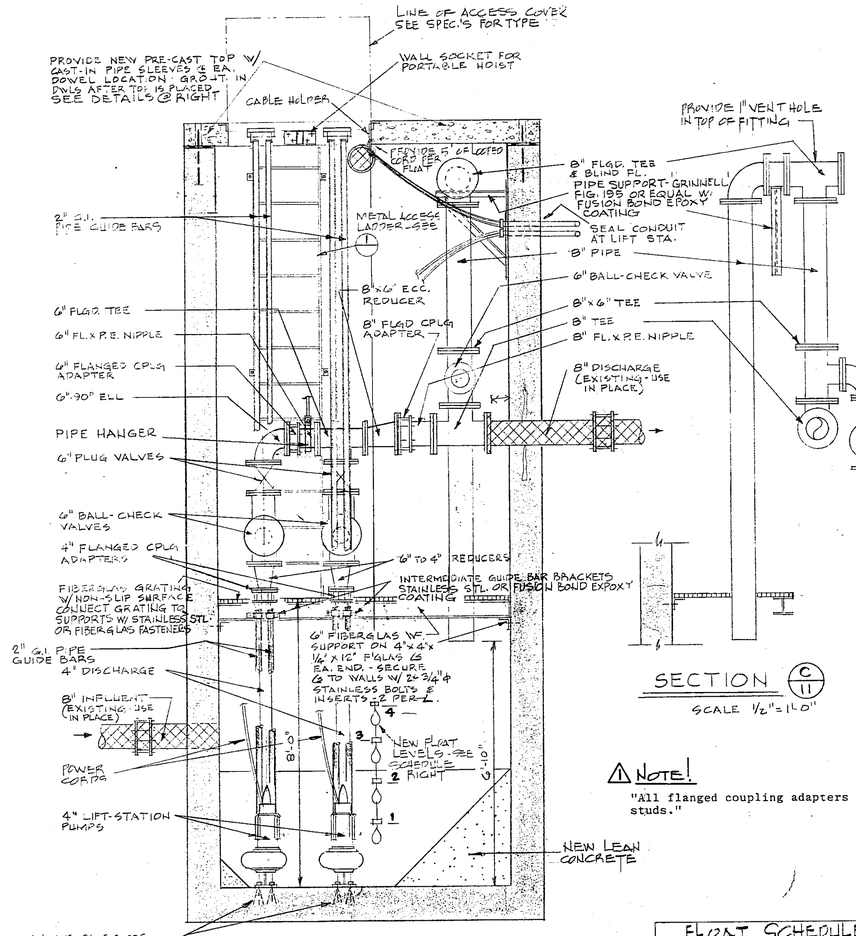
NOTES:

1. ALL PIPING, FITTINGS, PUMPS, MOTORS, EQUIPMENT SHOWN W/ DOTTED OR DASHED LINES IS TO BE REMOVED
2. EXISTING PIPING SHOWN W/ CROSS HATCHING (XXXX) - SHALL REMAIN IN PLACE & REUSED.



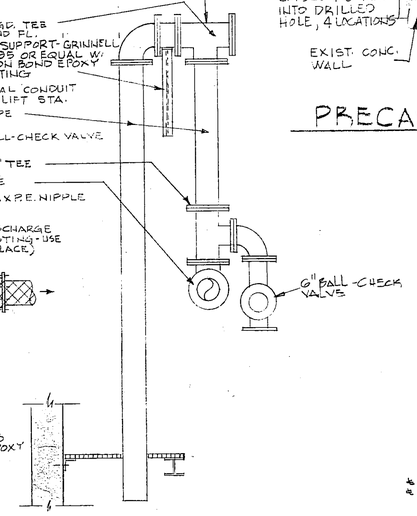
SECTION A/11

SCALE ½"=1'-0"



SECTION B/11

SCALE ½"=1'-0"



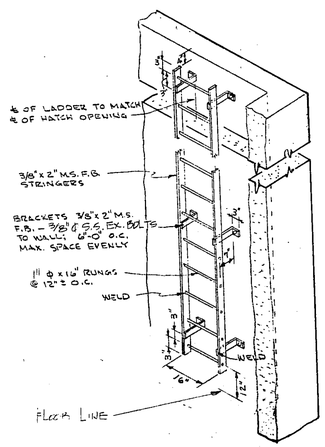
SECTION C/11

SCALE ½"=1'-0"

⚠ NOTE!

"All flanged coupling adapters shall have anchor studs."

FLOAT SCHEDULE		
FLOAT NO.	FLOAT POSITION	FLOAT SETTING (FT. & IN. ABOVE FLR.)
1	PUMPS OFF	2'-0"
2	LEAD PUMP ON	3'-0"
3	LAG PUMP ON	3'-6"
4	HIGH WATER ALARM	4'-0"



LADDER DETAIL 1/11

NO SCALE

! NOTE !

1. LADDERS MAY BE FIBERGLASS, STEEL W FUSION BONDED EPOXY COATING OR TYPE 316 L STAINLESS STEEL W. USE SS. EXPANSION BOLTS
2. LADDER LOCATION & LENGTH WILL VARY FROM THAT SHOWN. SEE LIFT STATION PLANS

Gray + Osborne, Inc., P.S.
CONSULTING ENGINEERS
SEATTLE & TACOMA
WASHINGTON

DATE....NOV., 1984....
SCALE....AS NOTED....
DRAWN..M.M.H....CHECKED....D.M.T.....
APPROVED..J.S.D.....

No.	REVISION	DATE	BY	APPD.
⚠	ADD NOTE	10/85	HLA	DMT

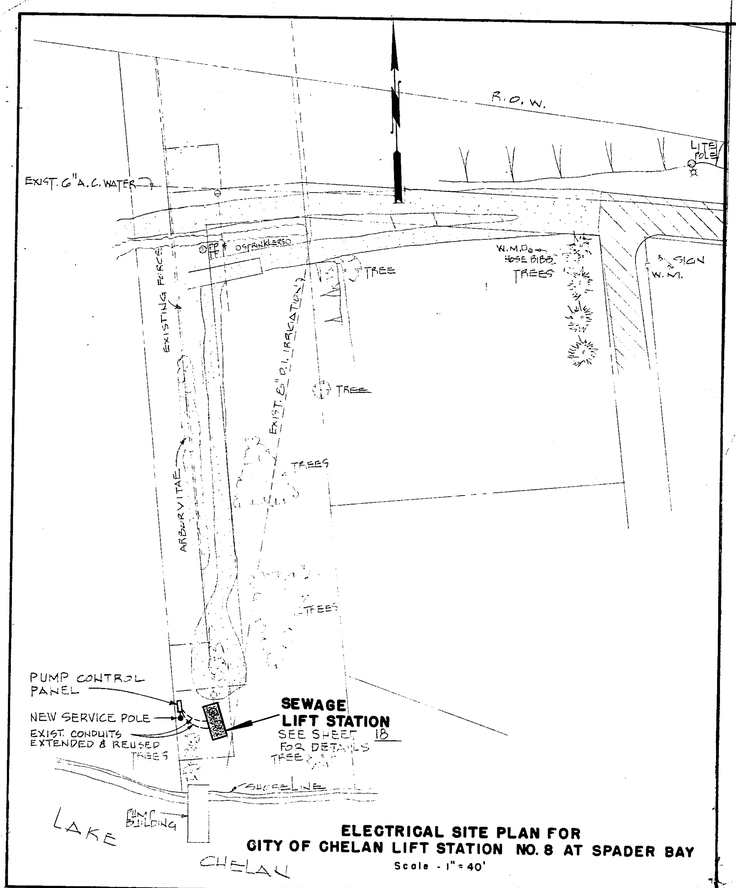
J. S. DOWNIE JR. — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER
N. TULLOCH — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

City of Chelan
Chelan County
Washington
Wastewater Facilities
Treatment SEWER DISTRICT
LAKE CHELAN STATIONS NO.s 2 3 & 4
PUMP STATIONS MECHANICAL / STRUCTURAL

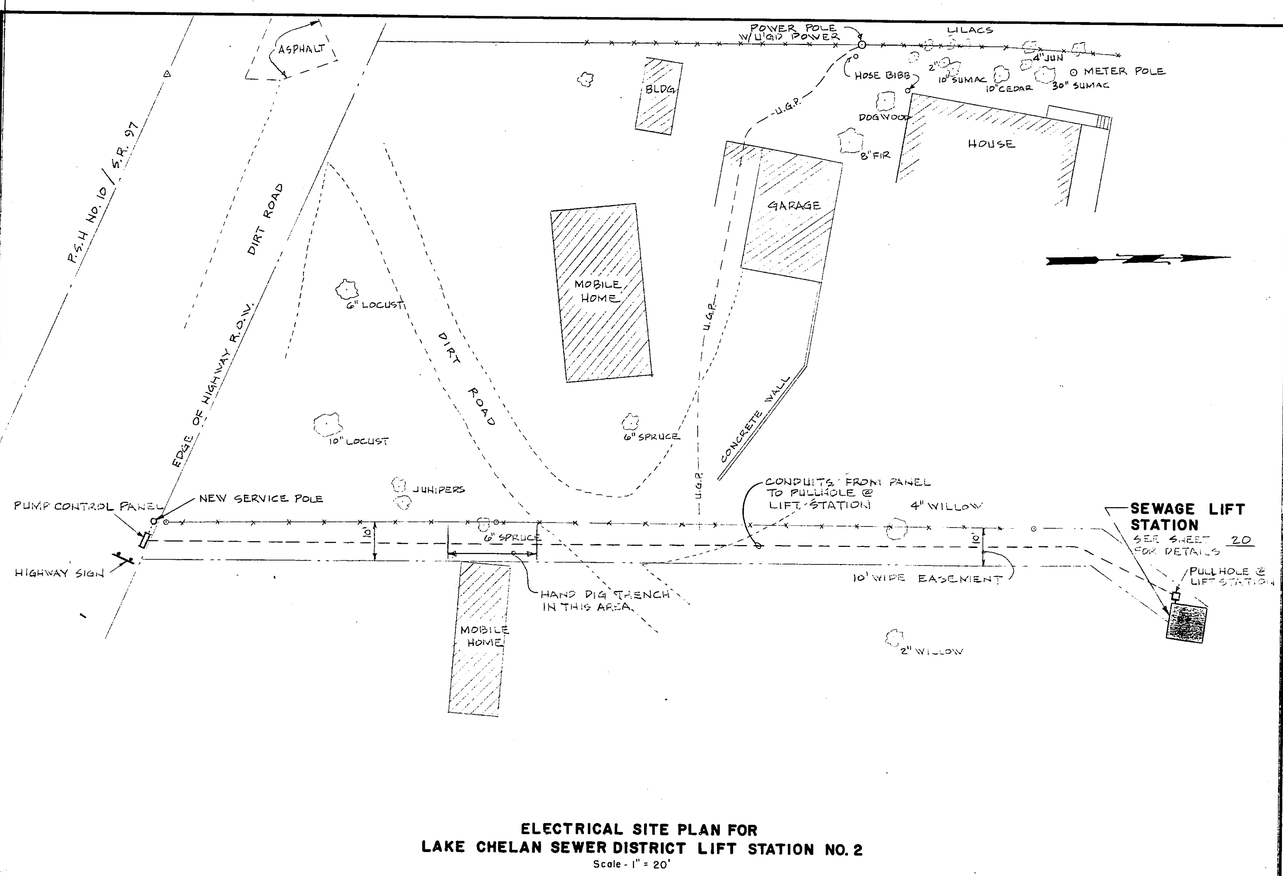
SCHEDULE 1C

SHEET 11
OF 22
B 531
JOB No 79036

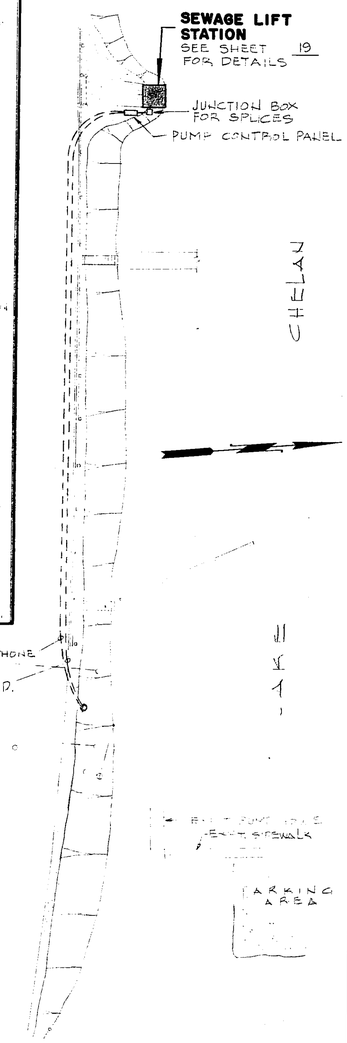
ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



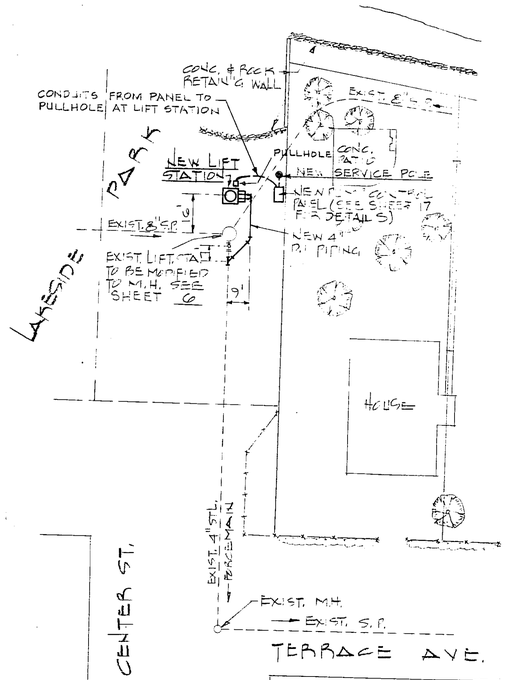
ELECTRICAL SITE PLAN FOR
GITY OF CHELAN LIFT STATION NO. 8 AT SPADER BAY
Scale - 1" = 40'



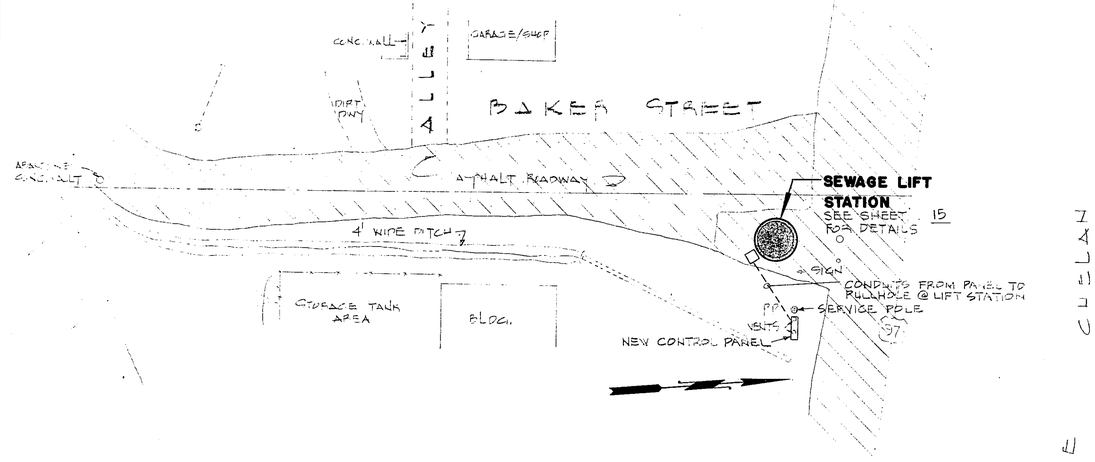
ELECTRICAL SITE PLAN FOR
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 2
Scale - 1" = 20'



ELECTRICAL SITE PLAN FOR
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 1
Scale - 1" = 30'



ELECTRICAL SITE PLAN FOR
CITY OF CHELAN LIFT STATION NO. 7
Scale - 1" = 30'



ELECTRICAL SITE PLAN FOR
CITY OF CHELAN LIFT STATION NO. 4
Scale - 1" = 20'

Gray + Osborne Inc., P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DATE: NOV. 1984
SCALE: NOTED
DRAWN: M.H.R.-J.H.H
CHECKED: P.L.C.
APPD. BY: J.S.D.

No.	REVISION	DATE	BY	APPD.

P.L. CONLEY — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

S. DUANE JOHNSON — STATE OF WASHINGTON — REGISTERED PROFESSIONAL ENGINEER

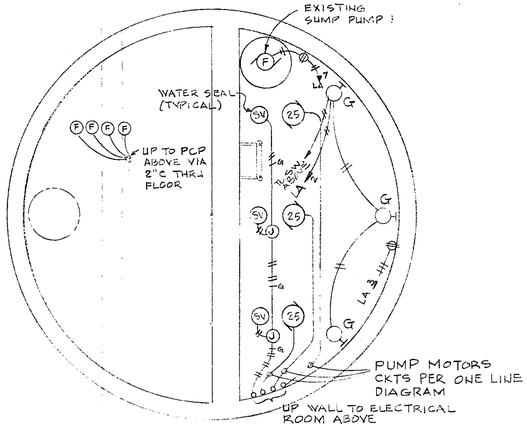
City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
CITY OF CHELAN PUMP STATIONS NO. 4, 7, & 8
LAKE CHELAN SEWER DISTRICT PUMP STATIONS NO. 1 & 2
ELECTRICAL SITE PLANS

SCHEDULE IC

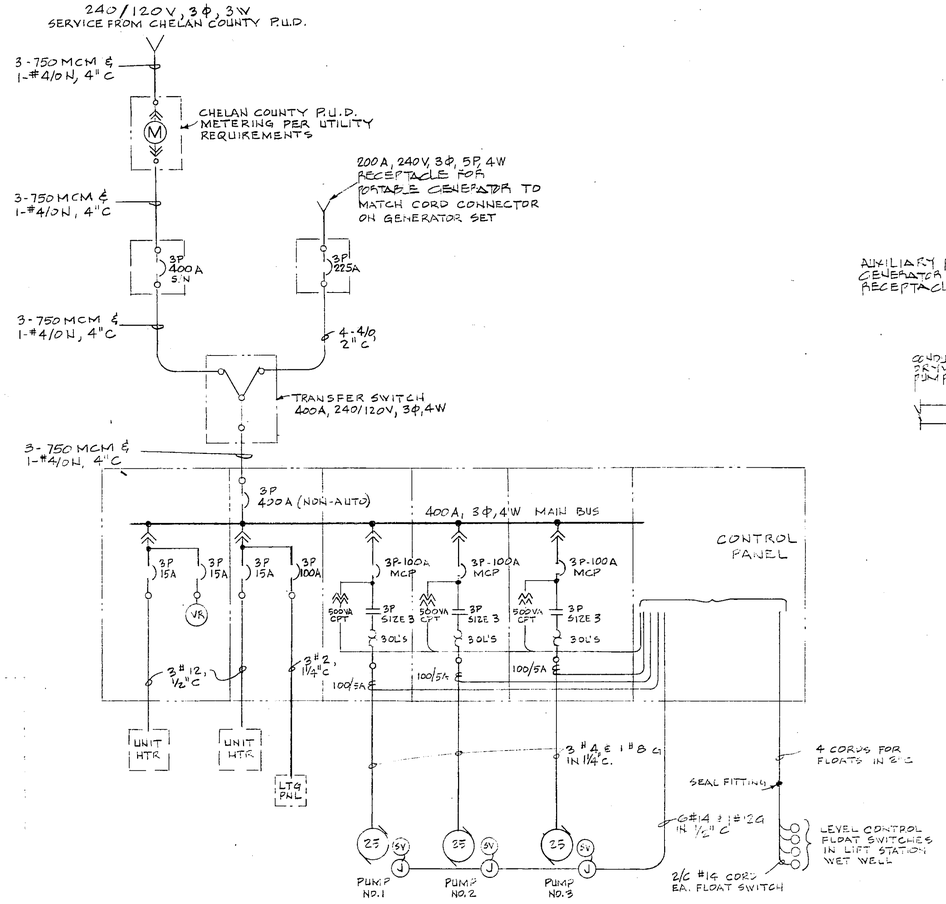
SHEET 12 OF 22

B 550

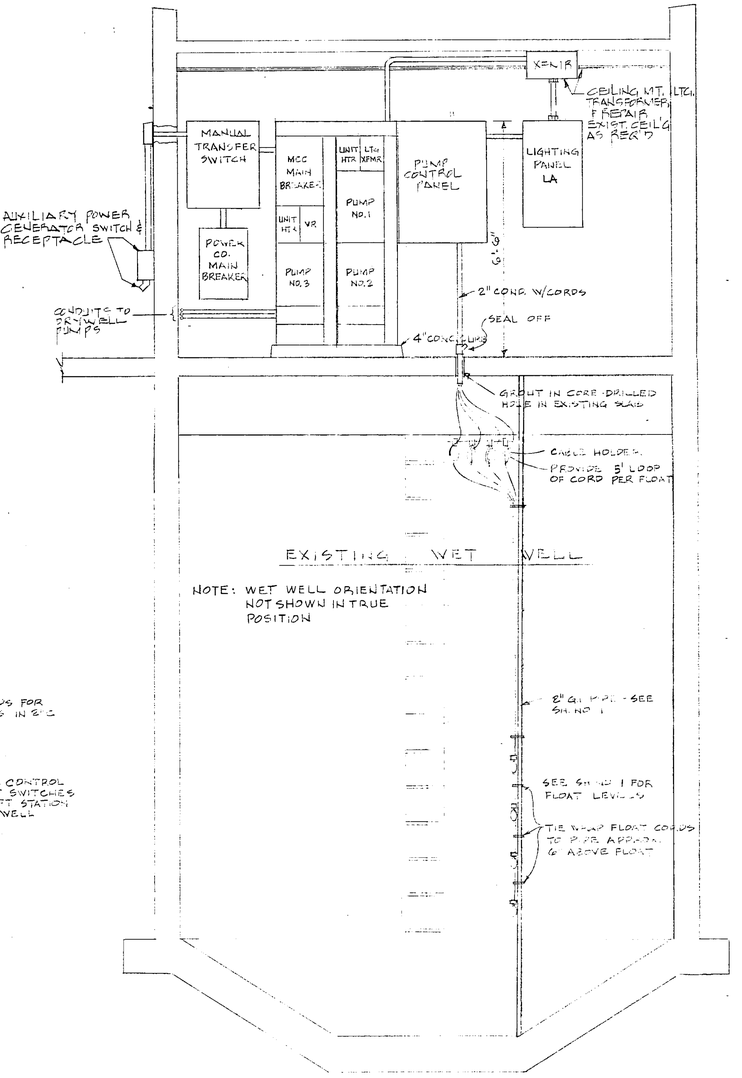
ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES



ELECTRICAL PLAN - WETWELL / DRYWELL



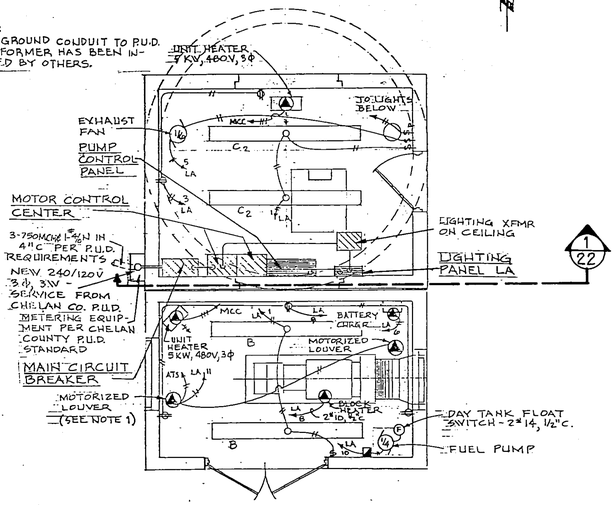
ONE LINE DIAGRAM FOR LIFT STATION NO. 1



SECTION THRU WET WELL & PUMP ROOM (1/22)

SCALE ½"=1'-0"

NOTE:
UNDERGROUND CONDUIT TO P.U.D. TRANSFORMER HAS BEEN INSTALLED BY OTHERS.



ELECTRICAL PLAN - UPPER LEVEL
LIFT STATION NO. 1

SCALE 1/4"=1'-0"

NOTE 1:
LOUVERS SHALL OPEN WHEN DE-ENERGIZED. PROVIDE CONTACTS AS REQUIRED TO CAUSE LOUVERS TO OPEN WHENEVER GENERATOR RUNS.

CIRCUIT SCHEDULE - LIGHTING PANEL LA
240/120V, 1φ, 3W w/2P-100A MAIN BRKR

CKT NO.	LOAD DESCRIPTION	WIRE SIZE	CKT BRKR	POLE NO		CKT BRKR	WIRE SIZE	LOAD DESCRIPTION	CKT NO.
1	BUILDING LIGHTING	#12	1P 20A	1	2	1P 20A	#12	DRY WELL LIGHTING	2
3	BUILDING OUTLETS	#12	1P 20A	3	4	1P 20A	#12	PUMP CONTROL PANEL	4
5	EXHAUST FANS	#12	1P 20A	5	6	1P 20A	#12	BATTERY CHARGER	6
7	SUMP PUMP	#12	1P 20A	7	8	1P 20A	#12	BLOCK HEATER	8
9	GENERATOR RM. OUTLETS	#12	1P 20A	9	10	1P 20A	#12	DAY TANK PUMP	10
11	MOTORIZED LOUVERS	#12	1P 20A	11	12	1P 20A		SPARE	12
13	SPARE		1P 20A	13	14	1P 20A		SPARE	
	SPACE			15	16			SPACE	
	SPACE			17	18			SPACE	

Gray + Osborne Inc., P.S.
CONSULTING ENGINEERS
SEATTLE • TACOMA
WASHINGTON

DATE.... NOV., 1984
SCALE.. AS NOTED
DRAWN.... MMH
CHECKED.... P.S.C.
APPD. J.S.P.

No.	REVISION	DATE	BY
1	REUSED CIRCUIT SCHEDULE, PHELPS DIAGRAM, NOTES	10-85	JWH

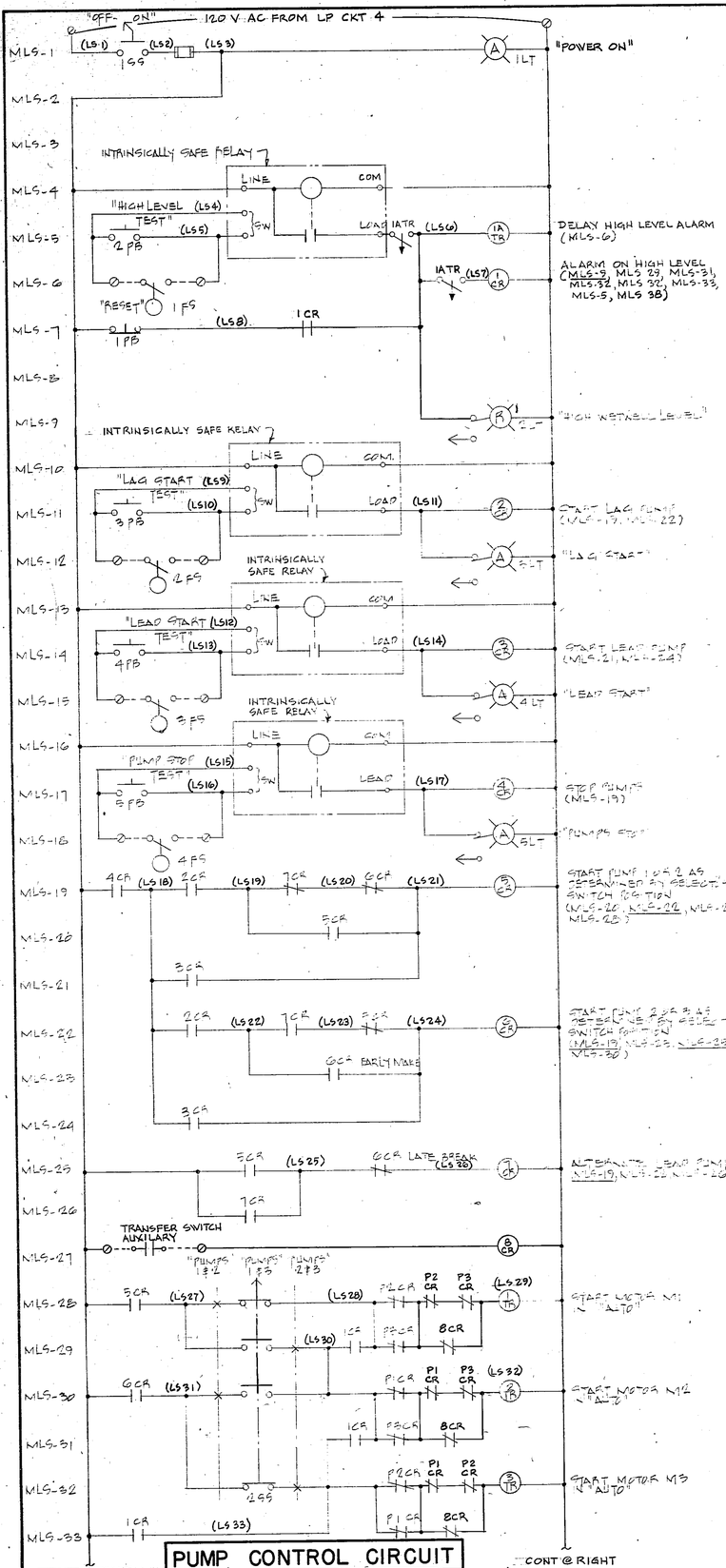
TC

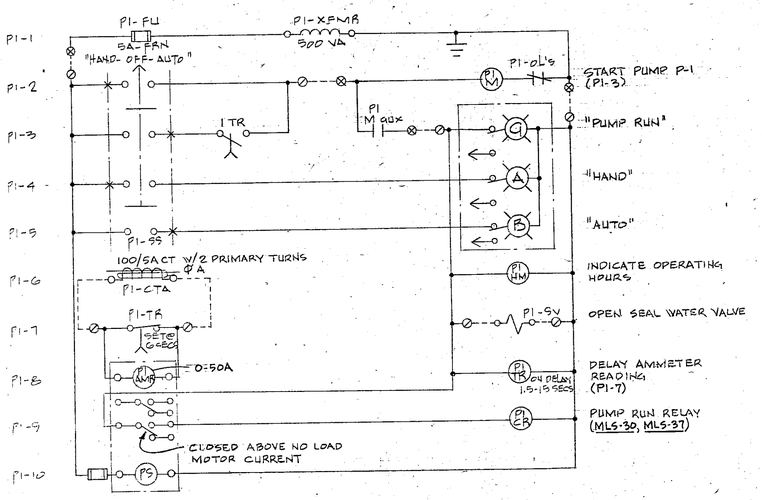
City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL - LIFT STATION NO. 1
PLAN - SCHEDULE - ONE LINE DIAGRAM

SCHEDULE IC

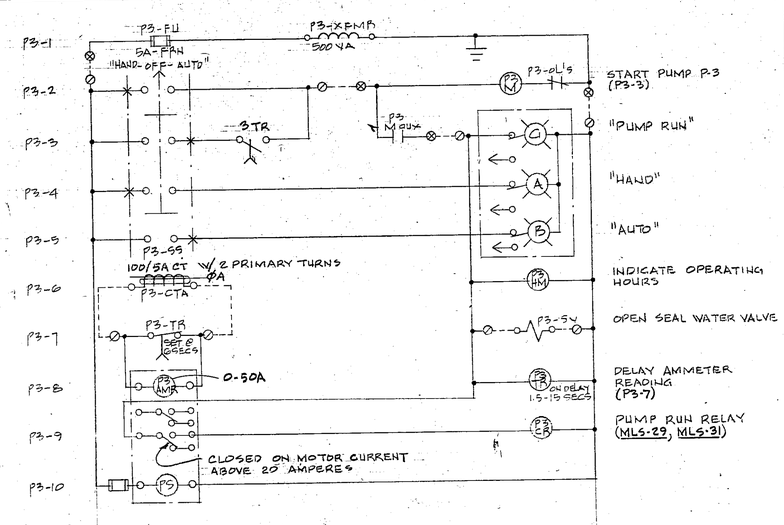
SHEET 13
OF 22
B549
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES





LIFT PUMP NO. 1
ELEMENTARY WIRING DIAGRAM

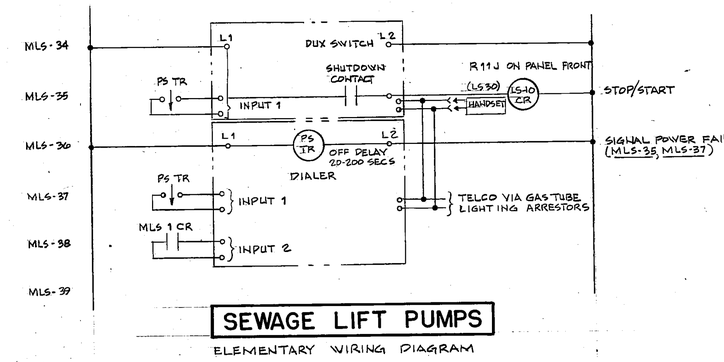


LIFT PUMP NO. 3
ELEMENTARY WIRING DIAGRAM

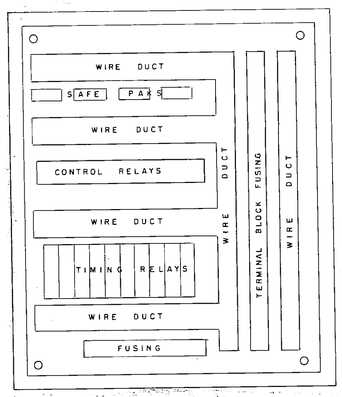
LIFT PUMP NO. 2
ELEMENTARY WIRING DIAGRAM

NAMEPLATE SCHEDULE

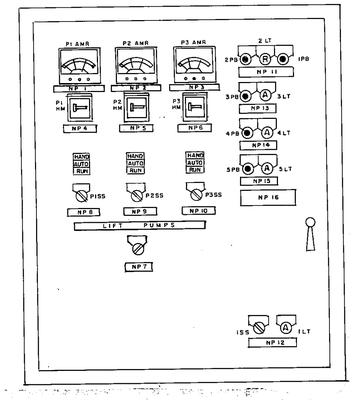
NP1	MOTOR CURRENT
NP2	MOTOR CURRENT
NP3	MOTOR CURRENT
NP4	RUN TIME
NP5	RUN TIME
NP6	RUN TIME
NP7	PUMP SELECTOR
NP8	SEWAGE LIFT PUMP NO. 1
NP9	SEWAGE LIFT PUMP NO. 2
NP10	SEWAGE LIFT PUMP NO. 3
NP11	HIGH LEVEL FLOAT AND ALARM
NP12	PANEL CONTROL POWER
NP13	LAG START FLOAT
NP14	LEAD START FLOAT
NP15	PUMP STOP FLOAT
NP16	SEWAGE LIFT PUMPS LEVEL CONTROLS



SEWAGE LIFT PUMPS
ELEMENTARY WIRING DIAGRAM



PANEL INTERIOR



PANEL DOOR

PUMP CONTROL PANEL — ELEVATIONS

Gray + Osborne Inc., P.S.
CONSULTING ENGINEERS
SEATTLE, WASHINGTON

DATE ... NOV. 1984
SCALE ... NONE
DRAWN ... HLR
CHECKED ... PLS
APPD. ... JSP

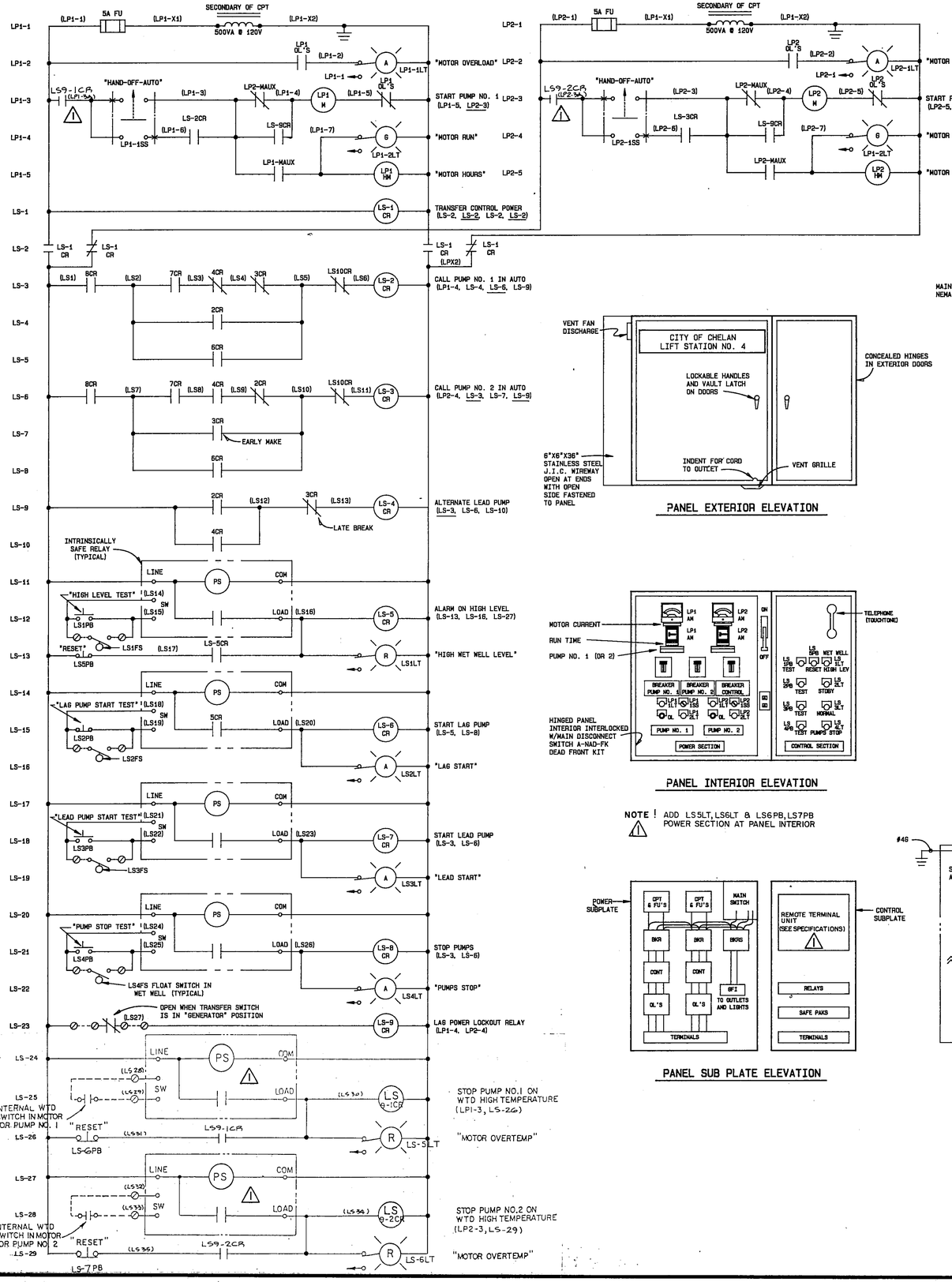
No.	REVISION	DATE	BY	APPD.

SCHEDULE IC

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL-CITY PUMP STATION NO. 1
CONTROL DIAGRAMS

SHEET 14
OF 22
B548
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

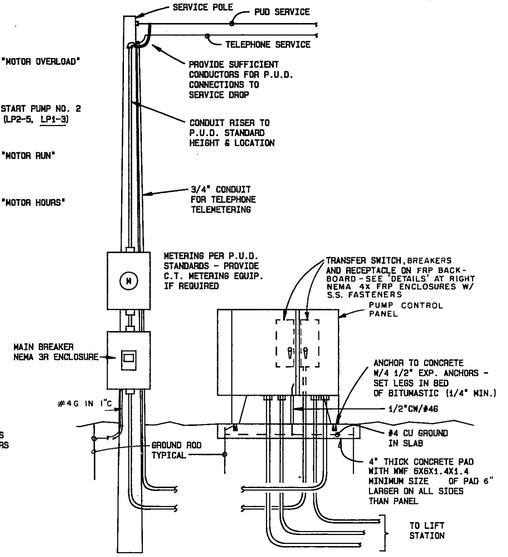


PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

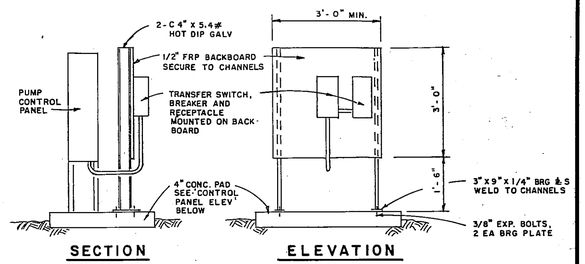
NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

PANEL SUB PLATE ELEVATION



SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE



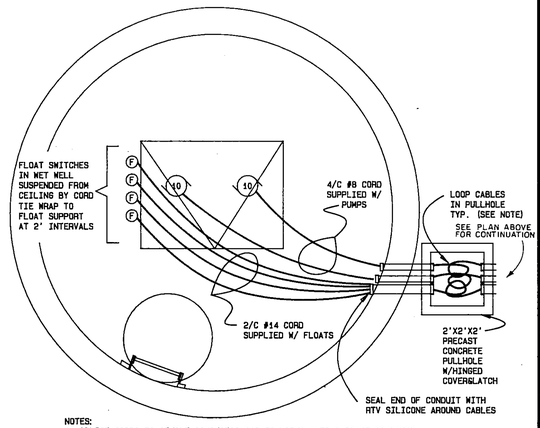
FRP BACKBOARD DETAILS

NOTE: TYPICAL ARRANGEMENT SHOWN. FIELD LOCATE AS DIRECTED BY THE ENGINEER. MINOR CHANGES IN CONTROL PANEL & BACKBOARD ORIENTATION TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.

⚠ "NOTE: Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to daylight or to a dry well (1 cubic yard washed drain gravel minimum).

ONE LINE DIAGRAM
CITY OF CHELAN LIFT STATION NO. 4



NOTES:
1. SPLICE CORDS TO SINGLE CONDUCTOR CABLES USING ANTI-OXIDANT COMPOUND FILLED COMPRESSION SLEEVE CONNECTORS. INSULATE SPLICE W/ SCOTCH RESIN FILLER; HEAT SHRINK COVER SLEEVE, TWO LAYERS HALF LAPPED #88 TAPE & PAINT W/ 'GLYPTAL' OR EQUAL.

ELECTRICAL PLAN
CITY OF CHELAN LIFT STATION NO. 4

SCALE: 1/2" = 1'-0"

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE: NOV 1984	DRAWN: DH	CHECKED: PLC	APPROVED: JSD
SCALE: NOTED			

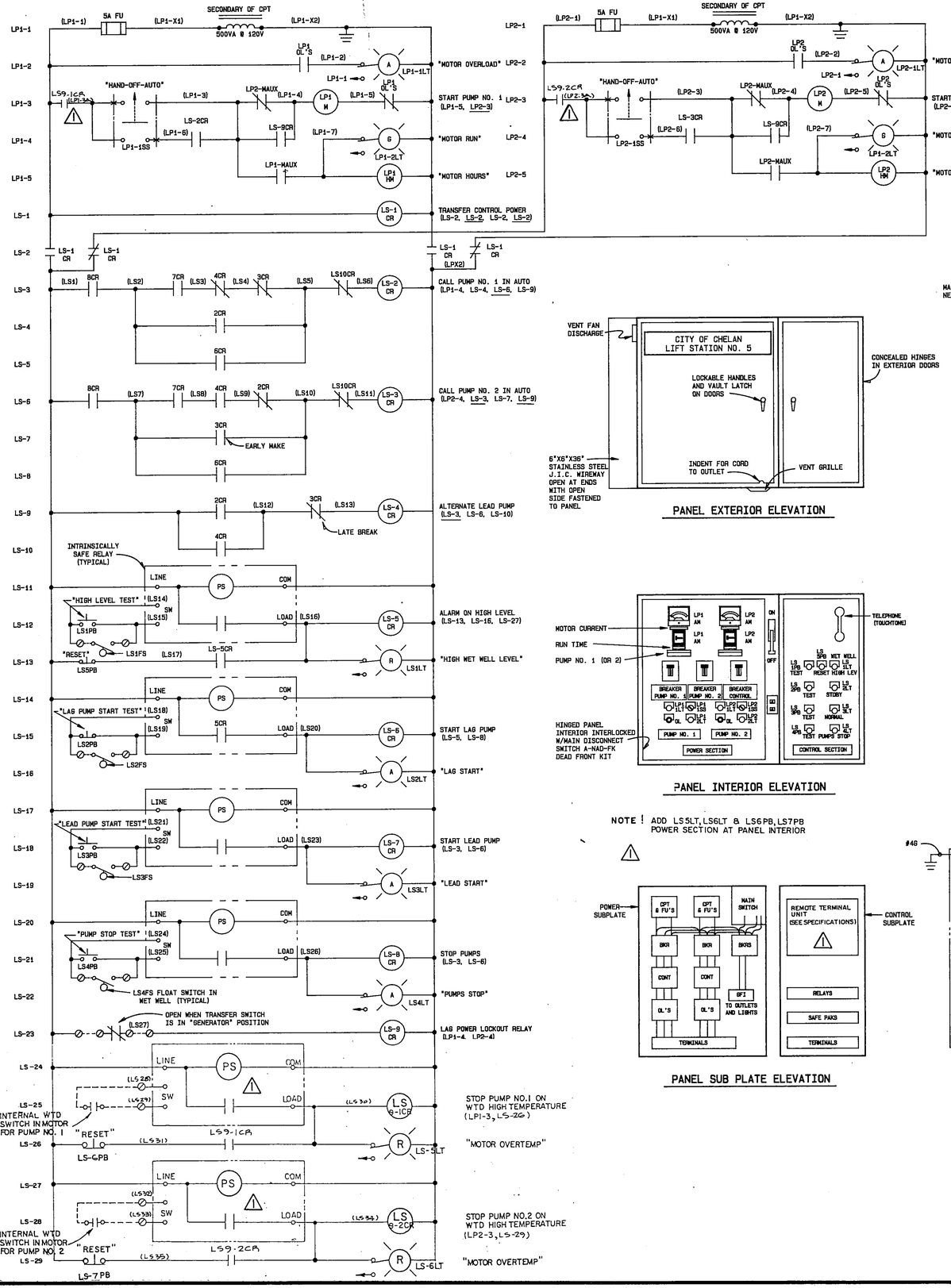
No.	REVISION	DATE	APPD
1	ADD NOTES & ADD MOTOR CONNECTIONS TO WIRING DIAGRAM	1/85	PLC

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL - CITY LIFT STATION NO. 4

SCHEDULE IC

SHEET: 15
OF: 22
FILE No. B 547
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

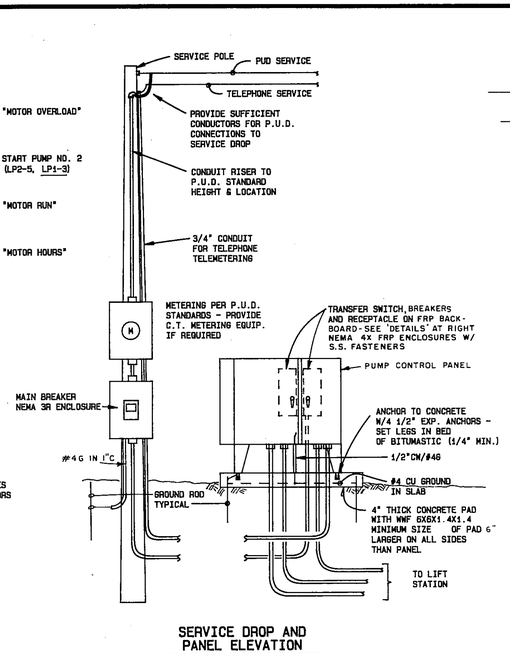


PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

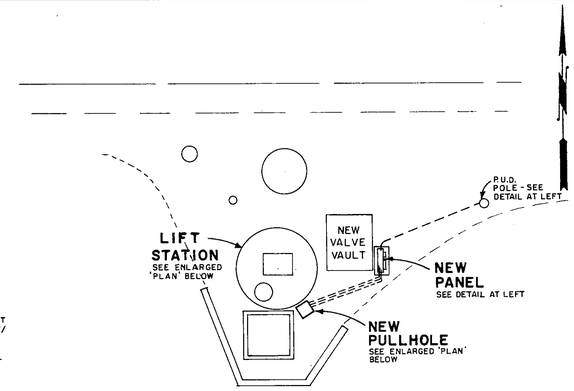
NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

PANEL SUB PLATE ELEVATION



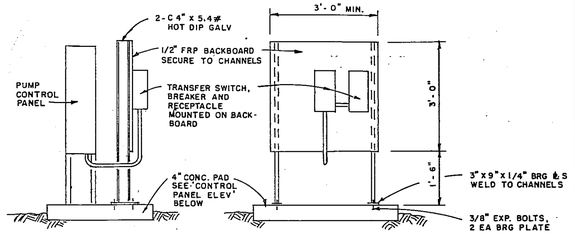
SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE



SITE PLAN

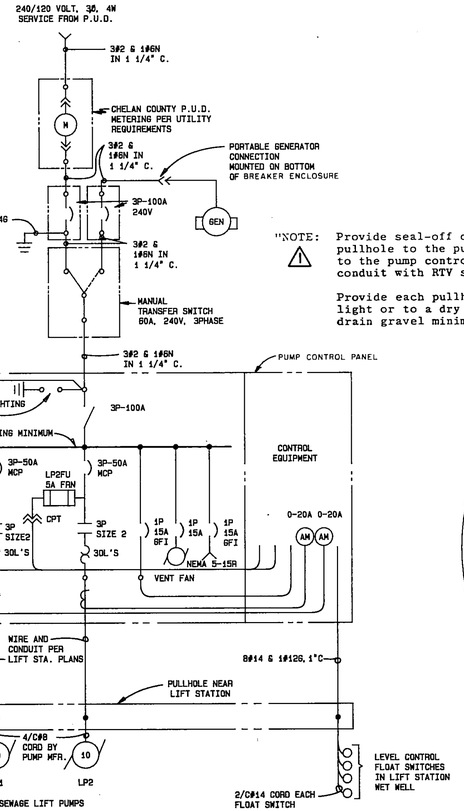
SCALE 1" = 10'-0"



SECTION ELEVATION

FRP BACKBOARD DETAILS

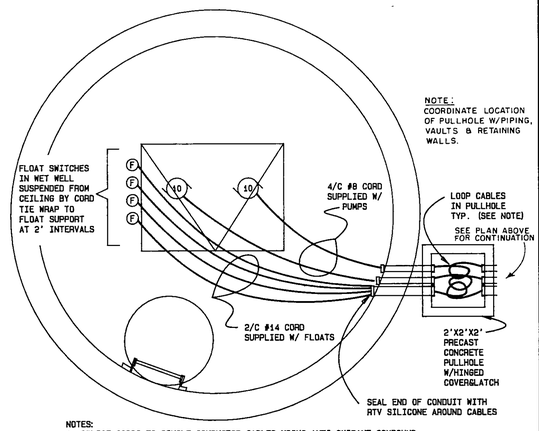
NOTE: TYPICAL ARRANGEMENT SHOWN. FIELD LOCATE AS DIRECTED BY THE ENGINEER. MINOR CHANGES IN CONTROL PANEL & BACKBOARD ORIENTATION TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.



ONE LINE DIAGRAM
CITY OF CHELAN LIFT STATION NO. 5

"NOTE: Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to daylight or to a dry well (1 cubic yard washed drain gravel minimum).



NOTES:
1. SPLICE CORDS TO SINGLE CONDUCTOR CABLES USING ANTI-OXIDANT COMPOUND FILLED COMPRESSION SLEEVE CONNECTORS. INSULATE SPLICE W/ SCOTCH RESIN FILLER; HEAT SHRINK COVER SLEEVE, TWO LAYERS HALF LAPPED #88 TAPE & PAINT W/ "GLYPTAL" OR EQUAL.

ELECTRICAL PLAN
CITY OF CHELAN LIFT STATION NO. 5

SCALE: 1/2" = 1'-0"

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE	NOV 1984
SCALE	NOTED
DRAWN:	DH
CHECKED:	PLC
APPROVED:	JSD

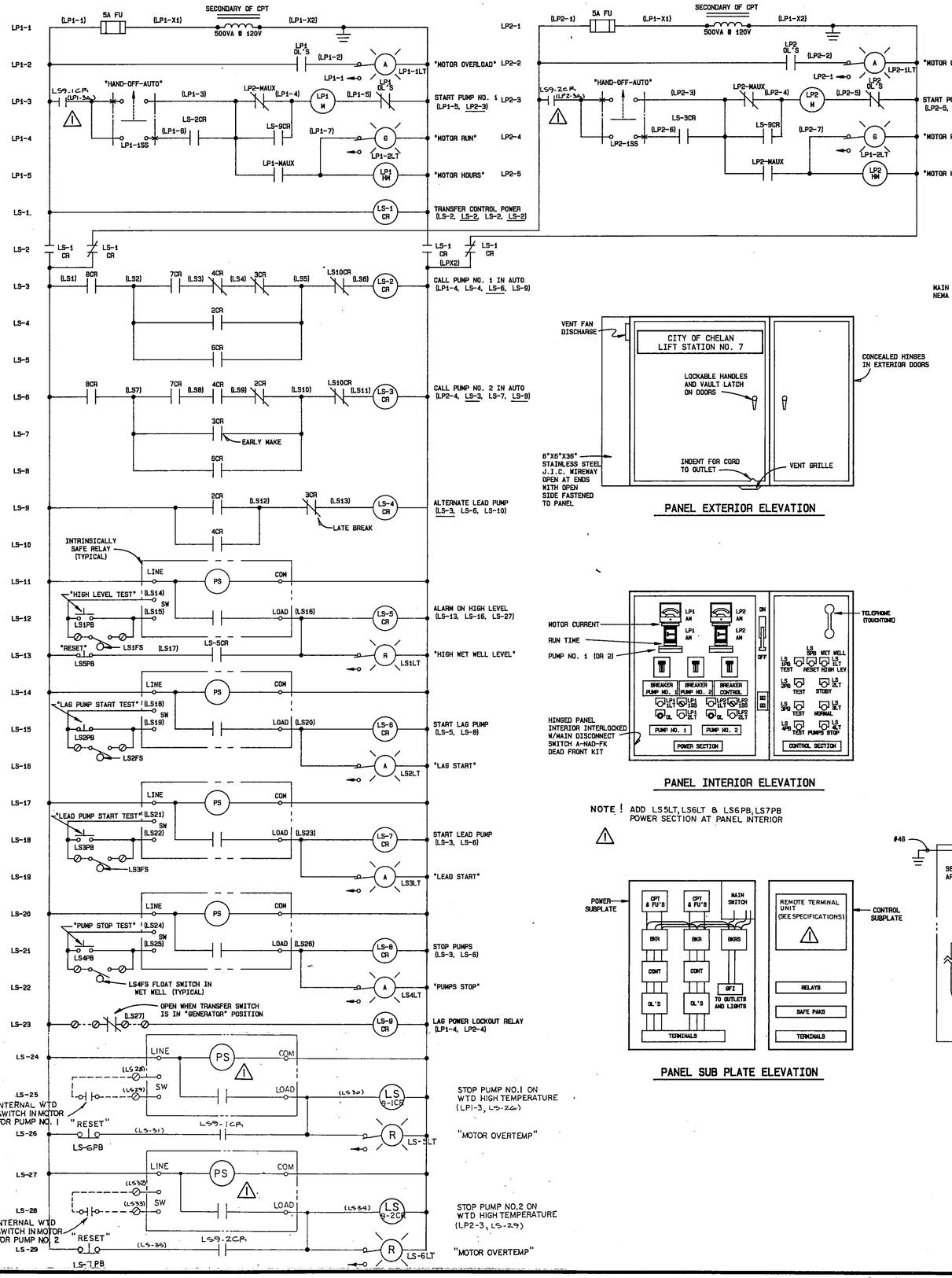
No.	REVISION	DATE	APPD
1	ADD NOTES, ADD METER & CONDUIT TO PANEL DIAGRAM	12/85	PLC

City of Chelan
Chelan County Wastewater Treatment Facilities
ELECTRICAL- CITY LIFT STATION NO. 5

SCHEDULE

SHEET: 16
OF: 22
FILE No. B 546
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

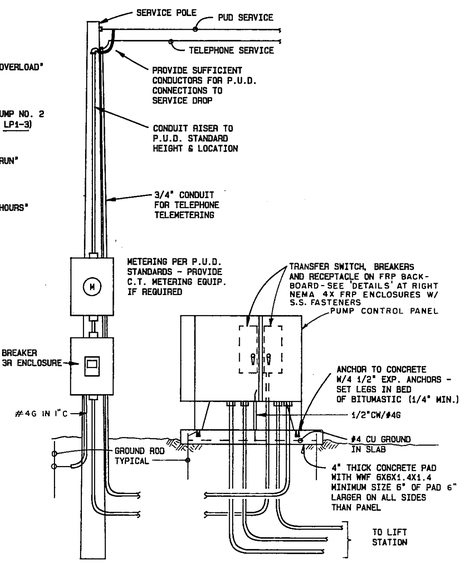


PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

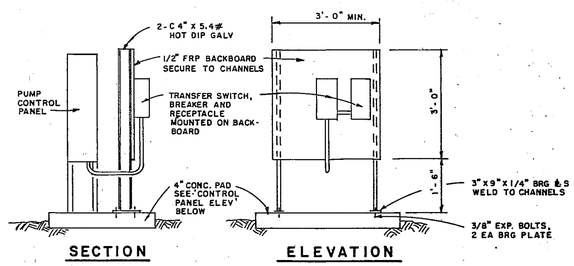
NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

PANEL SUB PLATE ELEVATION



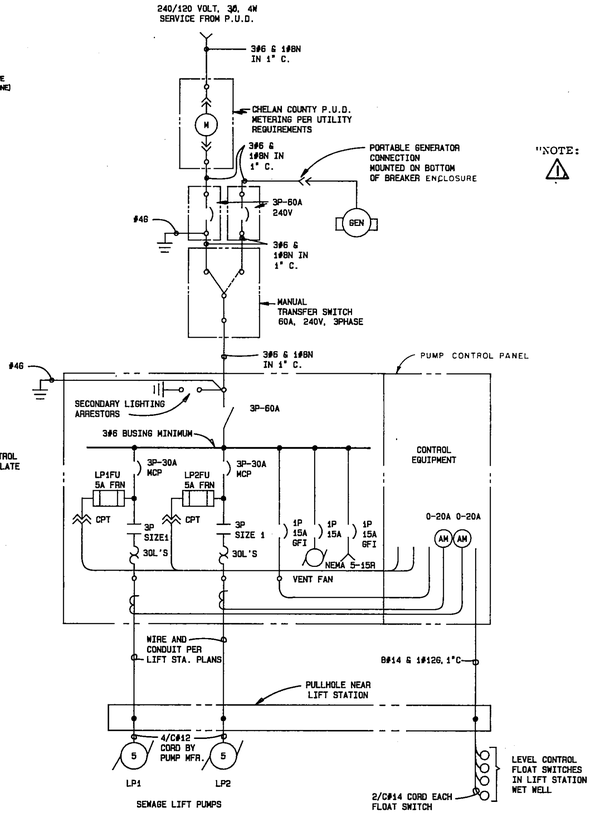
SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE



FRP BACKBOARD DETAILS

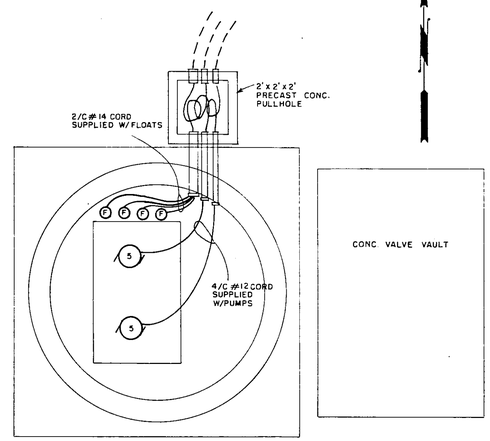
NOTE: TYPICAL ARRANGEMENT SHOWN. FIELD LOCATE AS DIRECTED BY THE ENGINEER. MINOR CHANGES IN CONTROL PANEL & BACKBOARD ORIENTATION TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.



ONE LINE DIAGRAM
CITY OF CHELAN LIFT STATION NO. 7

"NOTE: Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to daylight or to a dry well (1 cubic yard washed drain gravel minimum).



ELECTRICAL PLAN

SCALE: 1/2" = 1'-0"

Gray + Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE: NOV 1984
SCALE: NOTED
DRAWN: DH
CHECKED: PLC
APPROVED: JSD

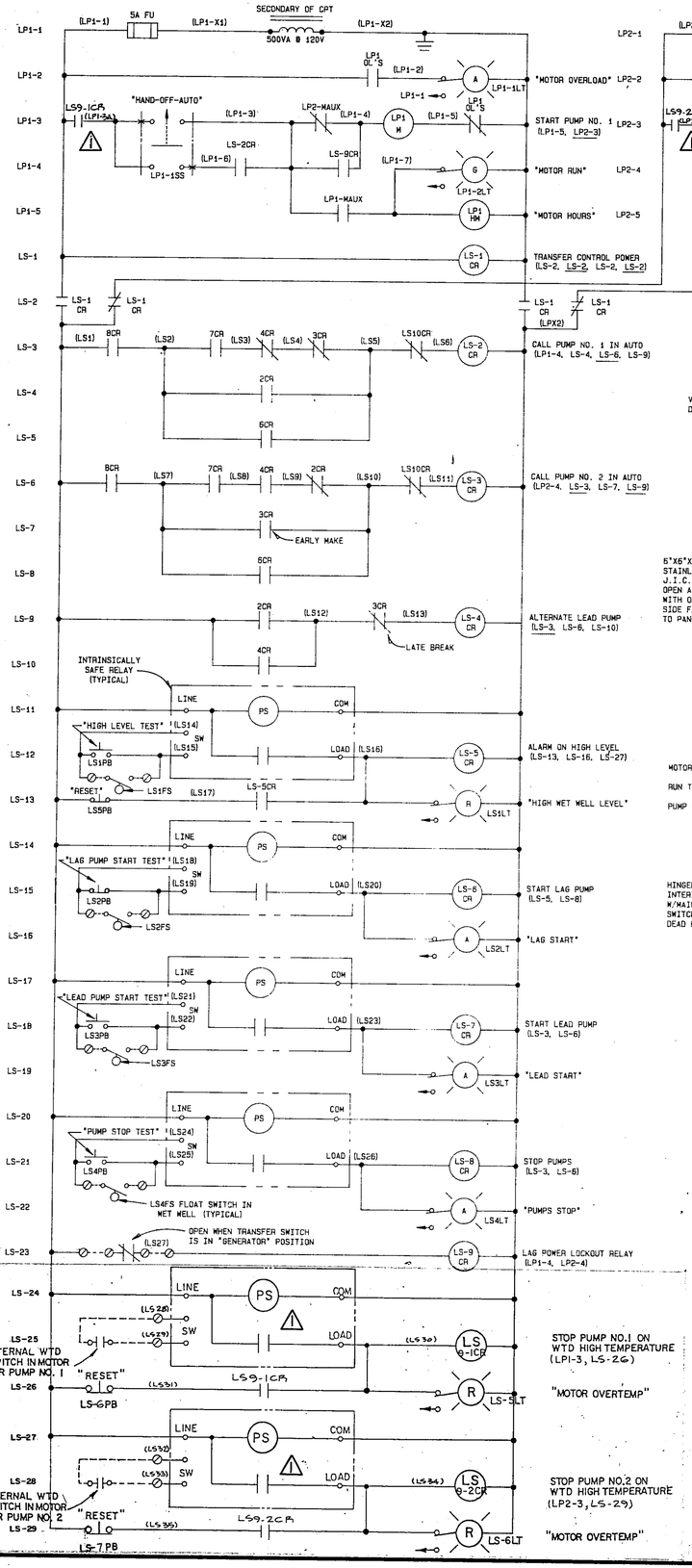
No.	REVISION	DATE	APPD
1	ADD NOTES — ADD MOTOR AMPERAGE & WIRING DIAGRAM	12/85	PLC

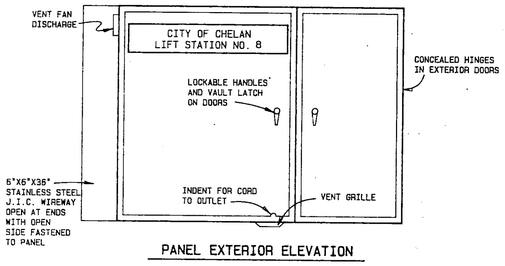
City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL- CITY LIFT STATION NO. 7

SHEET: 17
OF: 22
FILE No. B 545
JOB No. 79036

SCHEDULE IC

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

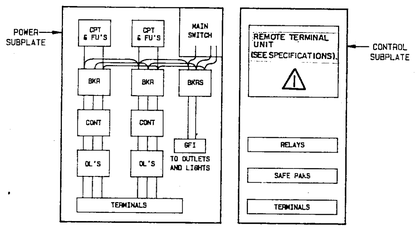




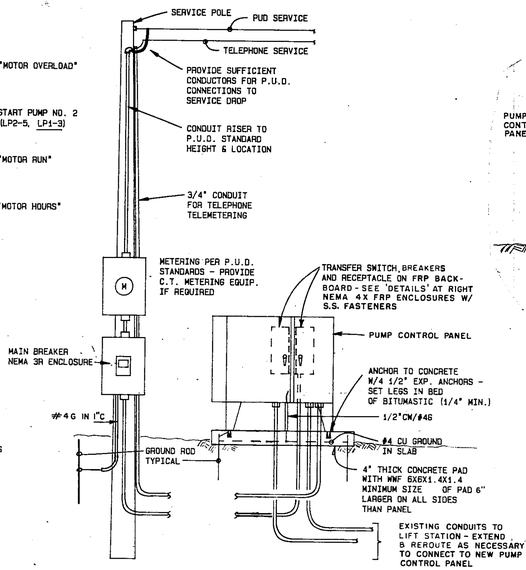
PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

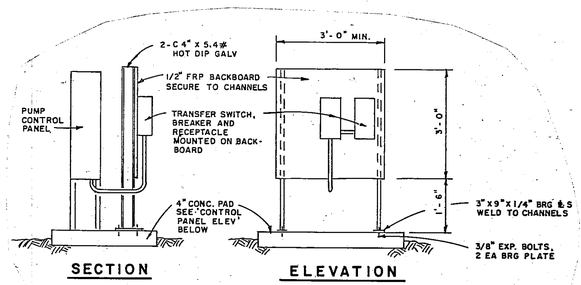


PANEL SUB PLATE ELEVATION



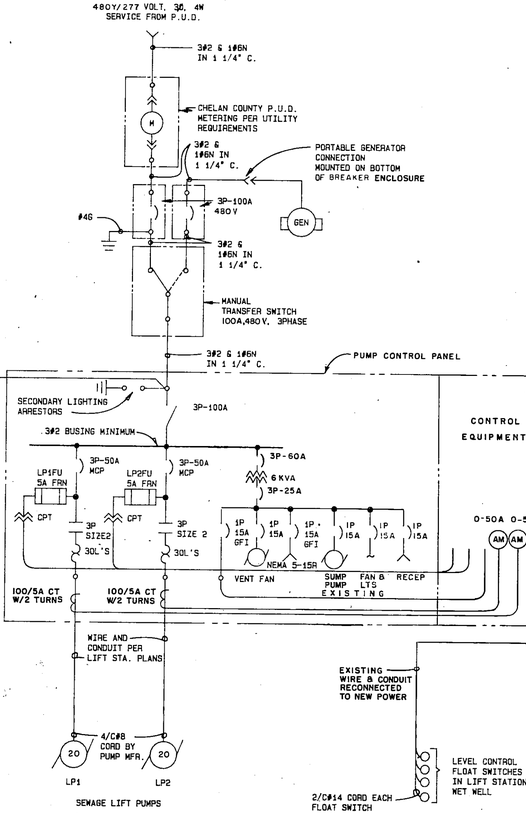
SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE

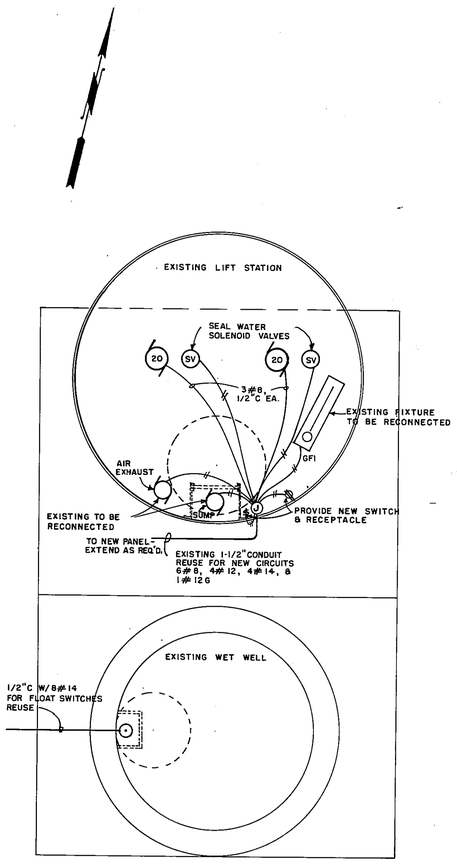


FRP BACKBOARD DETAILS

NOTE: TYPICAL ARRANGEMENT SHOWN. FIELD LOCATE AS DIRECTED BY THE ENGINEER. MINOR CHANGES IN CONTROL PANEL & BACKBOARD ORIENTATION TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.



ONE LINE DIAGRAM
CITY OF CHELAN LIFT STATION NO. 8



ELECTRICAL PLAN

SCALE 1/2" = 1'-0"

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
SEATTLE — TACOMA
YAKIMA — WASHINGTON

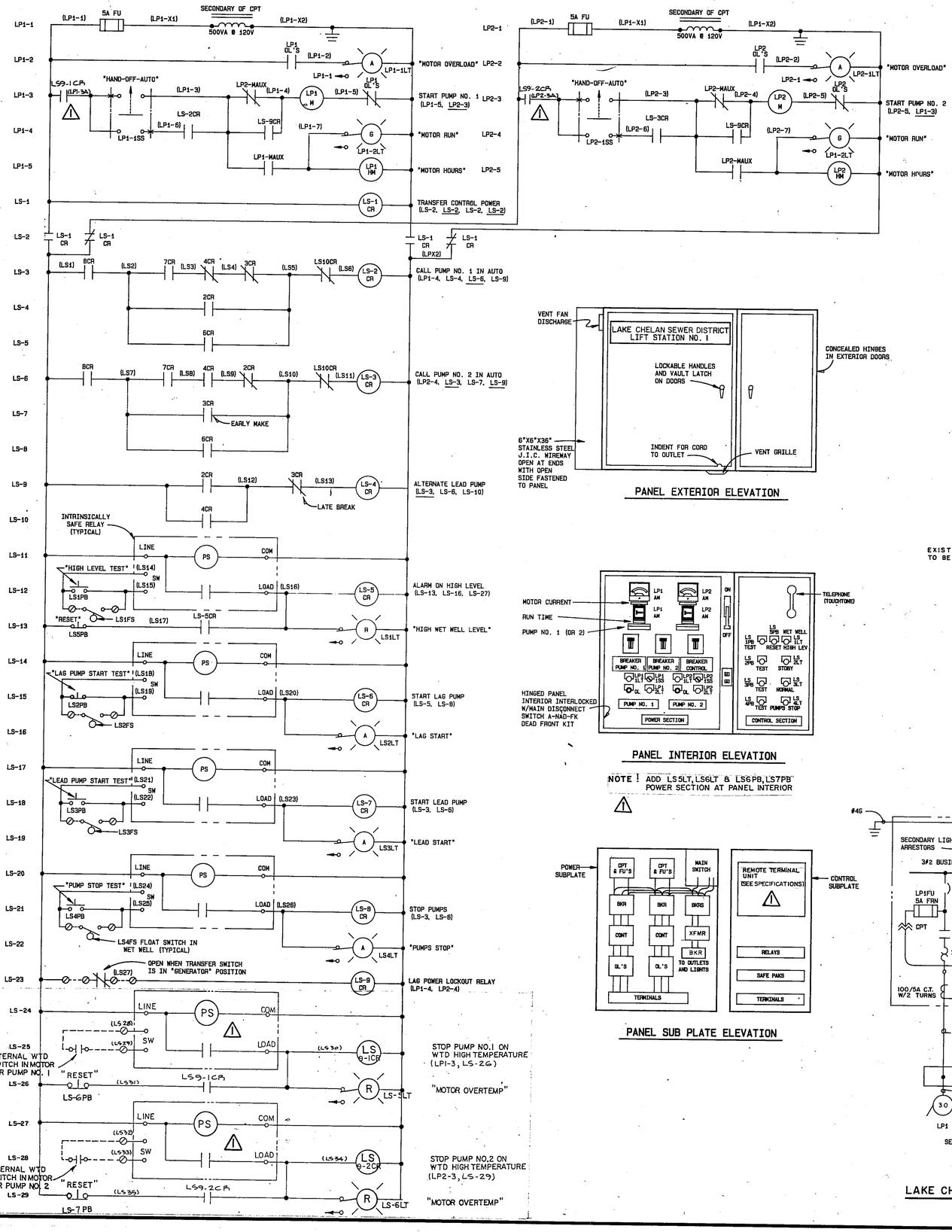
DATE NOV 1984
SCALE NOTED
DRAWN: DH
CHECKED: PLC
APPROVED: JSD

No.	REVISION	DATE	APPD
1	ADD NOTES & ADD NOTES CONFORM TO WIRING DIAGRAM	10/85	PLC

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL- CITY LIFT STATION NO. 8

SHEET: 18
OF: 22
FILE No. 8544

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

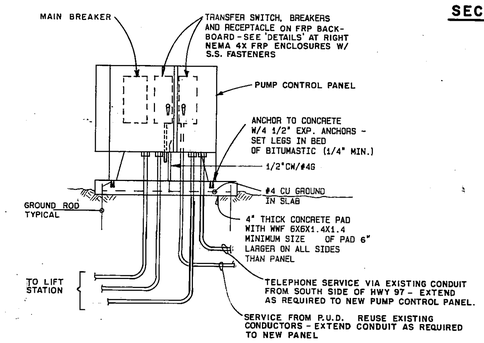


PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

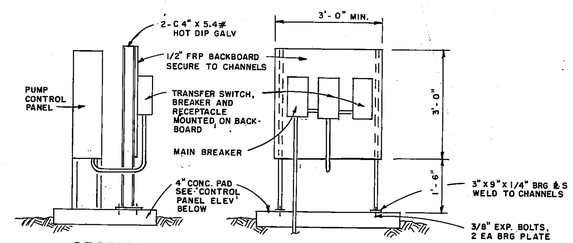
NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

PANEL SUB PLATE ELEVATION



PANEL ELEVATION

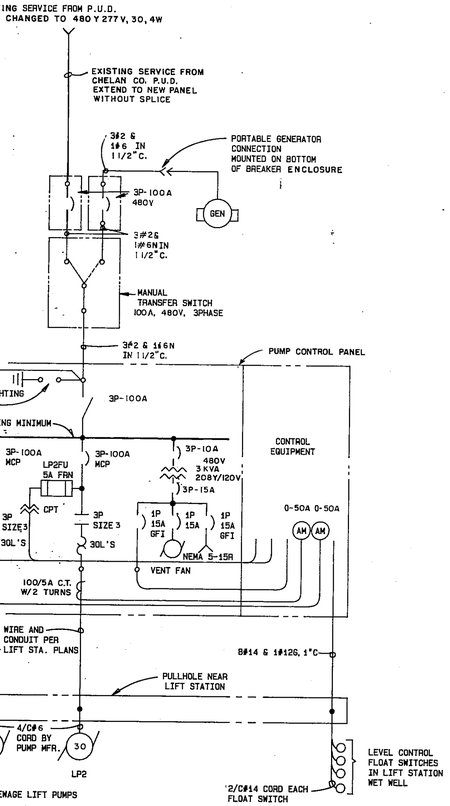
SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE



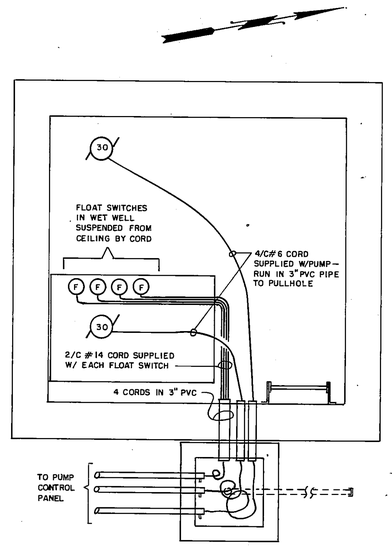
SECTION ELEVATION

FRP BACKBOARD DETAILS

NOTE: TYPICAL ARRANGEMENT SHOWN. FIELD LOCATE AS DIRECTED BY THE ENGINEER. MINOR CHANGES IN CONTROL PANEL & BACKBOARD ORIENTATION TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.



ONE LINE DIAGRAM
LAKE CHELAN SEWER DISTRICT - LIFT STATION NO. 1



ELECTRICAL PLAN
SCALE 1/2" = 1'-0"

NOTES:
1. SPLICE CORDS TO SINGLE CONDUCTOR CABLES USING ANTI-OXIDANT COMPOUND FILLED COMPRESSION SLEEVE CONNECTORS. INSULATE SPLICE W/ SCOTCH RESIN FILLER; HEAT SHRINK COVER SLEEVE. TWO LAYERS HALF LAPPED #88 TAPE & PAINT W/ 'GLYPTAL' OR EQUAL.

"NOTE: Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to daylight or to a dry well (1 cubic yard washed drain gravel minimum).

Gray + Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA
WASHINGTON

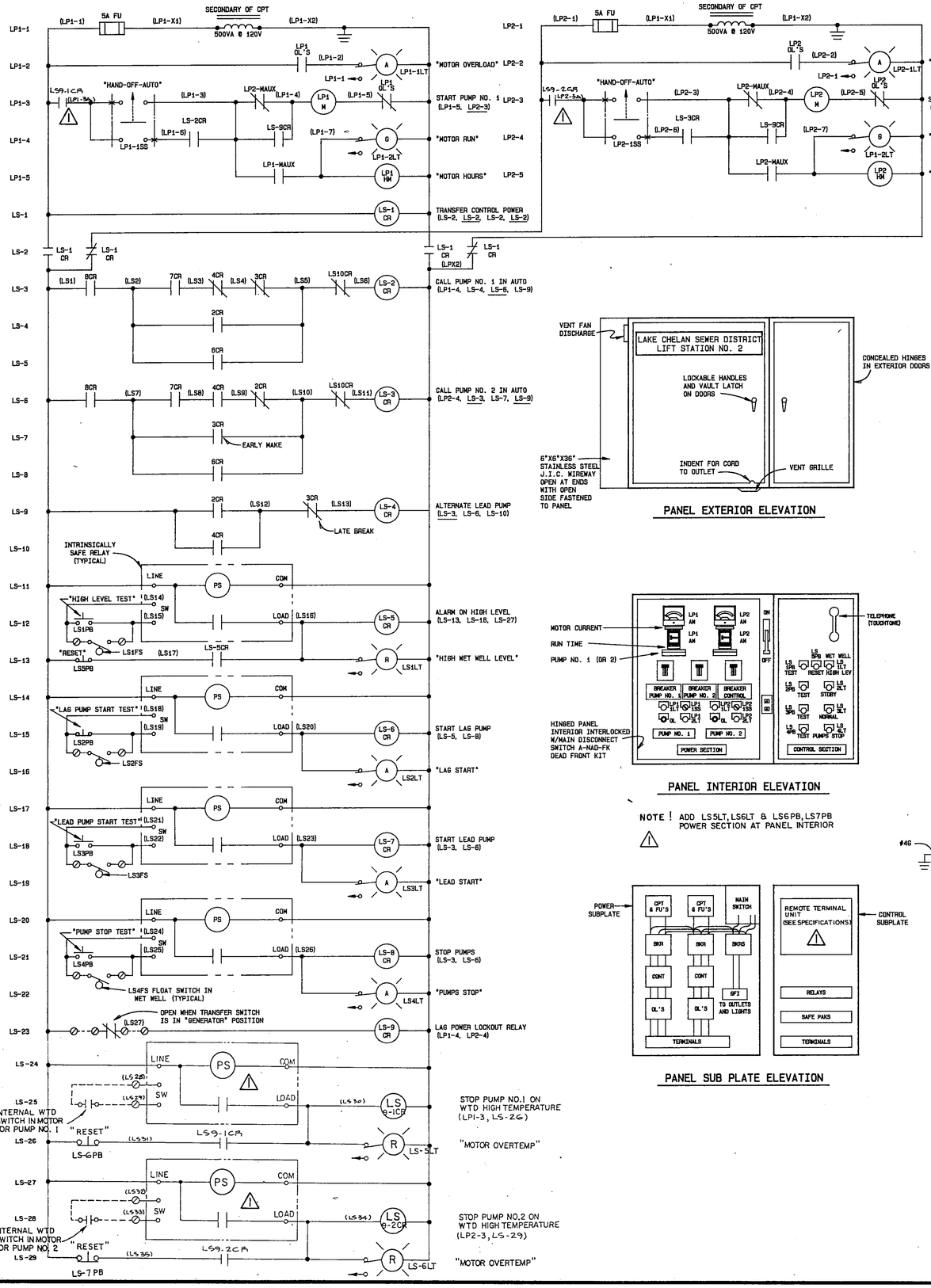
DATE: NOV 1984
SCALE: NOTED
DRAWN: DH
CHECKED: PLC
APPROVED: JSD

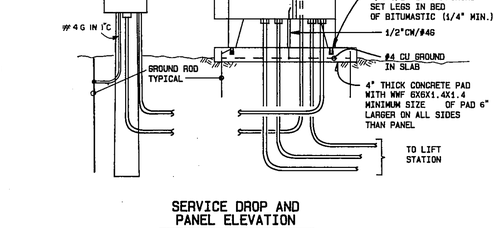
No.	REVISION	DATE	APP'D
1	ADD NOTES - ADD MOTOR CONTACTS TO WIRING DIAG.	12/86	J.C.

City of Chelan
Chelan County
Washington
Wastewater Treatment Facilities
ELECTRICAL - LAKE CHELAN SEWER DISTRICT
LIFT STATION NO. 1

SHEET: 19
OF: 22
FILE No. 8543

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES
Page 1029 of 1113



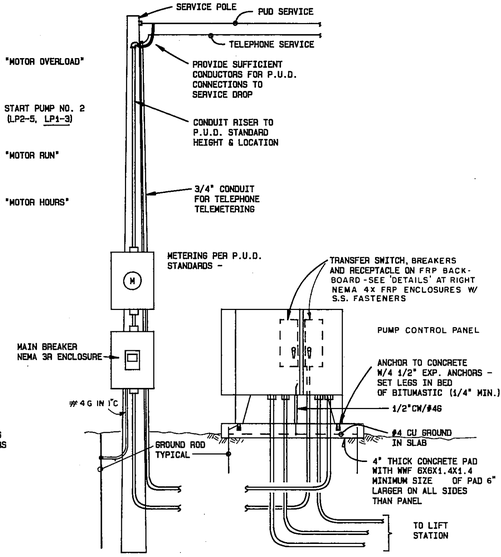


PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

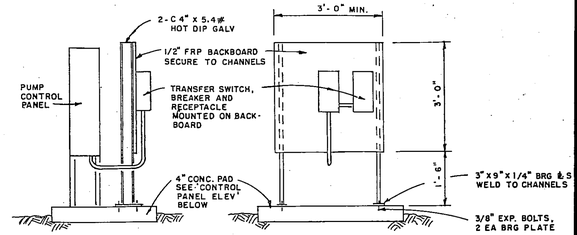
NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

PANEL SUB PLATE ELEVATION



SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE

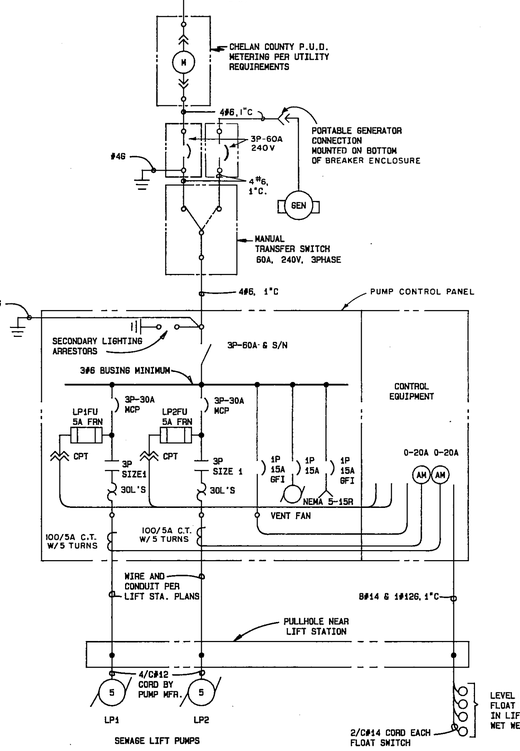


FRP BACKBOARD DETAILS

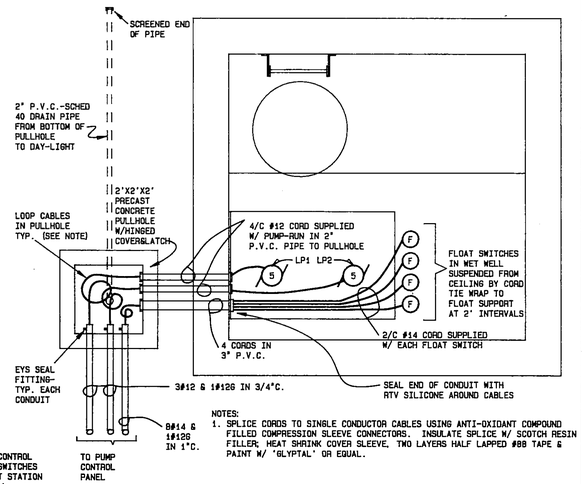
NOTE: TYPICAL ARRANGEMENT SHOWN. FIELD LOCATE AS DIRECTED BY THE ENGINEER. MINOR CHANGES IN CONTROL PANEL & BACKBOARD ORIENTATION TO BE MADE AT NO ADDITIONAL COST TO THE OWNER.

"NOTE: Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to daylight or to a dry well (1 cubic yard washed drain gravel minimum).



ONE LINE DIAGRAM
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 2



NOTES:
1. SPLICE CORDS TO SINGLE CONDUCTOR CABLES USING ANTI-OXIDANT COMPOUND FILLED COMPRESSION SLEEVE CONNECTORS. INSULATE SPLICE W/ SCOTCH RESIN FILLER, HEAT SHRINK COVER SLEEVE, TWO LAYERS HALF LAPPED #88 TAPE & PAINT W/ 'GLYPTAL' OR EQUAL.

ELECTRICAL PLAN

LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 2

SCALE: 1/2"=1'-0"

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE: NOV 1984
SCALE: NOTED
DRAWN: DH
CHECKED: PLC
APPROVED: JSD

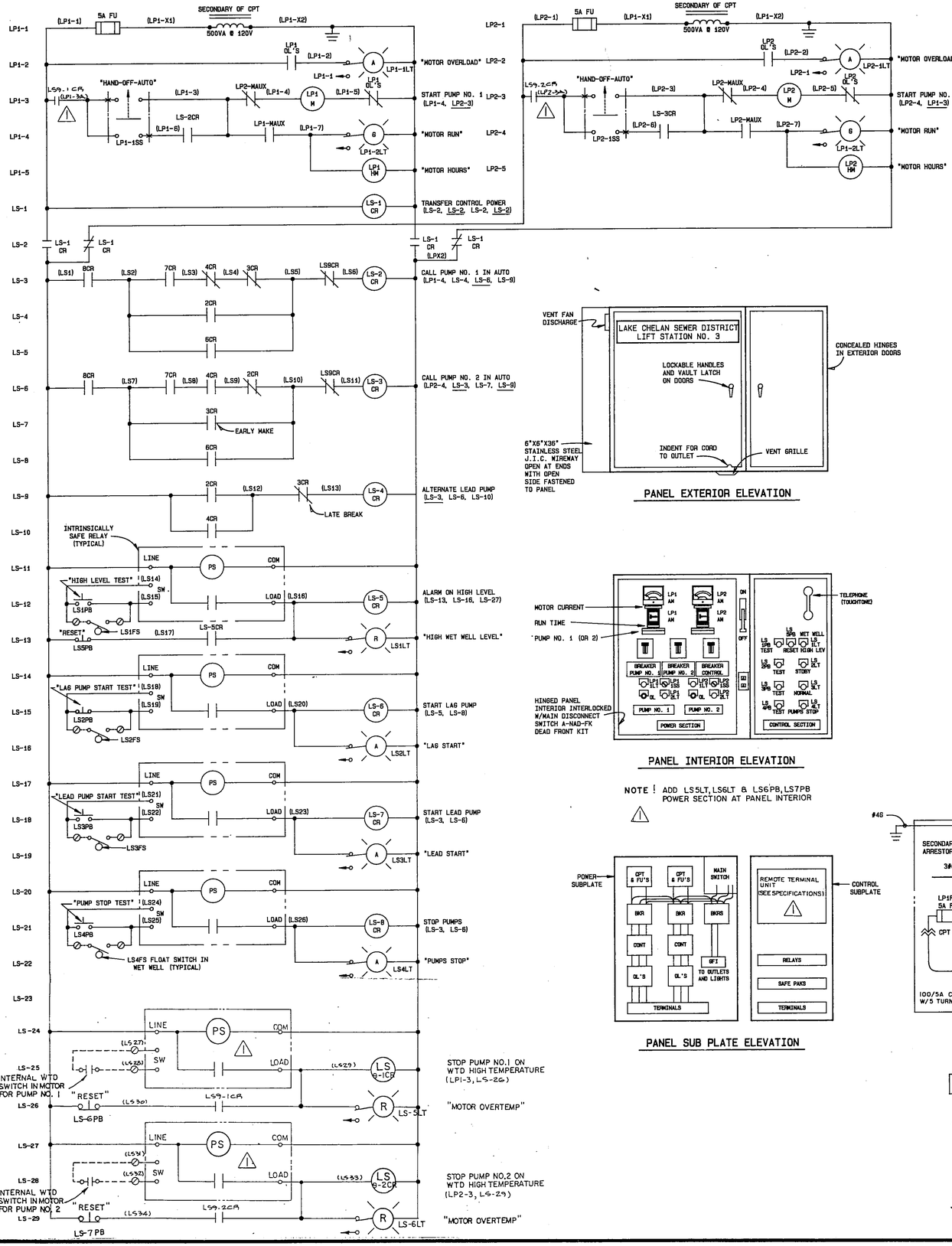
No.	REVISION	DATE	APPD
1	ADD NOTES - ADD HEATER & CONDUIT TO WING DIKE	10/85	PLC

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL - LAKE CHELAN SEWER DISTRICT
LIFT STATION NO. 2

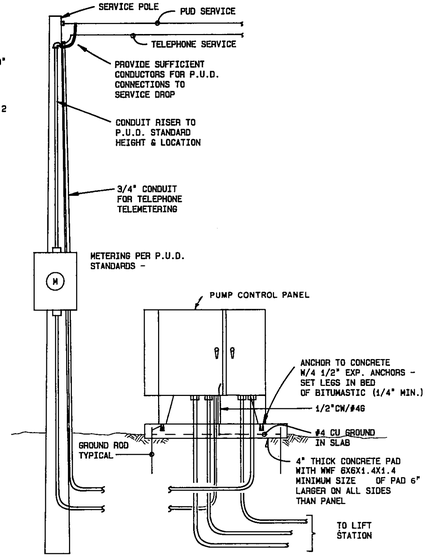
SCHEDULE IC

SHEET: 20
OF: 22
FILE No. B542
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

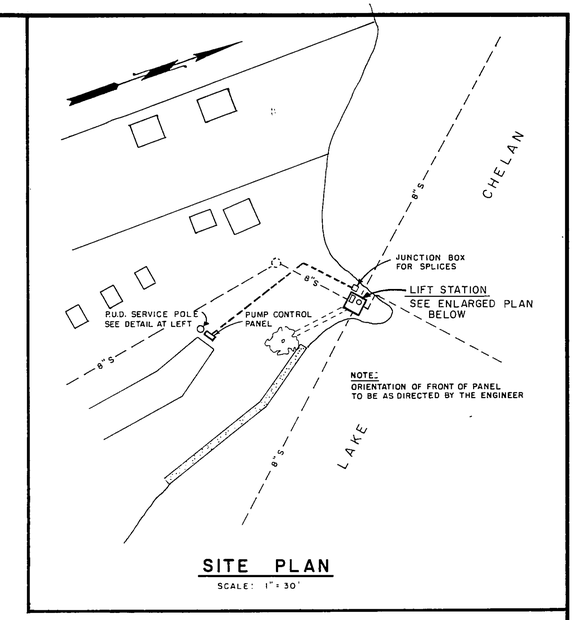


PANEL EXTERIOR ELEVATION



SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE



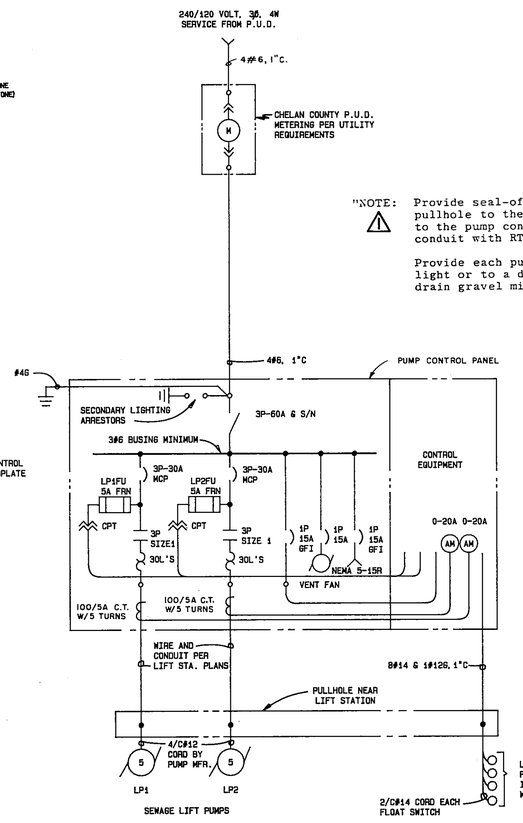
SITE PLAN

SCALE: 1" = 30'

PANEL INTERIOR ELEVATION

NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

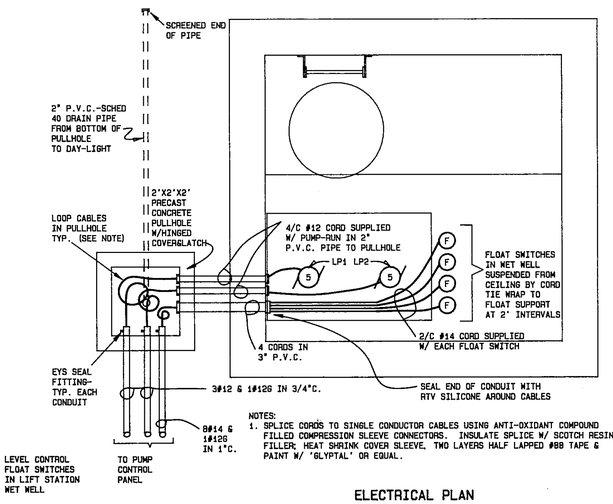
PANEL SUB PLATE ELEVATION



ONE LINE DIAGRAM
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 3

"NOTE: ⚠ Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to daylight or to a dry well (1 cubic yard washed drain gravel minimum).



NOTES:
1. SPLICE CORDS TO SINGLE CONDUCTOR CABLES USING ANTI-OXIDANT COMPOUND FILLED COMPRESSION SLEEVE CONNECTORS. INSULATE SPLICE W/ SCOTCH RESIN FILLER; HEAT SHRINK COVER SLEEVE, TWO LAYERS HALF LAPPED #88 TAPE & PAINT W/ 'GLYPTAL' OR EQUAL.

ELECTRICAL PLAN
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 3

SCALE: 1/2"=1'-0"

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE: NOV 1984
SCALE: NOTED
DRAWN: DH
CHECKED: PLC
APPROVED: JSD

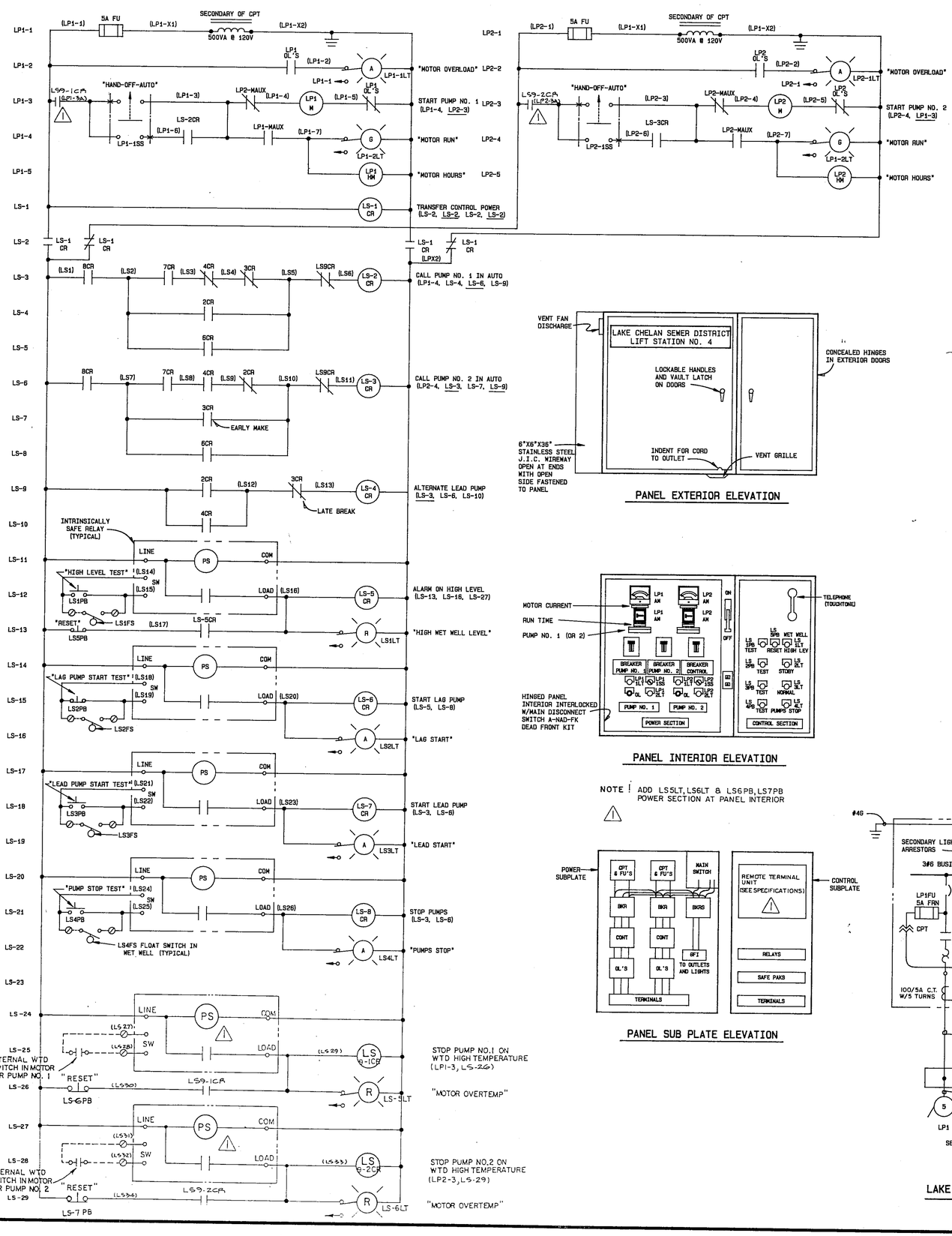
No.	REVISION	DATE	APP'D
1	ADD NOTES - ADD MOTOR ORIENTATION TO WIRING DIAG.	10/85	PLC

City of Chelan
Chelan County Washington
Wastewater Treatment Facilities
ELECTRICAL - LAKE CHELAN SEWER DISTRICT
LIFT STATION NO. 3

SCHEDULE IC

SHEET: 21
OF: 22
FILE No. 5541
JOB No. 79036

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES

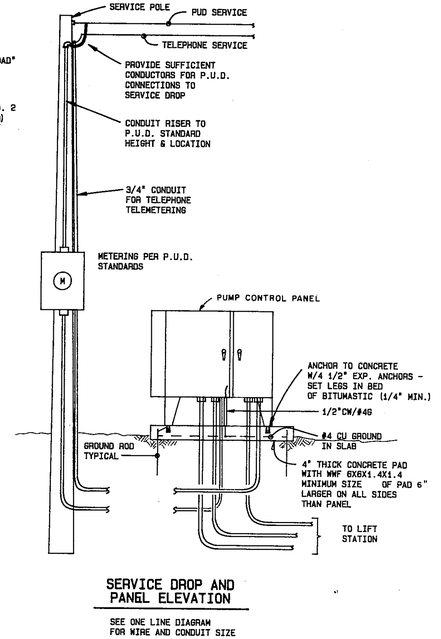


PANEL EXTERIOR ELEVATION

PANEL INTERIOR ELEVATION

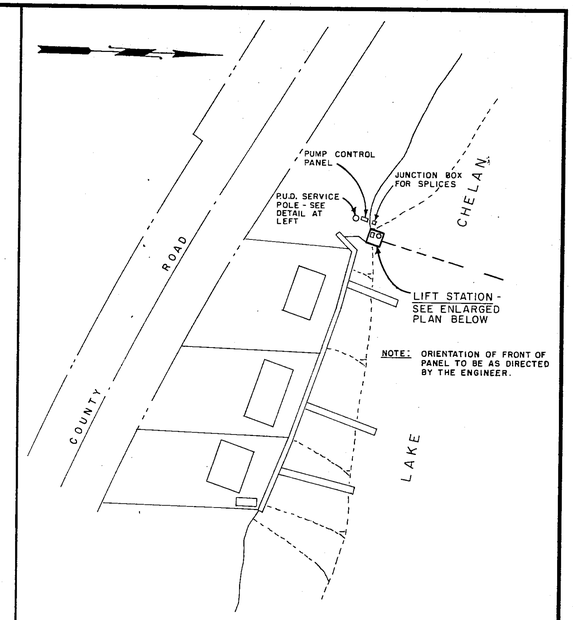
NOTE ! ADD LS5LT, LS6LT & LS6PB, LS7PB POWER SECTION AT PANEL INTERIOR

PANEL SUB PLATE ELEVATION



SERVICE DROP AND PANEL ELEVATION

SEE ONE LINE DIAGRAM FOR WIRE AND CONDUIT SIZE



SITE PLAN

SCALE: 1" = 30'

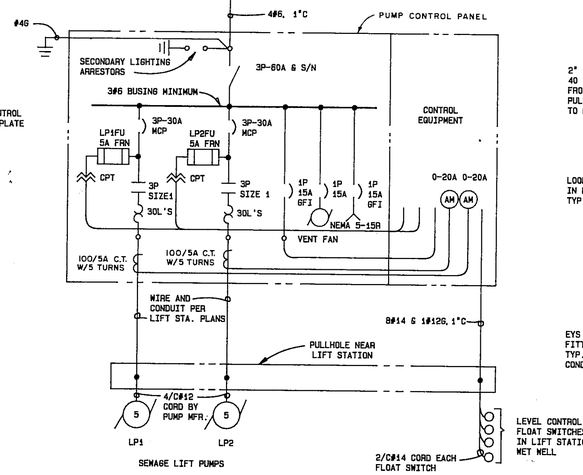
240/120 VOLT, 3Ø, 4W SERVICE FROM P.U.D.

4 #6, 1"C

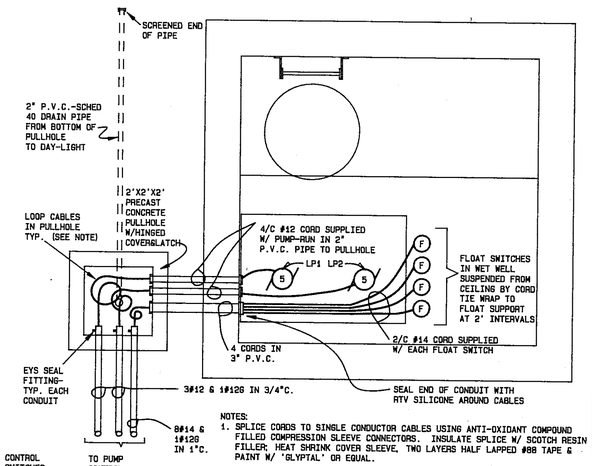
M CHELAN COUNTY P.U.D. METERING PER UTILITY REQUIREMENTS

"NOTE: ⚠ Provide seal-off on each conduit from the pullhole to the pumps and from the pullhole to the pump control panel. Seal end of conduit with RTV silicone around cables.

Provide each pullhole with a drain to day-light or to a dry well (1 cubic yard washed drain gravel minimum).



ONE LINE DIAGRAM
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 4



NOTES:
1. SPLICE CORDS TO SINGLE CONDUCTOR CABLES USING ANTI-OXIDANT COMPOUND FILLED COMPRESSION SLEEVE CONNECTORS. INSULATE SPLICE W/ SCOTCH RESIN FILLER; HEAT SHRINK COVER SLEEVE, TWO LAYERS HALF LAPPED #88 TAPE & PAINT W/ 'GLYPTAL' OR EQUAL.

ELECTRICAL PLAN
LAKE CHELAN SEWER DISTRICT LIFT STATION NO. 4
SCALE: 1/2"=1'-0"

Gray & Osborne, Inc., P.S.
CONSULTING ENGINEERS
YAKIMA — SEATTLE — TACOMA

DATE: NOV 1984 | SCALE: NOTED | DRAWN: DH | CHECKED: PLC | APPROVED: JSD

No.	REVISION	DATE	APP'D
1	ADD NOTES - ADD MOPA DISCONNECT AT MANHOLE DIAG.	1/85	PLC

City of Chelan
Chelan County
Washington
Wastewater Treatment Facilities
ELECTRICAL - LAKE CHELAN SEWER DISTRICT
LIFT STATION NO. 4

SHEET: 22
OF: 22
FILE No. B 540

ATTACHMENT A - 1985-CHELAN LIFT STATION CC-1 UPGRADES
Page 1032 of 1113



STANDING NEAR THE SW CORNER OF BC MCDONALDS BUILDING LOOKING SOUTHWESTERLY TOWARD LIFT STATION.



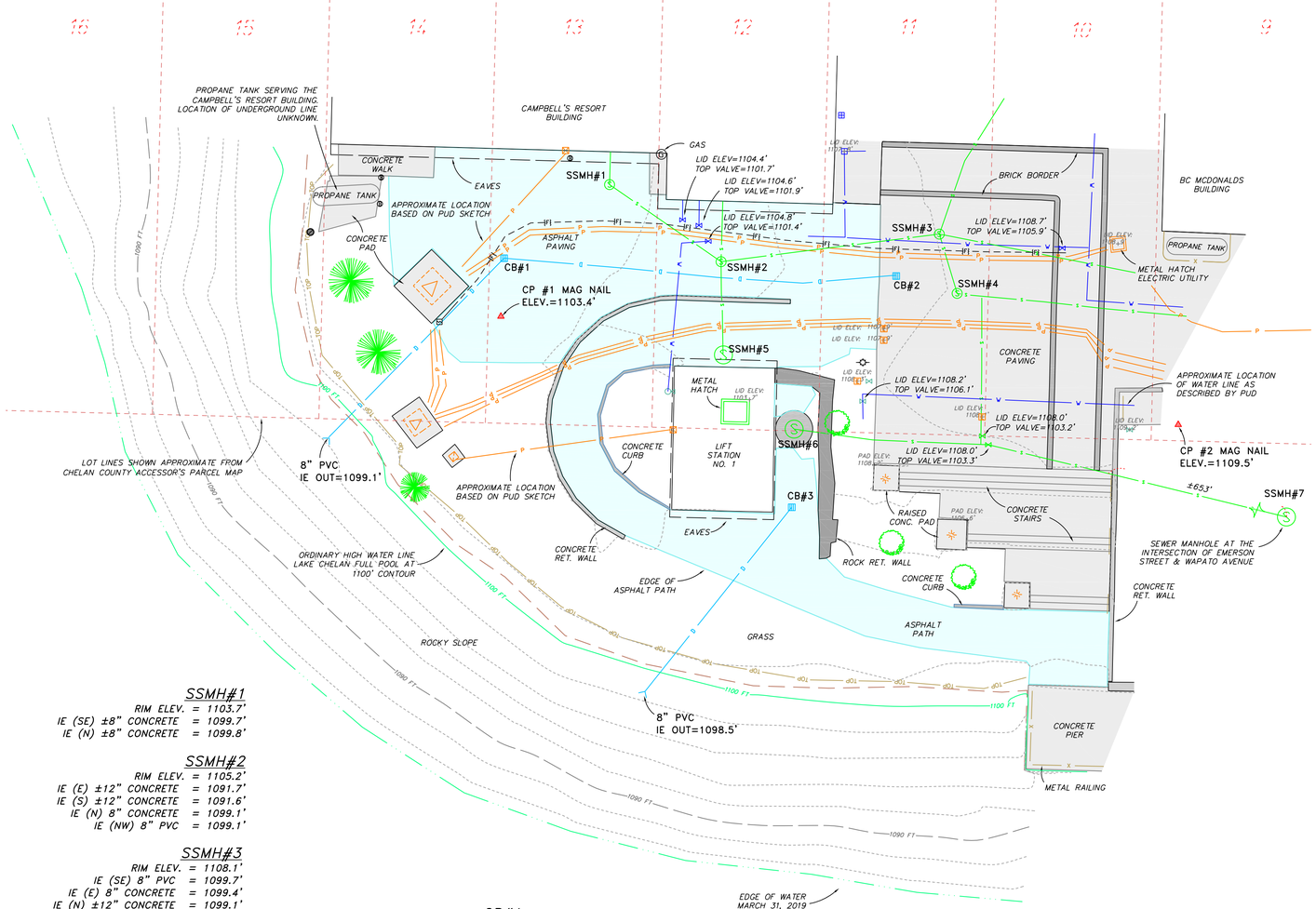
STANDING NEAR CP #2 LOOKING WESTERLY TOWARD LIFT STATION

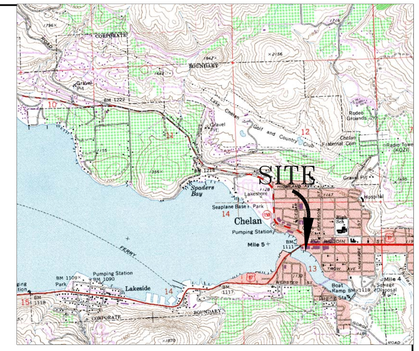


STANDING ON CONCRETE PIER LOOKING WESTERLY ALONG SHORELINE TOWARD LIFT STATION.



STANDING NEAR CB#1 LOOKING SOUTHEASTERLY TOWARD LIFT STATION





VICINITY MAP (SCALE: 1"=1/2 MILE)

LEGEND

- SET MAG CONTROL NAIL
- FOUND 3/4" IRON PIPE
- GAS
- BOLLARD
- CATCH BASIN
- IRRIGATION RISER
- IRRIGATION VALVE CONTROL BOX
- WATER VALVE HANDHOLE
- WATER METER
- SEWER HANDHOLE
- SEWER MANHOLE
- FIBER OPTIC BOX
- ELECTRIC HANDHOLE
- LIGHT POST
- STREET LIGHT
- ELECTRIC TRANSFORMER
- ELECTRIC METER
- ELECTRIC CONTROL PANEL
- CONIFEROUS TREE
- DECIDUOUS TREE
- P — UNDERGROUND POWER PAINT MARK UNLESS NOTED
- W — UNDERGROUND WATER PAINT MARK UNLESS NOTED
- S — UNDERGROUND SEWER PAINT MARK UNLESS NOTED
- D — UNDERGROUND STORM PAINT MARK UNLESS NOTED
- FI — UNDERGROUND FIBER OPTIC BASED ON PUD SKETCH

UNDERGROUND UTILITITES ARE APPROXIMATE AND BASED ON SKETCHES AND DESCRIPTIONS PROVIDED BY THE CITY OF CHELAN AND CHELAN COUNTY PUD. INFORMATION RELATED TO UNDERGROUND POWER TO THE STREET LIGHT AND LIGHT POSTS WAS NOT PROVIDED. LOCATION UNKNOWN.

SURVEY SPECIFICATIONS

NORTH

SCALE: 1" = 10'

0 5' 10' 20'

BASIS OF BEARINGS:
WASHINGTON STATE PLANE COORDINATE SYSTEM OF 1983, NORTH ZONE, AS DEFINED IN CHAPTER 58.20, RCW, BASED ON STATIC DUAL FREQUENCY GPS TIES TO AT LEAST THREE N.G.S. CORS STATIONS
CONVERGENCE ANGLE = −00°36'21"

ALL MEASURED DISTANCES ARE REDUCED TO GRID DISTANCES. MULTIPLY BY 1.000099 TO OBTAIN ACTUAL GROUND DISTANCE

HORIZONTAL DATUM IS NAD83(CORS96)
LATITUDE: 47°50'22" LONGITUDE: −120°01'11"

VERTICAL DATUM:
FULL POOL LAKE CHELAN = 1100'
BASED ON WATER SURFACE OBSERVATION MARCH 31, 2019 AND THE PUBLISHED LAKE ELEVATION FROM CHELAN PUD

CONTOUR INTERVAL = 2 FOOT

EQUIPMENT:
TOPCON HIPER V AND A FC 5000 DATA COLLECTION SYSTEM.

TOPCON GPT−3003LW TOTAL STATION.

PROCEDURES:
REAL TIME KINEMATIC GPS SURVEY WITH DOUBLE OBSERVATION OF NEW AND EXISTING MONUMENTATION WITH AN APPROXIMATE PRECISION OF ±0.06 FEET OR BETTER.
ADDITIONAL OBSERVATIONS FROM A GPS DERIVED CONTROL BASELINE USING CONVENTIONAL TOTAL STATION MEASUREMENTS.

SURVEY DATE:
MARCH 31 & APRIL 1ST & 12, 2019

SSMH#1
RIM ELEV. = 1103.7'
IE (SE) ±8" CONCRETE = 1099.7'
IE (N) ±8" CONCRETE = 1099.8'

SSMH#2
RIM ELEV. = 1105.2'
IE (E) ±12" CONCRETE = 1091.7'
IE (S) ±12" CONCRETE = 1091.6'
IE (N) 8" CONCRETE = 1099.1'
IE (NW) 8" PVC = 1099.1'

SSMH#3
RIM ELEV. = 1108.1'
IE (SE) 8" PVC = 1099.7'
IE (E) 8" CONCRETE = 1099.4'
IE (N) ±12" CONCRETE = 1099.1'
IE (W) ±12" CONCRETE = 1099.0'

SSMH#4
RIM ELEV. = 1108.0'
IE (E) 8" PVC = 1100.1'
IE (NW) 8" PVC = 1100.0'

SSMH#5
RIM ELEV. = 1106.4'
TOP METAL FLANGE = 1092.4'

SSMH#6
RIM ELEV. = 1103.3'
TOP 8" METAL PIPE = 1098.2'

SSMH#7
RIM ELEV. = 1120.3'
IE(W) 8" METAL PIPE = 1114.7'

CB#1
RIM ELEV. = 1102.7'
IE (E) 8" PVC = 1099.6'
IE (SW) 8" PVC = 1099.5'

CB#2
RIM ELEV. = 1107.7'
IE (W) 8" PVC = 1105.6'

CB#3
RIM ELEV. = 1103.2'
IE (SW) 8" PVC = 1101.3'

DIGITAL COPY

Pinnacle Surveying
Tim Hollingsworth, PLS
601 W. Woodin Ave., P.O. Box 1107 - Chelan Washington, 98816
509.682.2266 - holly@pinnacle-surveying.com

DRAWN BY: AW/TH	LAYOUT: TOPO
DATE: APRIL 17, 2019	FILE NO: 219010−TOPO.dwg
SCALE: 1"=10 FT	PROJ.: H: \219010\DWG

Topographic Site Plan
CITY OF CHELAN
LIFT STATION #1
prepared for
RH2 ENGINEERING

SHT 1 OF 1

ATTACHMENT B - 2019-CHELAN LIFT STATION CC-1 TOPO

CITY OF CHELAN

CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

CITY OFFICIALS

Robert Goedde
Mayor

Mike Cooney

Guy Harper

Ben Higgins

Wendy Isenhart

Erin McCardle

Cameron Morehouse

Mike Steele
City Council

Dwane Van Epps
Public Works Director

James Reinbold
City Administrator

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 11/2013
By: ABC/THP
Checked By: DVC

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 (509) 453-4833

ABBREVIATIONS

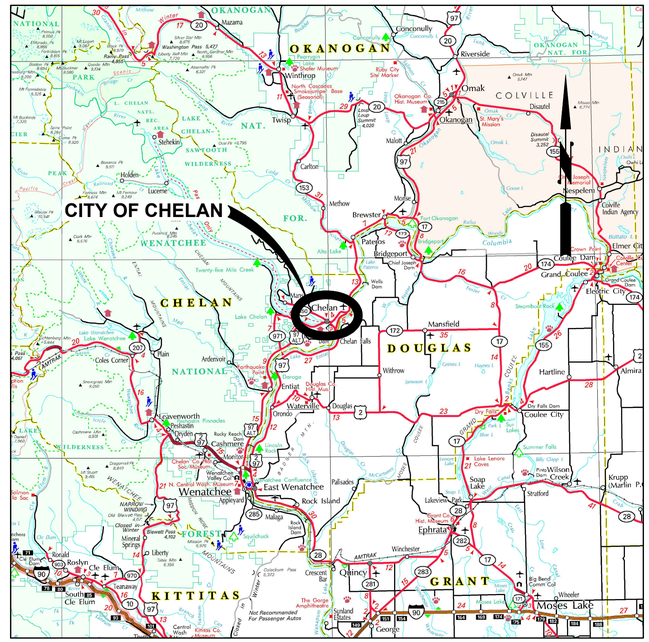
AVE	AVENUE
AC	ASBESTOS CEMENT PIPE
AP	ANGLE POINT
ASPH	ASPHALT
BVCE	BEGIN VERTICAL CURVE ELEVATION
BVCS	BEGIN VERTICAL CURVE STATION
CB	CATCH BASIN
CI	CAST IRON
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
CONC	CONCRETE
CP	CONTROL POINT
CY	CUBIC YARD
CF	CUBIC FEET
DI	DUCTILE IRON
DIA	DIAMETER
D	DRAIN
E	EAST
EA	EACH
EL	ELEVATION
EVCE	END VERTICAL CURVE ELEVATION
EVCS	END VERTICAL CURVE STATION
EXIST	EXISTING
FT	FEET
IE	INVERT ELEVATION
IN	INCH
LF	LINEAR FEET
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
PI	POINT OF INTERSECTION
PVI	POINT OF VERTICAL INTERSECTION
PERF	PERFORATED
PVC	POLYVINYL CHLORIDE
PVT	POINT OF VERTICAL TANGENT
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PT	POINT OF TANGENCY
RET	RETAINING
R	RADIUS
S	SOUTH
SCH	SCHEDULE
SF	SQUARE FEET
SL	SLOPE
STA	STATION
T	TELEPHONE
TYP	TYPICAL
W	WELD
W	WEST
W/	WITH

SYMBOL LEGEND

EXISTING	PROPOSED	DESCRIPTION
		ASPHALT SURFACE
		GRAVEL SURFACE
		CONCRETE SURFACE
		CONCRETE SIDEWALK
		DRIVEWAY ENTRANCE
		GRASS SURFACE
		CURB & GUTTER
		RETAINING WALL
		RIGHT-OF-WAY LINE
		CENTERLINE OF RIGHT-OF-WAY
		PROPERTY LINE
10		CONTOUR LINE
D	D	STORM DRAIN
E	E	BURIED ELECTRICAL
G		BURIED GAS
OHP		OVERHEAD ELECTRICAL
S	S	SANITARY SEWER
SS		SANITARY SIDE SEWER
T		BURIED TELEPHONE
W		WATER MAIN
		DITCH
D		CULVERT
X X X	X X X	FENCE
X O X		FENCE POST
FM	FM	FORCEMAIN
P		POWER VAULT
T		TELEPHONE VAULT
		MANHOLE / STRUCTURE
		TYPE 1 CATCH BASIN
		TYPE 2 CATCH BASIN / DRYWELL
		POLE W/ GUY WIRE
		POWER / TELEPHONE / GUY POLE
		LUMINAIRE
		JUNCTION BOX/TELEPHONE PEDISTAL
		WATER VALVE
		WATER METER
		FIRE HYDRANT
		MAILBOX
		SIGN
		TREE (CONIFER)
		TREE (DECIDIOUS)
		SHRUBS
		BUILDING
		MONUMENT
		ANGLE POINT

SHEET INDEX

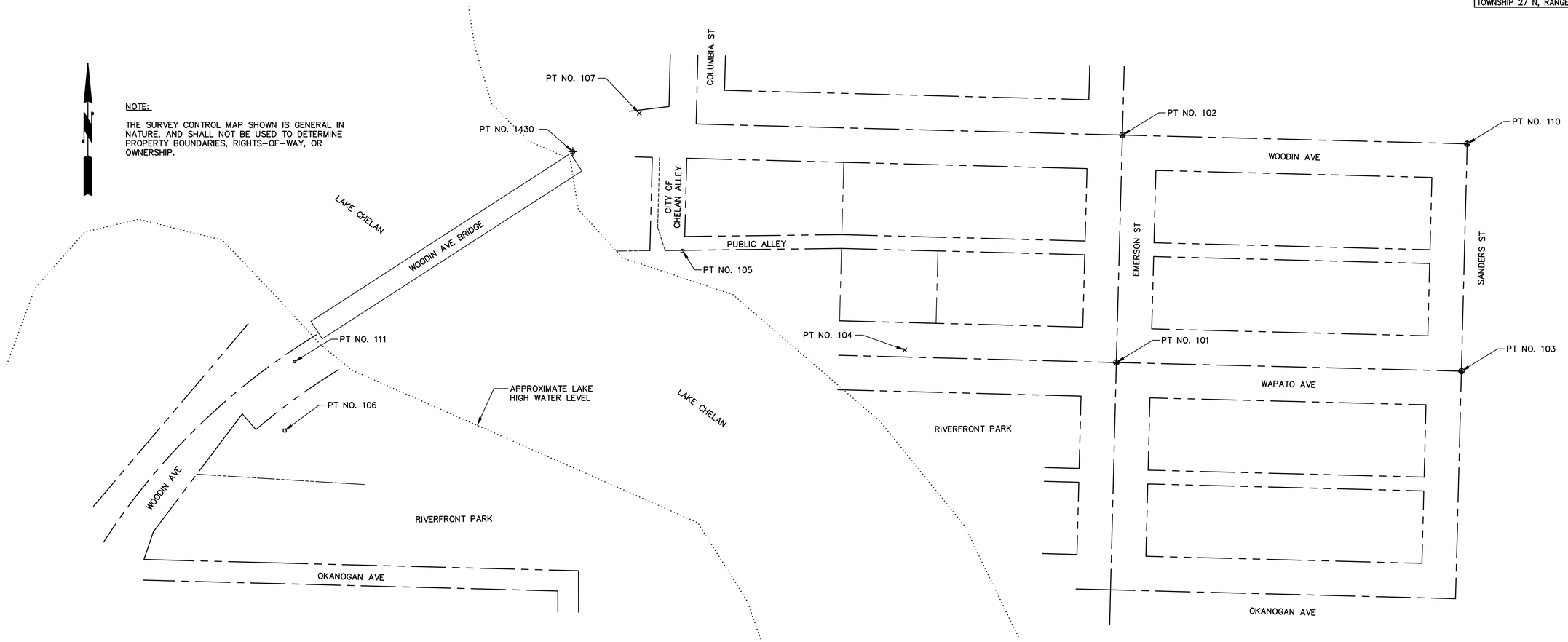
SHEET NO.	DESCRIPTION
	COVER
G-1	ABBREVIATIONS, SYMBOLS, SHEET INDEX, VICINITY & LOCATION MAPS
G-2	SURVEY CONTROL MAP & TABLE
G-3	PLAN & PROFILE - STA 0+00 TO STA 3+80
G-4	PLAN & PROFILE - STA 3+80 TO STA 7+60
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S1-1	LIFT STATION SITE MISC STRUCTURAL
S2-1	ORIGINAL BRIDGE STRUCTURAL PLAN SHEET 1 OF 3
S2-2	ORIGINAL BRIDGE STRUCTURAL PLAN SHEET 2 OF 3
S2-3	ORIGINAL BRIDGE STRUCTURAL PLAN SHEET 3 OF 3
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E-8	VFD ELEMENTARY WIRING DIAGRAMS
E-9	CONTROL PANEL "LS2CCP"
E-10	CONTROL PANEL "LS2CP"
E-11	TELEMETRY CONTROL PANEL "LS2TCP"


CITY OF CHELAN
OKANOGAN
CHELAN
DOUGLAS
KITTITAS
GRANT
COLVILLE
Wenatchee
East Wenatchee
Chelan
Manson
Twisp
Methow
Brewster
Pateros
Bridgeport
Omak
Okanogan
Riverside
Conconully
Mansfield
Waterville
Orondo
Rock Island
Palisades
Malaga
Cashmere
Leavenworth
Entiat
Withrow
Coulee City
Grand Coulee
Electric City
Soap Lake
Ephrata
Quincy
Moses Lake
Winchester
George
Ellensburg
Cle Elum
Roslyn
South Cle Elum
Liberty
Mineral Springs
Nahahum Canyon
Stehekin
Lucerne
Holden
Holden Village
Twenty-five Mile Creek
Lake Chelan
Lake Wenatchee
Lake Entiat
Lake Roosevelt
Columbia River
Methow River
Okanogan River
Wenatchee River
Entiat River
Chiwawa River
Stemilt Creek
Colockum Creek
Squilchuck Creek
Mission Creek
Peshastin Creek
Icicle Creek
Tumwater Canyon
Swakane Canyon
Chumstick Mountain
Entiat Mountains
Chiwaukum Mountains
Stuart Range
Saddle Mountains
Frenchman Hills
Moses Coulee
Douglas Creek
Badger Mountain
Beezley Hills
Foster Creek
Grand Coulee Dam
Banks Lake
Billy Clapp Lake
Summer Falls
Lake Lenore Caves
Dry Falls Dam
Steamboat Rock
Blue Lake
Alkali Flat
Potholes Reservoir
Crab Creek
Winchester Wash
Frenchman Coulee
Dodson Coulee
Corkscrew Canyon
Douglas Canyon
Moses Coulee
Jameson Lake
Pearrygin Lake
Patterson Lake
Big Bend Dam Col
Rocky Reach Dam
Wells Dam
Chief Joseph Dam
Rufus Woods Lake
Columbia Basin Irrigation Project
Not Recommended For Passenger Autos
Not Recommended For Passenger Autos
Chelan Butte
Chelan Ridge
Chelan Mountains
Sawtooth Ridge
Sawtooth Wilderness
Pasayten Wilderness
Lake Chelan-Sawtooth Wilderness Area
Lake Chelan National Recreation Area
Okanogan National Forest
Wenatchee National Forest
Okanogan Nat. Forest
Okanogan Nat. Museum
Shafer Museum
Ruby City Site Marker
North Cascades Headquarters
Okanogan Nat. Museum
Mt. Mary's Mission
Omak Longhouse
Colville Indian Agency
Ellensburg Rodeo Museum
Ellensburg Rodeo Grounds
Gingko Petrified Forest State Park
Columbia River Gorge National Scenic Area
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Columbia River Gorge National Scenic Area

STATE: WASHINGTON
SECTION: 13
TOWNSHIP 27 N, RANGE 22 E, W.M.

NOTE:

THE SURVEY CONTROL MAP SHOWN IS GENERAL IN NATURE, AND SHALL NOT BE USED TO DETERMINE PROPERTY BOUNDARIES, RIGHTS-OF-WAY, OR OWNERSHIP.



SURVEY CONTROL MAP

1"=80'

SURVEY CONTROL TABLE

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
101	7187.73	11015.49	1120.61	CASED MONUMENT @ INTX E. WAPATO AVE / S. EMERSON ST, 2" IP
102	7517.63	11024.21	1123.17	CASED MONUMENT @ INTX WOODIN AVE / S. EMERSON ST, 2 1/2" IP
103	7175.18	11515.95	1122.69	CASED MONUMENT @ INTX E. WAPATO AVE / S. SANDERS ST, CONC. FILLED 2" IP w/ NAIL HEAD
104	7205.95	10708.44	1116.94	SET LG MAG NAIL/TAG "G&O CONTROL", @ FACE/CURB SW COR PARKING LOT W. OF #101
105	7349.70	10386.15	1109.62	SET HUB & TACK 1.4' S. & 3.5' E. OF BACK/CURB @ S'LY PROJ'D E. SIDE OF ALLEYWAY
106	7089.10	9809.21	1103.09	SET HUB & TACK IN GRASS AREA S. SIDE OF RIVER, 62' E. OF BACK/SIDEWALK, 26' N. OF PATHWAY
107	7549.21	10323.55	1111.49	SET LG MAG NAIL/TAG "G&O CONTROL", 3' S. OF N. CURB LINE WOODIN AVE, 65' W. OF W. SIDE COLUMBIA ST
110	7504.90	11524.40	1125.10	CASED MONUMENT @ INTX E. WOODIN AVE / S. SANDERS ST, 2" IP HALFWAY UNDER BOTTOM SIDE OF CASE
111	7189.10	9823.61	1110.42	SET 60d SPIKE S. SIDE OF RIVER, 2.5' SE FROM BACK/SIDEWALK, 9' SW OF END OF GUARDRAIL
1430	7493.55	10226.97	1112.29	FOUND BENCHMARK NE SIDE OF BRIDGE DECK, "US DEPT OF INTERIOR, 100 FMK, 1967" (VERTICAL DATUM)

HORIZONTAL DATUM LOCAL, BASIS OF BEARING: 101-102 NORTH 01°30'51" EAST ALONG MONUMENTED C/L OF EMERSON ST.

VERTICAL DATUM LOCAL, PROJECT BM (#1430 ABOVE) SHT 2 OF 10 PER PLANSET "CHELAN RIVERFRONT SURVEY FOR CHELAN COUNTY PUD NO.1"

◊ STRUCTURE & PIPING COORDINATE TABLE

POINT NO.	STATION	NORTHING (Y)	EASTING (X)	DESCRIPTION	ON SHEET
1	0+20	7,104.64	9,767.11	CENTER 144" MANHOLE	G-3/G-10
2	0+33	7,114.29	9,759.06	CENTER 48" MANHOLE	G-3/G-10
3	0+48	7,126.06	9,749.24	FM 16" DI 45 BEND, MJxMJ	G-3
4	0+98	7,176.05	9,756.85	FM 16" 45 BEND	G-3
5	1+89	7,225.09	9,832.68	FM TRANSITION TO DI	G-3
6	6+85	7,495.00	10,250.10	FM TRANSITION TO PVC/HDPE	G-4
7	7+38	7,523.36	10,293.96	FM 16"45 BEND	G-4
8	8+12	7,521.45	10,367.80	FM 16" 90 BEND	G-5
9	9+57	7,376.43	10,364.05	FM WATER MAIN CROSSING	G-5
10	9+79	7,354.63	10,363.48	FM 16" TEE	G-5
11	11+65	7,355.81	10,549.66	FM ANGLE POINT	G-6
12	13+35	7,349.98	10,715.67	FM 16" 90 BEND	G-6
13	14+79	7,205.66	10,712.18	FM 16" 90 BEND	G-7
14	18+02	7,197.24	11,034.39	FM 16" 90 BEND	G-7
15	18+11	7,187.33	11,034.11	CENTER 60" MANHOLE	G-7
16	18+34	7,165.26	11,033.49	CENTER 48" MANHOLE	G-7
17	1000+10	7,128.03	9,693.81	~CENTER EXISTING 48' MANHOLE	G-8
18	1002+40	7,053.12	9,911.75	CENTER 48" MANHOLE	G-8
19	200+00	7,110.46	9,750.10	RETAINING WALL/FENCE START	G-11
20	200+26	7,090.40	9,767.29	RETAINING WALL/FENCE AP	G-11
21	200+68	7,116.77	9,799.54	RETAINING WALL/FENCE AP	G-11
22	200+98	7,144.91	9,788.51	RETAINING WALL/FENCE AP	G-11
23	201+07	7,151.36	9,782.25	RETAINING WALL/FENCE AP	G-11
24	201+22	7,141.36	9,772.04	RETAINING WALL/FENCE AP	G-11
25	201+25	7,138.47	9,769.89	RETAINING WALL/FENCE GATE START	G-11
26	201+45	7,122.17	9,758.30	RETAINING WALL/FENCE GATE END	G-11
27	201+50	7,110.46	9,750.10	RETAINING WALL/FENCE END	G-11
28	NA	7,117.85	9,771.92	CENTER DRYWELL	G-10
29	NA	7,140.91	9,778.11	NW GENERATOR PAD	G-10
30	NA	7,126.82	9,794.52	SE GENERATOR PAD	G-10
31	NA	7,151.28	9,787.91	CENTER ODOR CONTROL EQUIPMENT	G-10
32	NA	7,144.91	9,788.51	RETAINING WALL/FENCE START	G-11
33	NA	7,151.17	9,794.97	RETAINING WALL/FENCE AP	G-11
34	NA	7,157.63	9,788.72	RETAINING WALL/FENCE END	G-11
35	NA	7,204.21	9,846.18	CENTER AIR VAC MANHOLE	G-3
36	NA	7,353.57	10,720.75	CENTER AIR VAC MANHOLE	G-6

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE:	JULY 2014
SCALE:	NOTED
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: AEE
Checked By: DWC

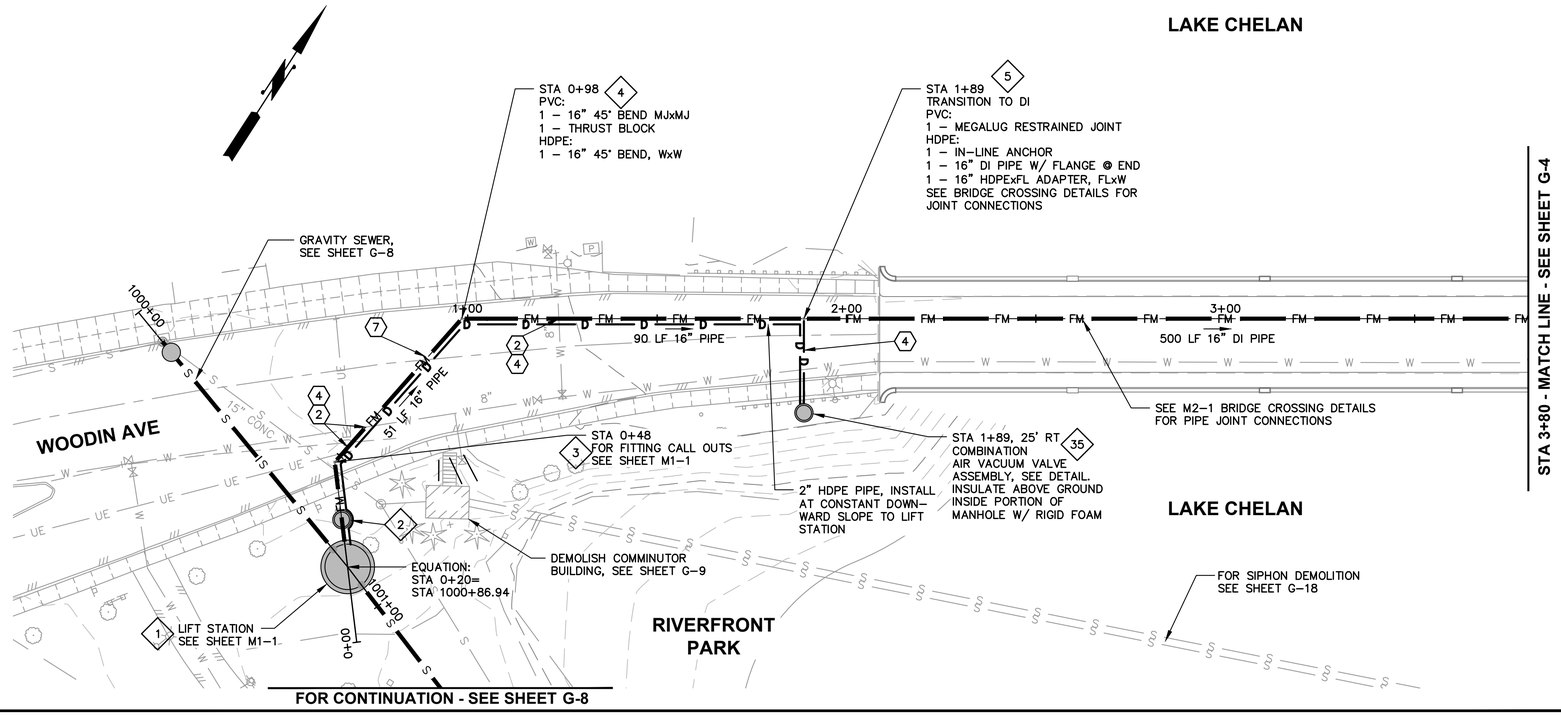
DANIEL K. LIERMAN — STATE OF WASHINGTON — 45700 — REGISTERED PROFESSIONAL LAND SURVEYOR

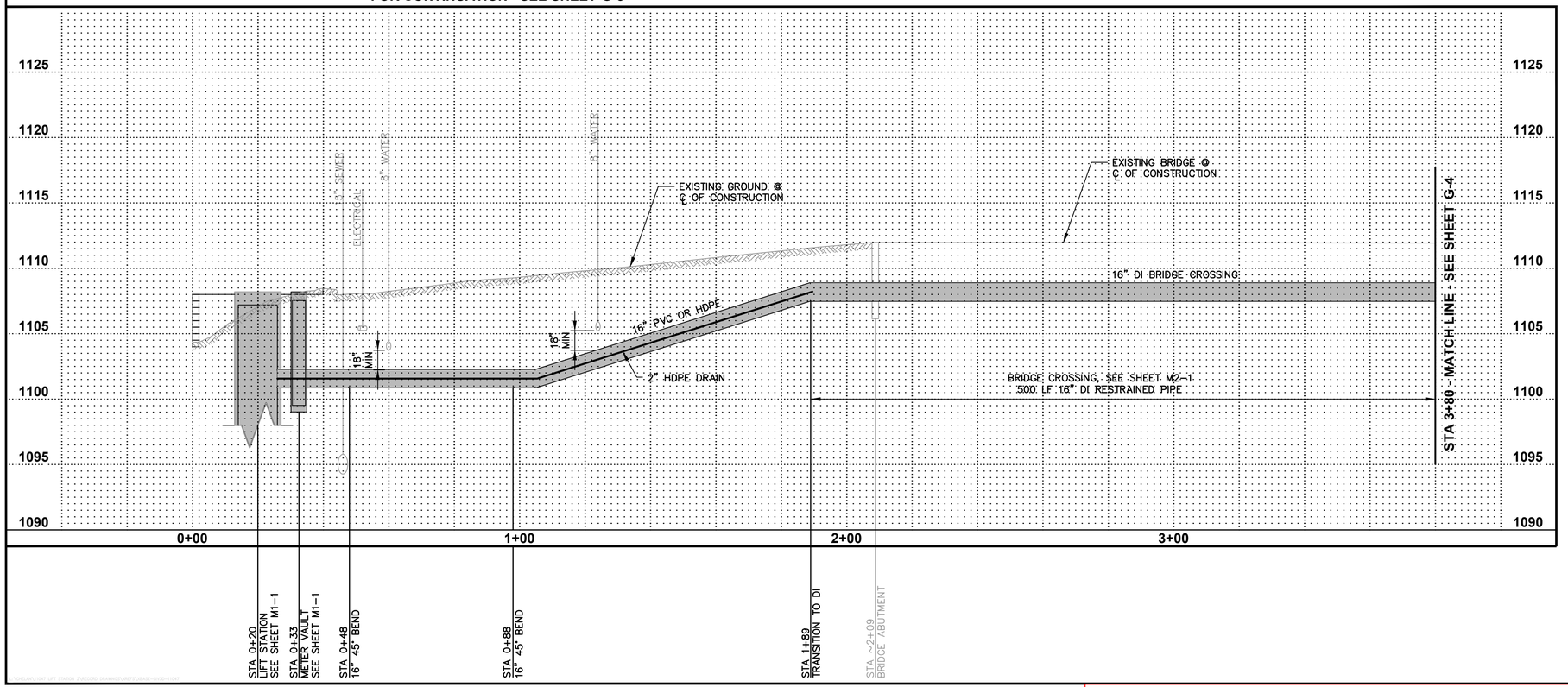
CITY OF CHELAN
CHELAN COUNTY WASHINGTON
LIFT STATION NO. 2
SURVEY CONTROL MAP & TABLE

RECORD DRAWINGS SHEET: G-2 OF: 18 RECORD DRAWINGS

JOB NO.: 11047
DWG: CONTROL

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES





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CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: 1"=20' (H) 1"=5' (V)	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: AEE
Checked By: DWC

DAVID VAN CLEVE — STATE OF WASHINGTON — 30168 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 30495 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY
WASHINGTON

LIFT STATION NO. 2

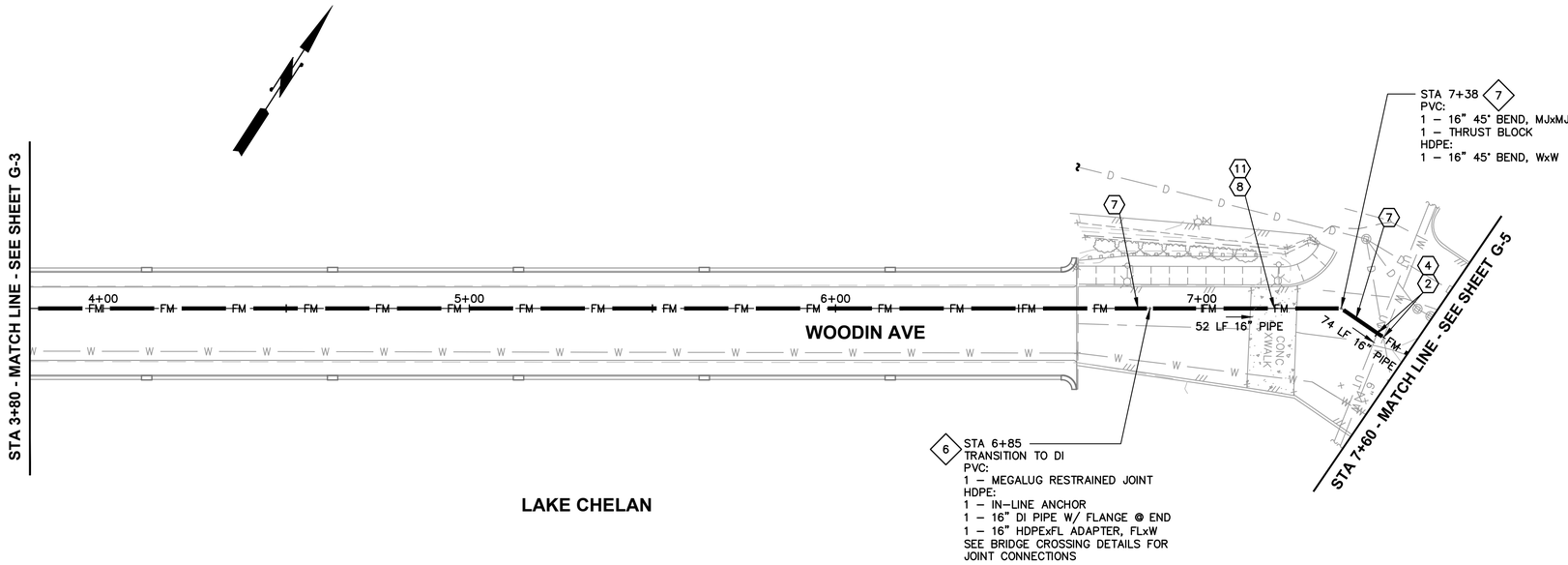
PLAN & PROFILE - STA 0+00 TO STA 3+80

RECORD DRAWINGS
SHEET: G-3
OF: 18
RECORD DRAWINGS

JOB NO.: 11047
DWG\XBASE–CIV3D–11047

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

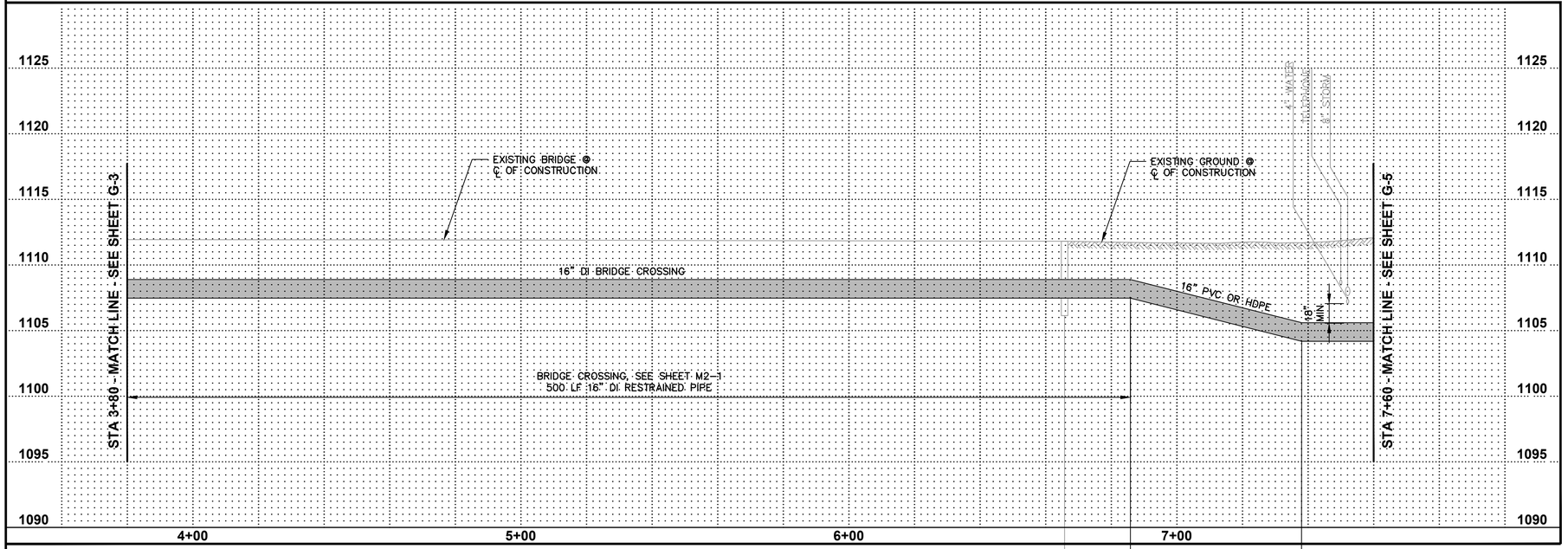
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0 1" 2"
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RECORD DRAWING
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Date: 05/2014
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DAVID VAN CLEVE — STATE OF WASHINGTON — 21582 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 21582 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

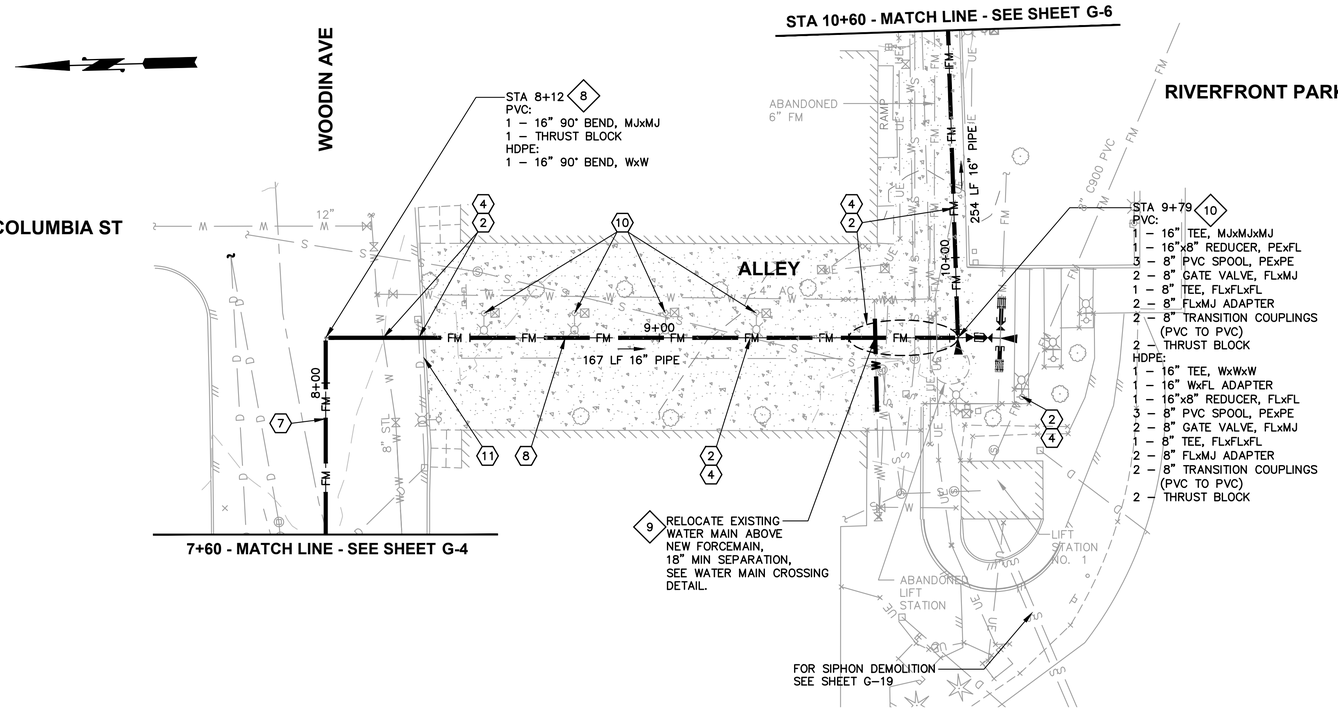
PLAN & PROFILE - STA 3+80 TO STA 7+60

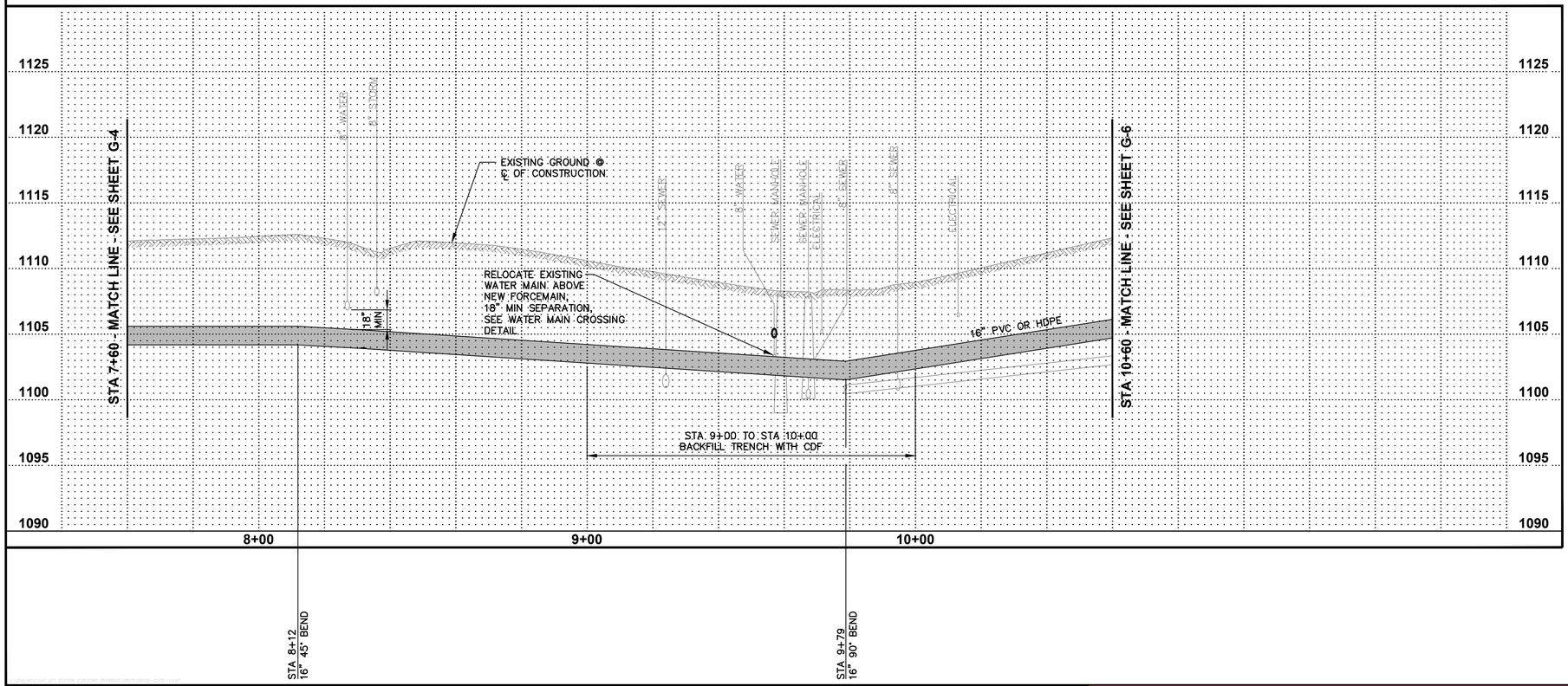
RECORD DRAWINGS SHEET: G-4 OF: 18 RECORD DRAWINGS

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NOTE:

FOR SURFACE RESTORATION OF ALLEY SEE SHEET G–16 & G–17

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

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CITY OF CHELAN
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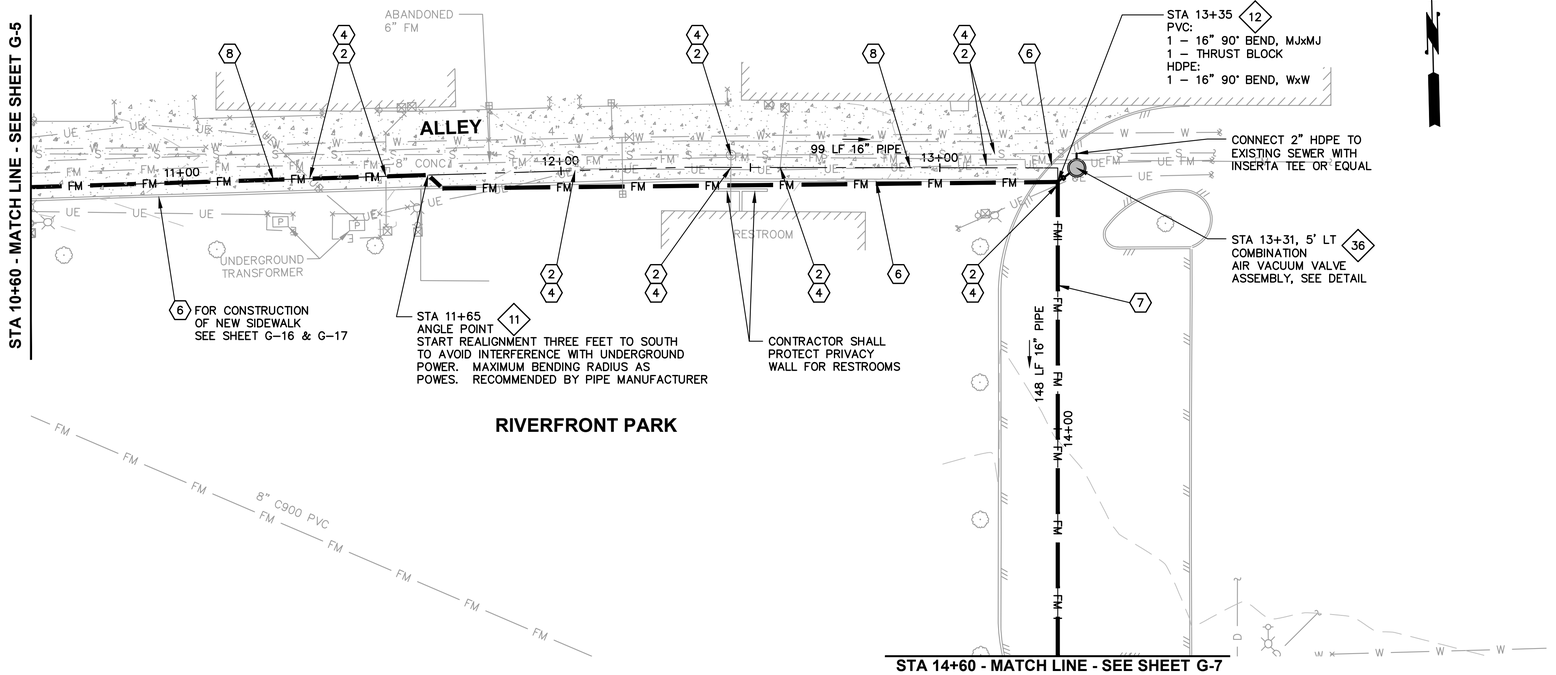
PLAN & PROFILE - STA 7+60 TO STA 10+00

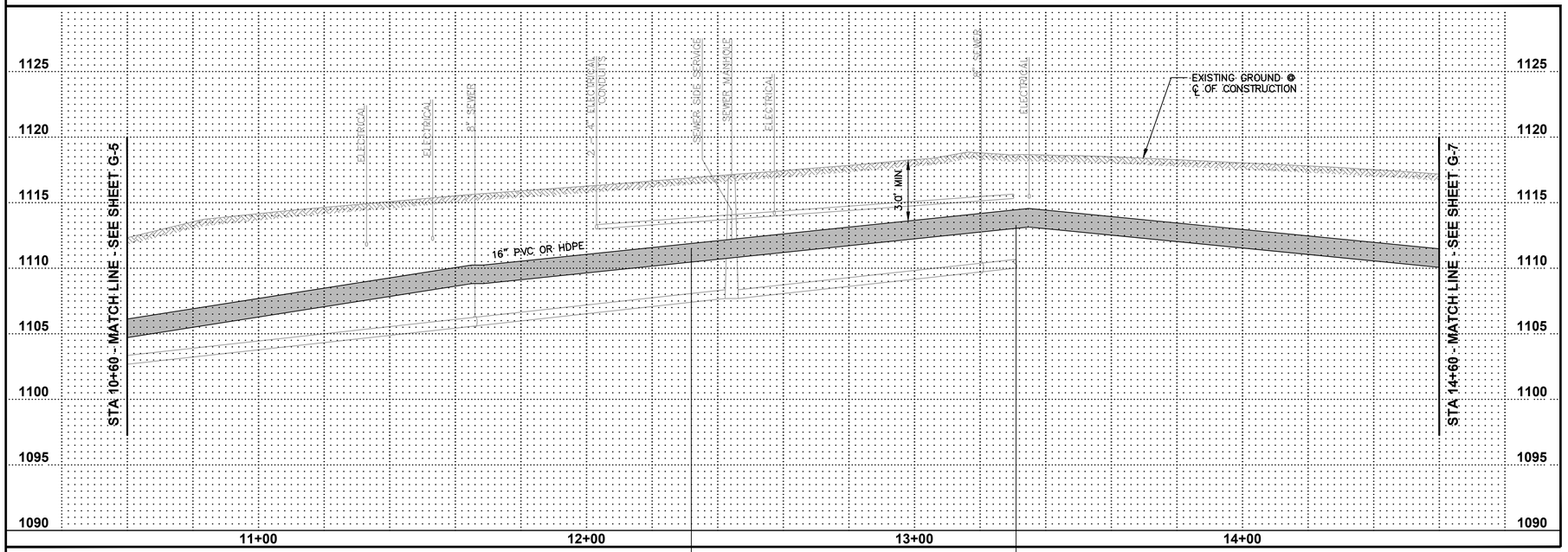
RECORD DRAWINGS
SHEET: G-5
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CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

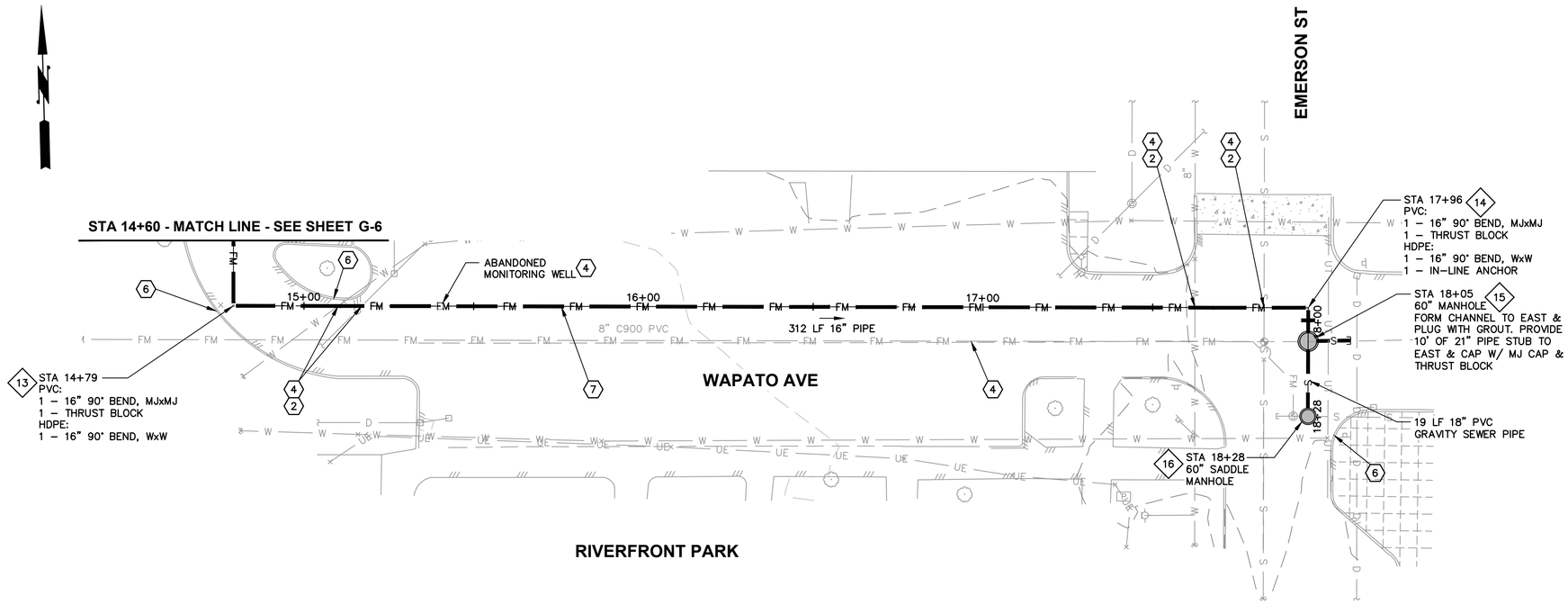
PLAN & PROFILE - STA 10+00 TO STA 13+80

RECORD DRAWINGS SHEET: G-6 OF: 18 RECORD DRAWINGS

JOB NO.: 11047

DWG\XBASE–CIV3D–11047

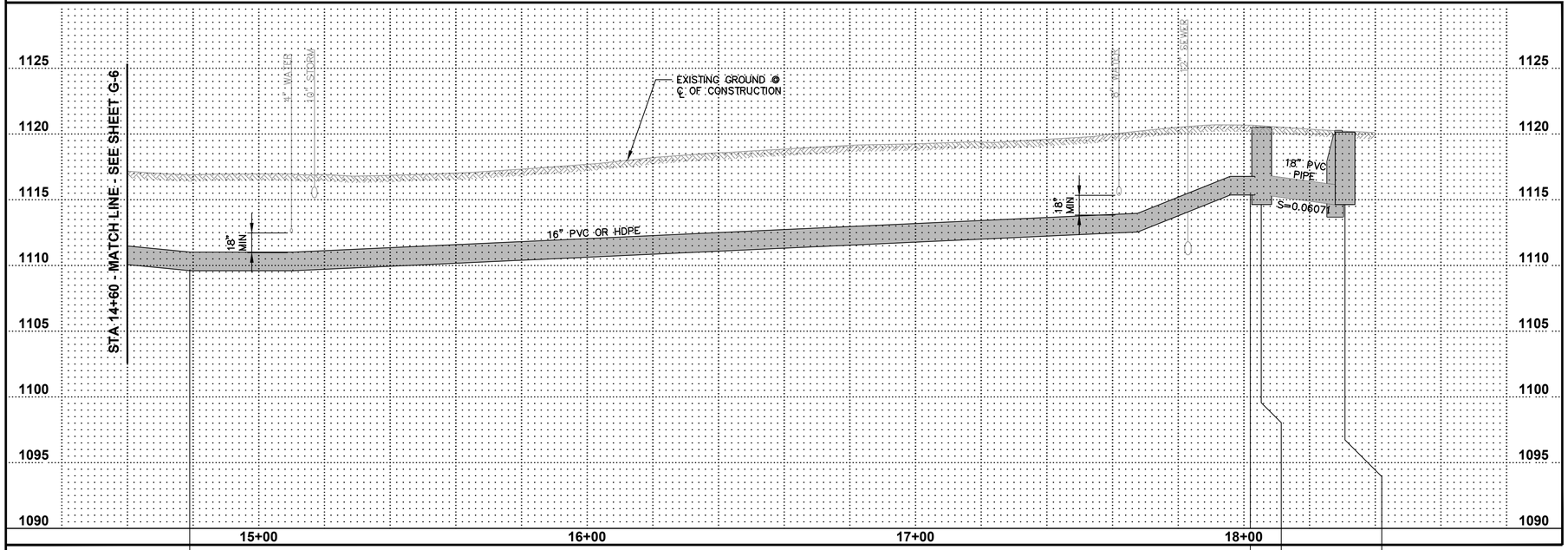
ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



CONSTRUCTION NOTES

NOTE: NOT ALL NOTES APPLY TO THIS SHEET.

1. ATTEMPTS HAVE BEEN MADE TO ACCURATELY LOCATE THE EXISTING UTILITIES; HOWEVER, THE EXACT LOCATION, SIZE, PIPE TYPE AND/OR DEPTH IS UNKNOWN IN MOST INSTANCES.
2. THE CONTRACTOR SHALL USE EXTREME CAUTION WHEN EXCAVATING NEAR EXISTING UTILITIES.
3. THE CONTRACTOR SHALL COORDINATE WITH CHELAN COUNTY P.U.D. TO HOLD POLES AND GUY WIRES IN PLACE, AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL SCHEDULE WORK THAT REQUIRES ONLY ONE POLE TO BE HELD AT ANYTIME.
4. THE CONTRACTOR SHALL POTHOLE EXISTING UTILITY, PRIOR TO CONSTRUCTION, TO VERIFY LOCATION. POTHOLING SHALL OCCUR AT LEAST ONE WEEK PRIOR TO CONSTRUCTION. SEE SPECIFICATIONS.
5. OVERHEAD POWER: CONTRACTOR SHALL CONDUCT OPERATIONS SUCH THAT ELECTRICAL SAFETY CLEARANCE SEPARATION REQUIREMENTS ARE MAINTAINED PER POWER COMPANY REQUIREMENTS AND OSHA REGULATIONS.
6. THE CONTRACTOR SHALL FURNISH & INSTALL CEMENT CONCRETE SIDEWALK OR CURB & GUTTER REPAIR, SEE DETAILS.
7. THE CONTRACTOR SHALL FURNISH & INSTALL HMA PAVEMENT REPAIR, SEE DETAILS.
8. THE CONTRACTOR SHALL FURNISH & INSTALL CEMENT CONCRETE REPAIR, SEE DETAILS. CEMENT CONCRETE REPAIRS SHALL EXTEND TO EXISTING PANEL EDGE.
9. BYPASS PUMPING REQUIRED.
10. THE CONTRACTOR SHALL HOLD EXISTING LIGHT POLE/LUMINAIRE.
11. THE CONTRACTOR SHALL REPLACE BRICK TRIM IN CONCRETE, SEE DETAIL.



0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: 1"=20' (H) 1"=5' (V)	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014 AEE
By: DWC
Checked By:

DAVID VAN CLEVE — STATE OF WASHINGTON — 19308 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 39495 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

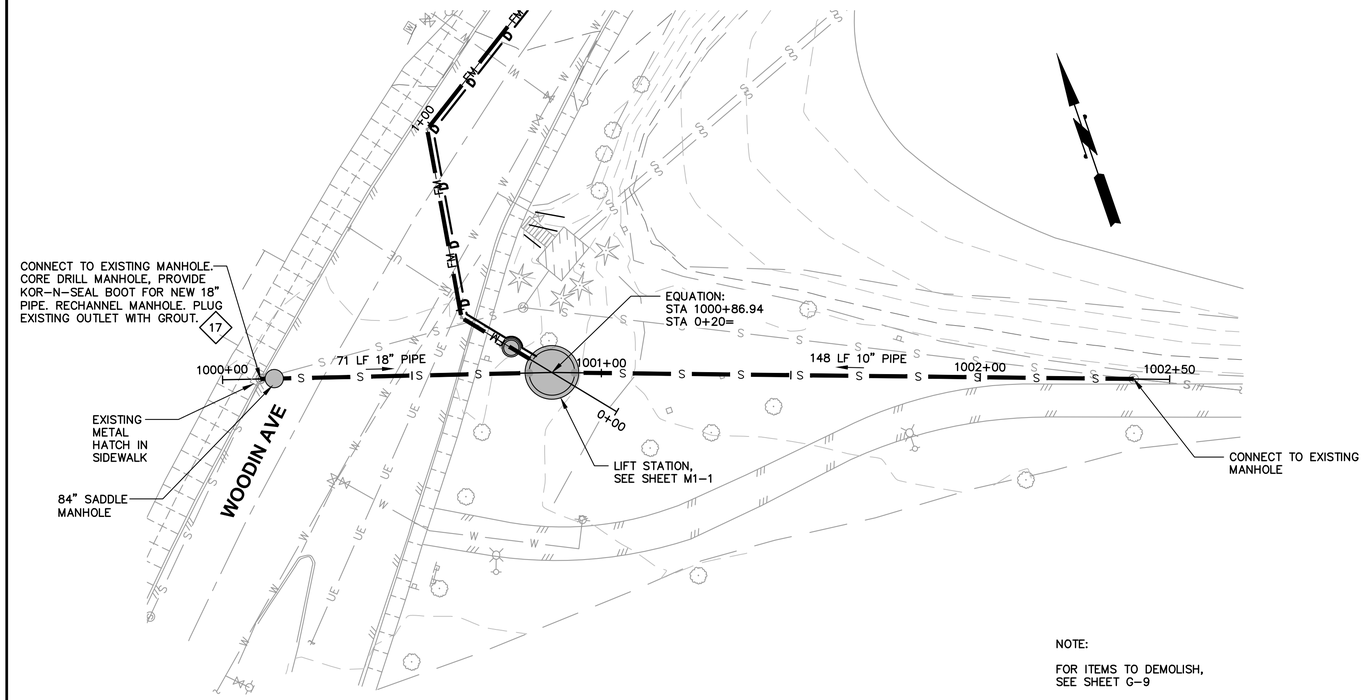
PLAN & PROFILE - STA 13+80 TO STA 17+80

RECORD DRAWINGS SHEET: G-7 OF: 18 RECORD DRAWINGS

JOB NO.: 11047

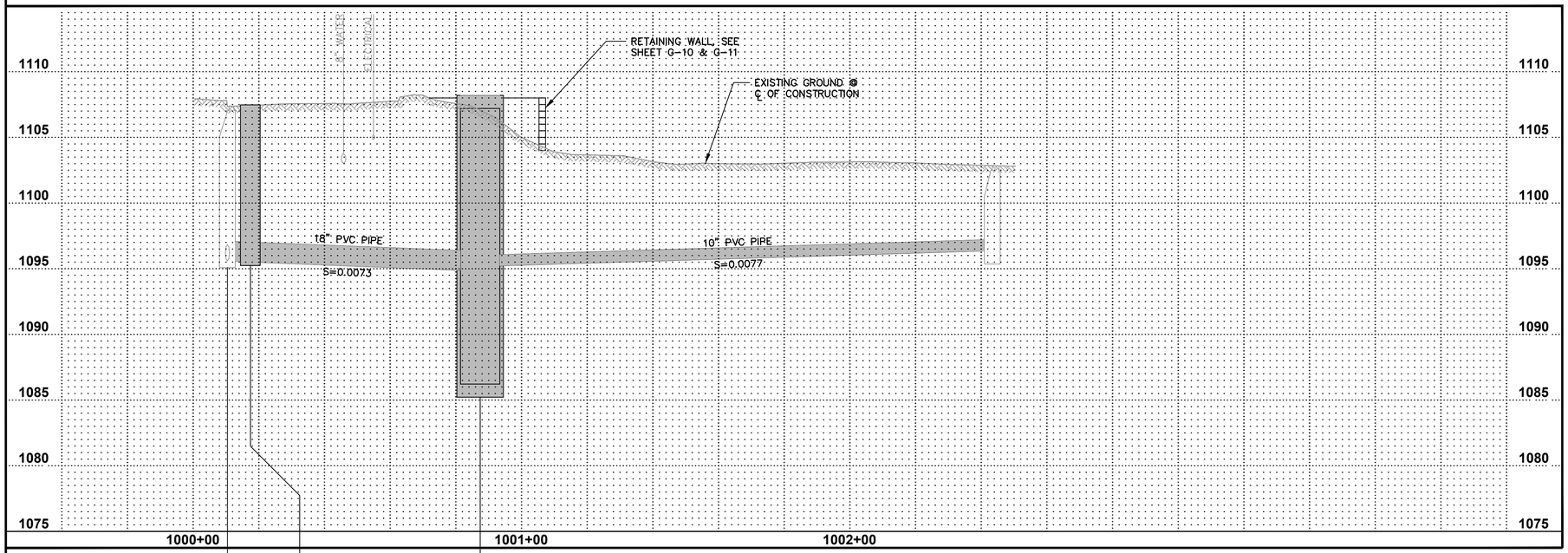
DWGXBASE–CIV3D–11047

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



NOTE:

FOR ITEMS TO DEMOLISH, SEE SHEET G-9



CONSTRUCTION NOTES

NOTE: NOT ALL NOTES APPLY TO THIS SHEET.

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5. OVERHEAD POWER: CONTRACTOR SHALL CONDUCT OPERATIONS SUCH THAT ELECTRICAL SAFETY CLEARANCE SEPARATION REQUIREMENTS ARE MAINTAINED PER POWER COMPANY REQUIREMENTS AND OSHA REGULATIONS.
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7. THE CONTRACTOR SHALL FURNISH & INSTALL HMA PAVEMENT REPAIR, SEE DETAILS.
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0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: 1"=20' (H) 1"=5' (V)	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 09/2014
By: ASC
Checked By: DVC

DAVID VAN CLEVE — STATE OF WASHINGTON — 30169 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 39695 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON
LIFT STATION NO. 2
PLAN & PROFILE - STA 100+00 TO STA 101+20

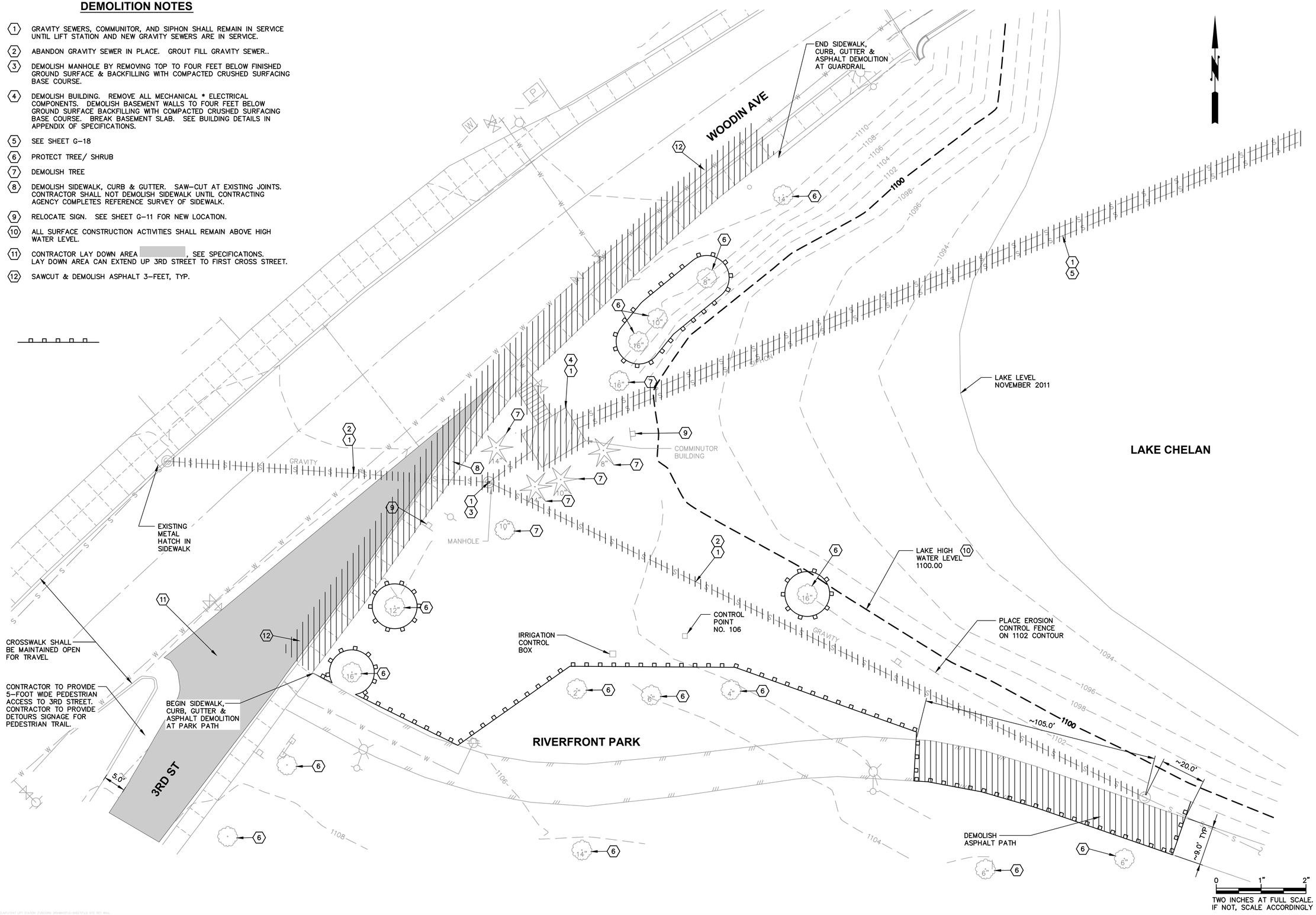
RECORD DRAWINGS SHEET: G-8 OF: 18 RECORD DRAWINGS

JOB NO.: 11047
DWG\XBASE-CIV3D-11047

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES

DEMOLITION NOTES

1. GRAVITY SEWERS, COMMUNITOR, AND SIPHON SHALL REMAIN IN SERVICE UNTIL LIFT STATION AND NEW GRAVITY SEWERS ARE IN SERVICE.
2. ABANDON GRAVITY SEWER IN PLACE. GROUT FILL GRAVITY SEWER..
3. DEMOLISH MANHOLE BY REMOVING TOP TO FOUR FEET BELOW FINISHED GROUND SURFACE & BACKFILLING WITH COMPACTED CRUSHED SURFACING BASE COURSE.
4. DEMOLISH BUILDING. REMOVE ALL MECHANICAL * ELECTRICAL COMPONENTS. DEMOLISH BASEMENT WALLS TO FOUR FEET BELOW GROUND SURFACE BACKFILLING WITH COMPACTED CRUSHED SURFACING BASE COURSE. BREAK BASEMENT SLAB. SEE BUILDING DETAILS IN APPENDIX OF SPECIFICATIONS.
5. SEE SHEET G-18
6. PROTECT TREE/ SHRUB
7. DEMOLISH TREE
8. DEMOLISH SIDEWALK, CURB & GUTTER. SAW-CUT AT EXISTING JOINTS. CONTRACTOR SHALL NOT DEMOLISH SIDEWALK UNTIL CONTRACTING AGENCY COMPLETES REFERENCE SURVEY OF SIDEWALK.
9. RELOCATE SIGN. SEE SHEET G-11 FOR NEW LOCATION.
10. ALL SURFACE CONSTRUCTION ACTIVITIES SHALL REMAIN ABOVE HIGH WATER LEVEL.
11. CONTRACTOR LAY DOWN AREA , SEE SPECIFICATIONS. LAY DOWN AREA CAN EXTEND UP 3RD STREET TO FIRST CROSS STREET.
12. SAWCUT & DEMOLISH ASPHALT 3-FEET, TYP.



Gray & Osborne, Inc.
CONSULTING ENGINEERS
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YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE:	JULY 2014
SCALE:	1"=10'
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: AEE
Checked By: DVC

DAVID VAN CLEVE — STATE OF WASHINGTON — 21708 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 39455 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY
WASHINGTON

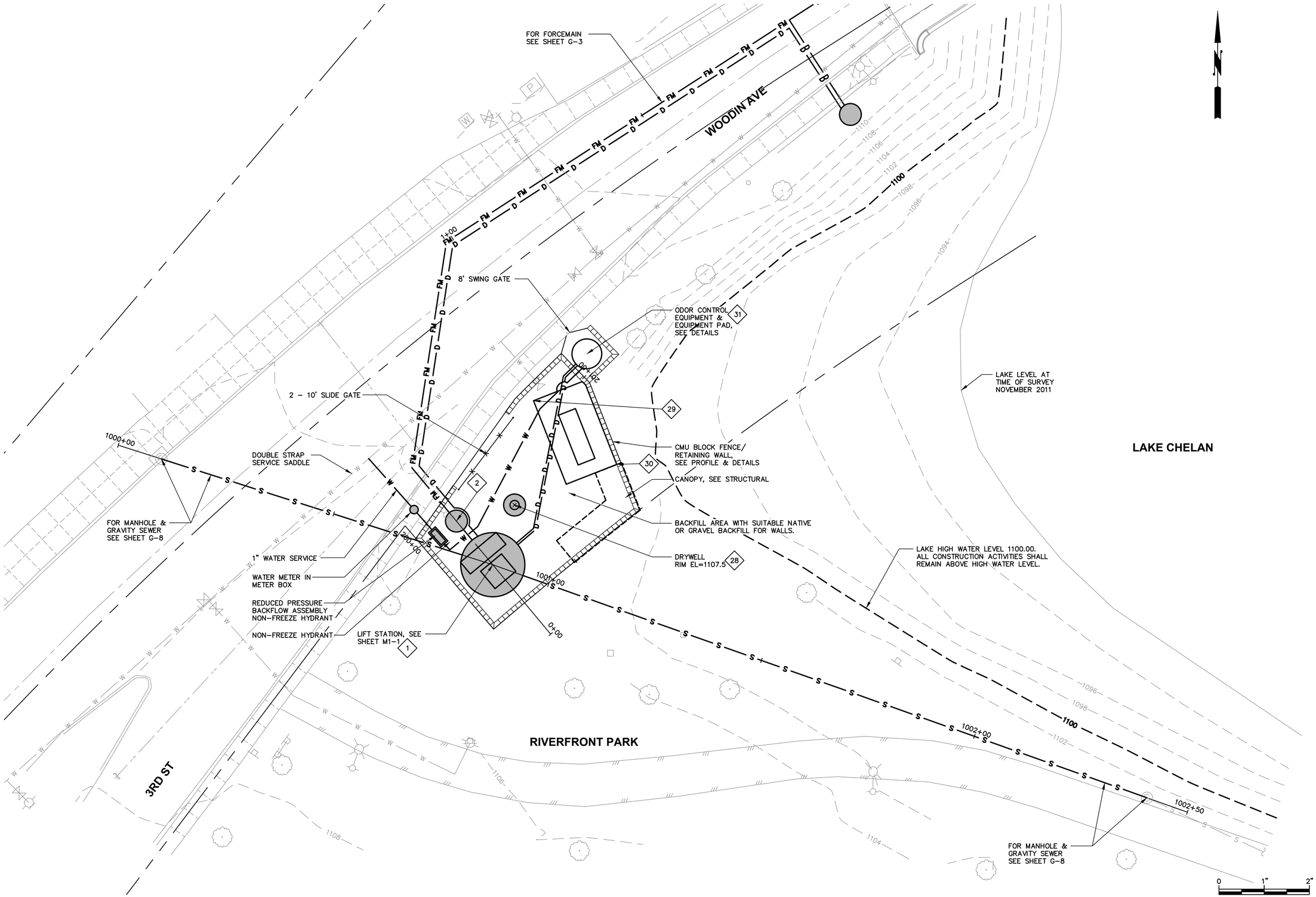
LIFT STATION NO. 2

LIFT STATION DEMOLITION & EROSION CONTROL PLAN

RECORD DRAWINGS
SHEET: G-9
OF: 18
RECORD DRAWINGS

JOB NO.: 11047
DWG: LS SITE RET WALL

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



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CONSULTING ENGINEERS
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YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: 1"=10'	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014
By: AEE
Checked By: DVC

DAVID VAN CLEVE — STATE OF WASHINGTON — 19036 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 39036 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

LIFT STATION SITE &GRADING PLAN

RECORD DRAWINGS
SHEET: G-10
OF: 18
RECORD DRAWINGS

JOB NO.: 11047
DWG: LS SITE RET WALL

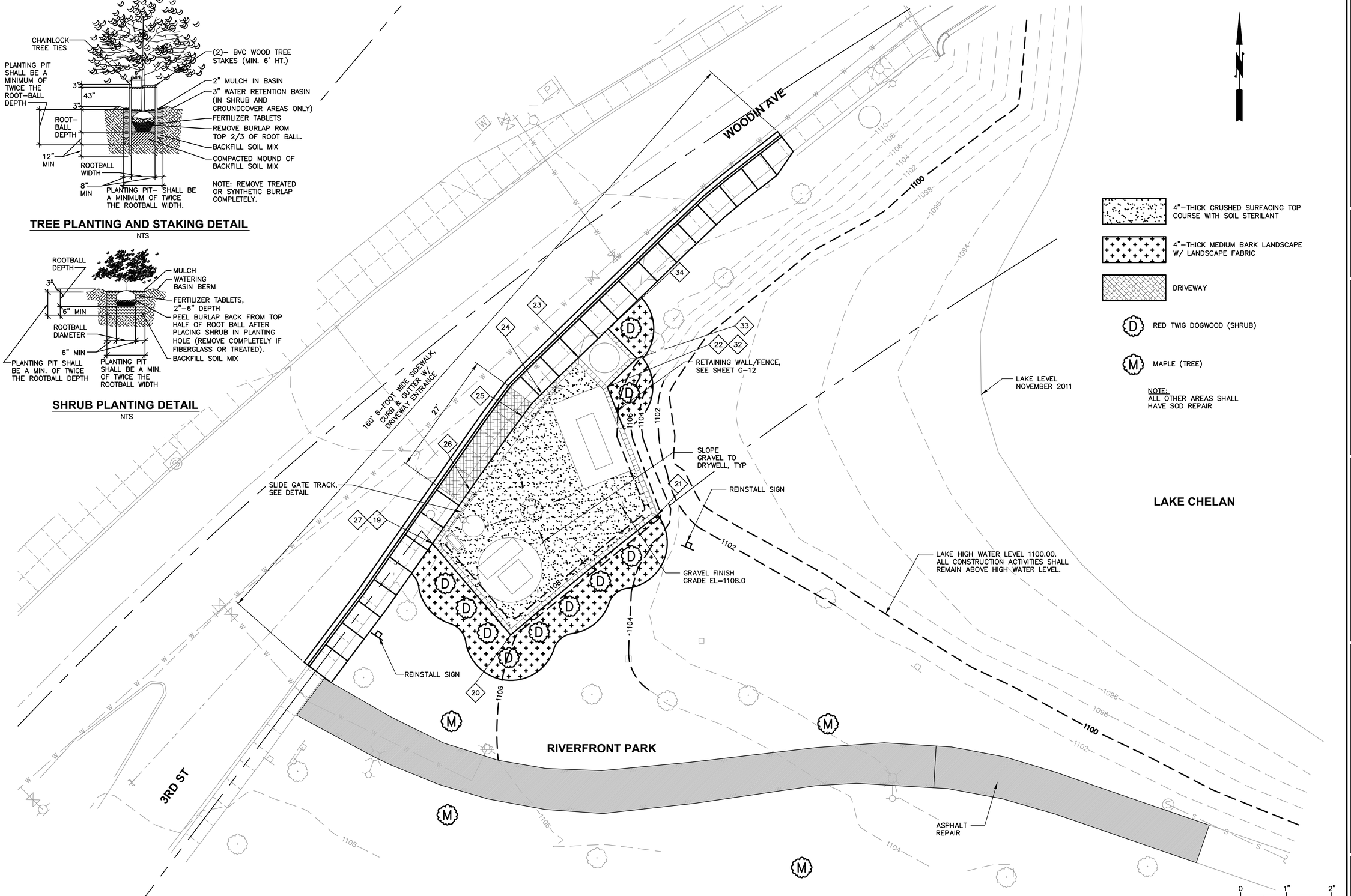
ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES

TREE PLANTING AND STAKING DETAIL

NTS

SHRUB PLANTING DETAIL

NTS



Gray & Osborne, Inc.
CONSULTING ENGINEERS
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YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: 1"=10'	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 03/2014
By: AEE
Checked By: DWC

DAVID VAN CLEVE — STATE OF WASHINGTON — 21606 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 21606 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

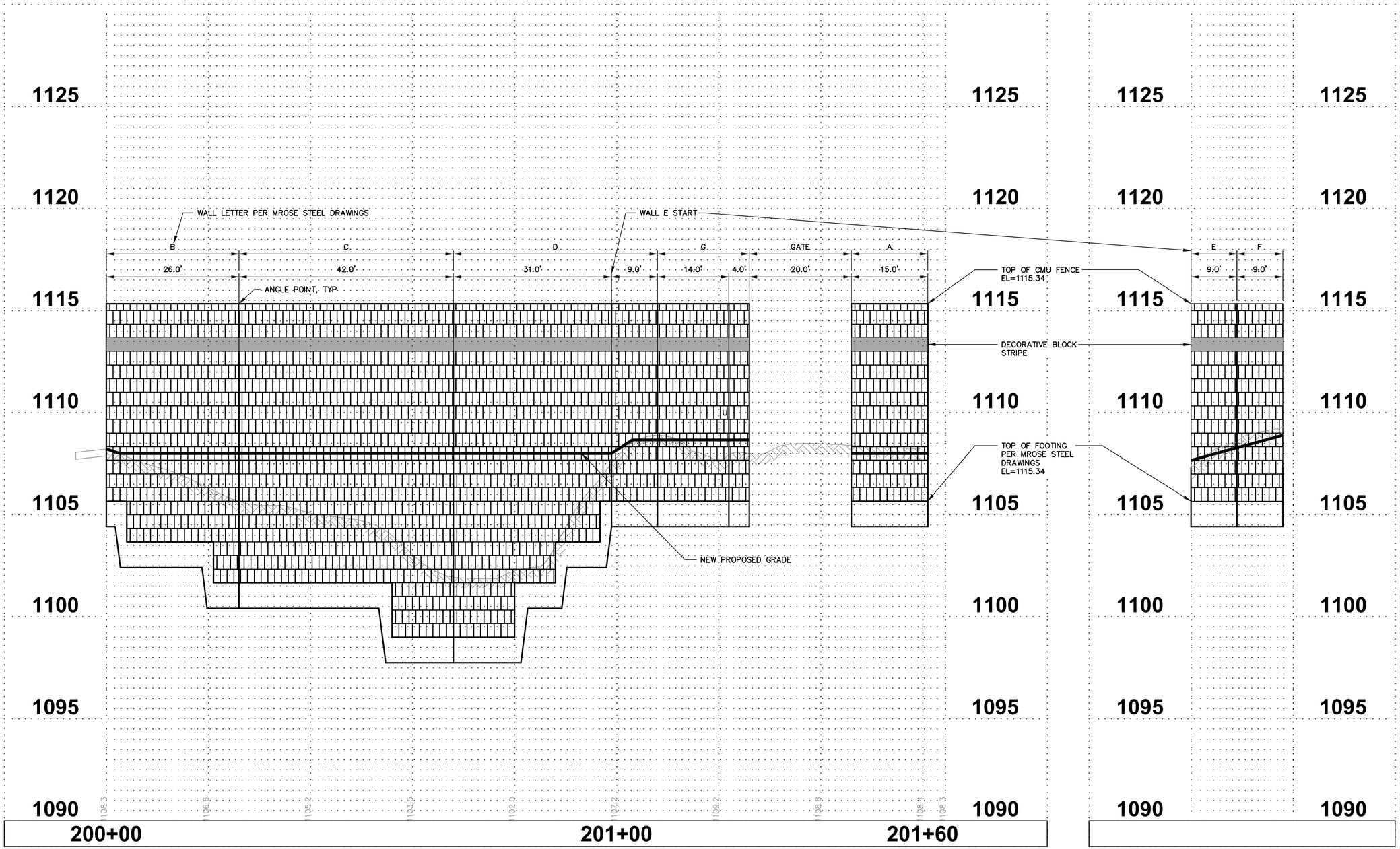
LIFS STATION LANDSCAPING PLAN

RECORD DRAWINGS SHEET: G-11 OF: 18 RECORD DRAWINGS

JOB NO.: 11047

DWG: LS SITE RET WALL

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



NOTE:
ALL BLOCKS ABOVE GROUND SPLIT FACE ROSE COLOR BROWN EXCEPT FOR DECORATIVE STRIP

ODOR CONTROL FENCE

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	
SCALE:	1"=40' (H) 1"=2.5' (V)
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 09/2014
By: AEE
Checked By: DVC

DAVID VAN CLEAVE
STATE OF WASHINGTON
20106
REGISTERED
PROFESSIONAL ENGINEER

JEFFREY W. STEVENS
STATE OF WASHINGTON
24963
REGISTERED
PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

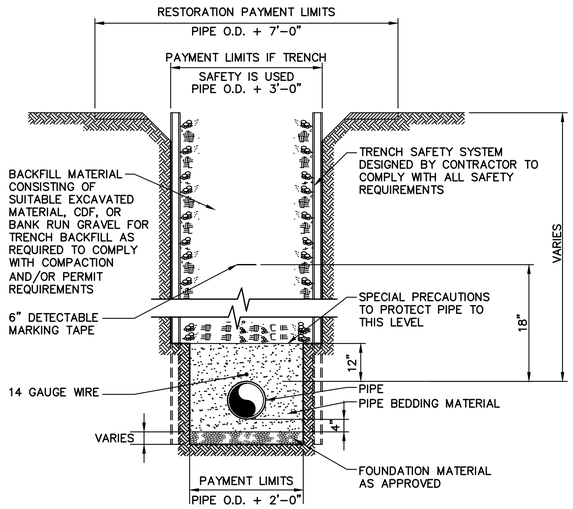
LIFT STATION NO. 2

RETAINING WALL / FENCE PROFILE

RECORD DRAWINGS SHEET: G-12 RECORD DRAWINGS
OF: 18

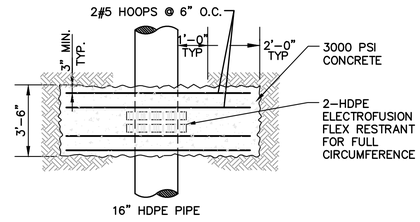
JOB NO.: 11047
DWG: LS SITE RET WALL

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES

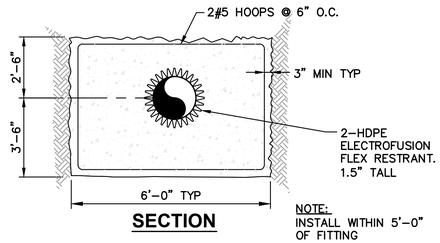


TYPICAL TRENCH SECTION

NTS



PLAN



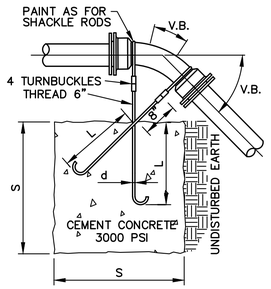
NOTE:
INSTALL WITHIN 5'-0" OF FITTING

SECTION

IN-LINE ANCHOR

NTS

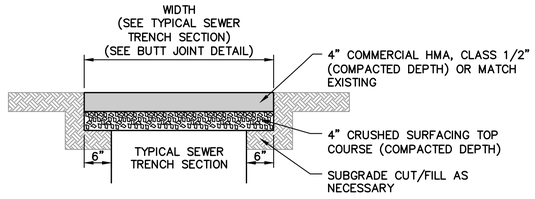
TYPE "B" BLOCKING FOR – 45° VERTICAL BENDS						
		VB		S	d	L
PIPE SIZE NOMINAL DIAMETER– INCHES	TEST PRESSURE PSI	VERTICAL BEND DEGREES	No. OF CU. FT. OF CONC. BLOCKING	SIDE OF CUBE LIN. FT.	DIAM. OF SHACKLE RODS (2) INCHES	DEPTH OF RODS IN CONCRETE LIN. FT.
4"	300	45	30	3.1	5/8"	2.0
6"			68	4.1		
8"			123	5.0		
12"	250		232	6.1	3/4"	2.5
16"	225		478	7.8	1 1/8"	4.0
20"	200		560	8.2	1 1/4"	
24"			820	9.4	1 3/8"	4.5



TYPE 'B' BLOCKING

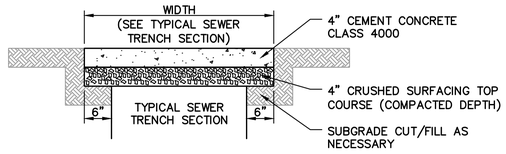
45° VERTICAL BENDS

UPLIFT



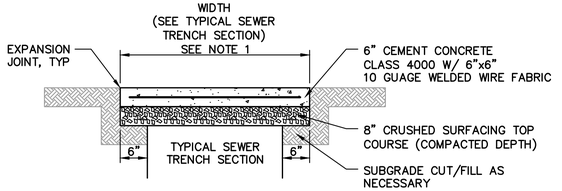
HMA PAVEMENT REPAIR DETAIL

NTS



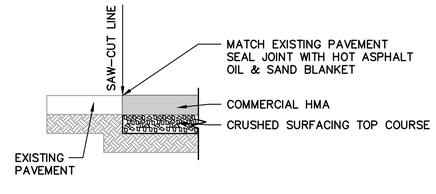
CEMENT CONCRETE SIDEWALK REPAIR DETAIL

NTS



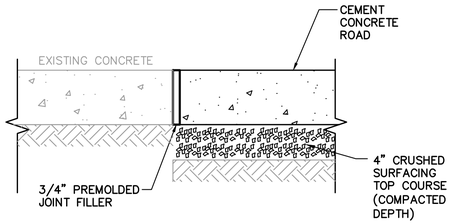
CEMENT CONCRETE PAVEMENT REPAIR DETAIL

NTS



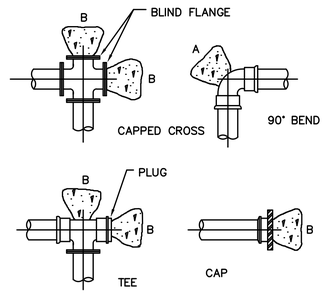
BUTT-JOINT DETAIL

NTS



CONCRETE BUTT JOINT DETAIL

NTS



NOTES: PROVIDE POLYETHYLENE SHEETING TO COVER BOLTS AND JOINTS FOR DISMANTLING.

THRUST BLOCK – TABLE
MIN. BEARING AREA AGAINST UNDISTURBED SOIL
SQUARE FEET

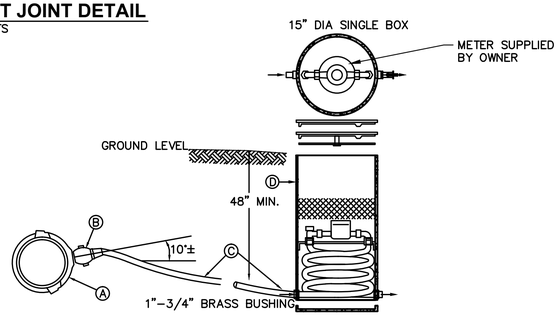
PIPE SIZE	A (FT.2)	B (FT.2)	C (FT.2)	D (FT.2)	E (FT.2)
3"	3	2	2	2	2
6"	4	4	2	2	2
8"	7	6	4	2	2
10"	11	10	6	3	2
12"	16	14	9	5	3
14"	22	19	12	6	3
16"	29	25	16	8	4
18"	36	31	20	10	5
20"	45	39	24	13	6
22"	54	47	29	15	8
24"	64	56	35	18	9
28"	87	76	48	24	12
30"	101	87	55	28	14
36"	145	125	78	40	20
42"	197	171	107	55	27
48"	257	223	140	71	36

NOTES:

1. BEARING AREA OF CONCRETE THRUST – BLOCK ON 200 PSI PRESSURE AND SAFE SOIL BEARING LOAD OF 2,000 POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER PIPE SIZES, PRESSURES AND SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING OF JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATION PRESSURE UNDER ALL CONDITIONS OF SERVICE.

CONCRETE THRUST BLOCK DETAILS

NTS



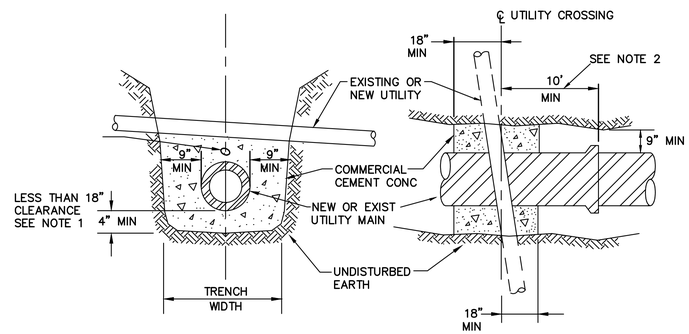
A. 1" SADDLE, ROMAC 101S OR 202S OR EQUAL.
B. 1" CORPORATION STOP, MUELLER OR APPROVED EQUAL.
C. 1" HDPE COPPER TUBE SIZE WITH A WORKING PRESSURE OF 200 PSI OR EQUAL
D. 3/4" MUELLER METER COIL BOX.

NOTES:

1. MATERIAL SUBSTITUTIONS OR DETERMINATION OF EQUAL ARE DISCRETION OF THE OWNER.
2. SERVICE LINE TO BE 90° OF MAIN.
3. ALUMINUM BACKED LOCATE TAPE OVER SERVICE LINE FOR LOCATION AND TONING WIRE
4. DRAWING NOT TO SCALE.

1" WATER METER SERVICE

NTS



NOTES:

1. CONTRACTOR SHALL PROVIDE CONCRETE PIPE ENCASEMENT AT ALL EXISTING UTILITY CROSSINGS IN THE EVENT THAT AN 18" SEPARATION CANNOT BE PROVIDED. THE CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE SITE UTILITIES TO ANTICIPATE PROVIDING AND INSTALLING CONCRETE ENCASEMENTS WHERE NECESSARY. THIS SHALL ALSO APPLY AT NEW STORM DRAIN STRUCTURES NEAR EXISTING WATER MAINS.
2. CONTRACTOR SHALL NOT CONSTRUCT ANY NEW PIPE JOINT WITHIN 10 FEET OF THE EXISTING CENTERLINE OF THE UTILITY CROSSING.

CEMENT CONCRETE PIPE ENCASEMENT DETAIL

NTS

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: NOTED	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: AEE
Checked By: DWC

DAVID VAN CLEVE 25361 REGISTERED PROFESSIONAL ENGINEER STATE OF WASHINGTON

JEFFREY W. STEVENS 29495 REGISTERED PROFESSIONAL ENGINEER STATE OF WASHINGTON

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

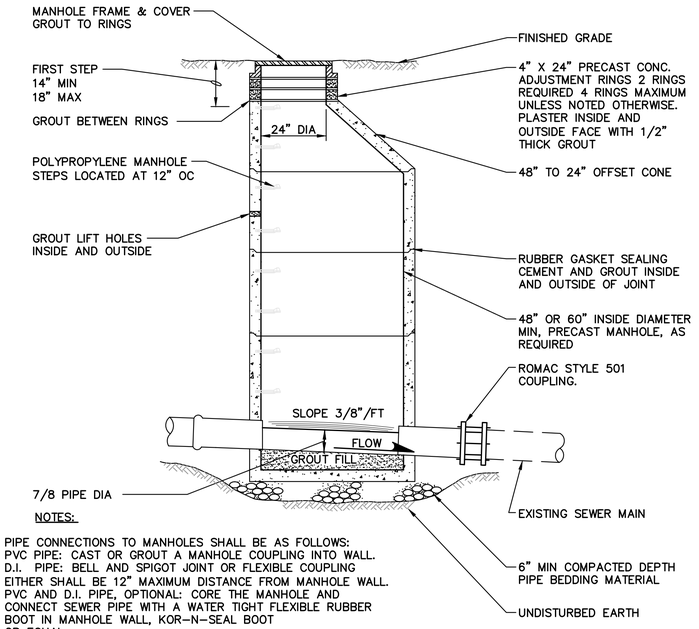
MISCELLANEOUS DETAILS

RECORD DRAWINGS SHEET: G-13 OF: 18 RECORD DRAWINGS

JOB NO.: 11047
DWG: DETAILS

L:\CHELAN\11047 LIFT STATION 2\RECORD DRAWINGS\G-SHEETS\DETAILS

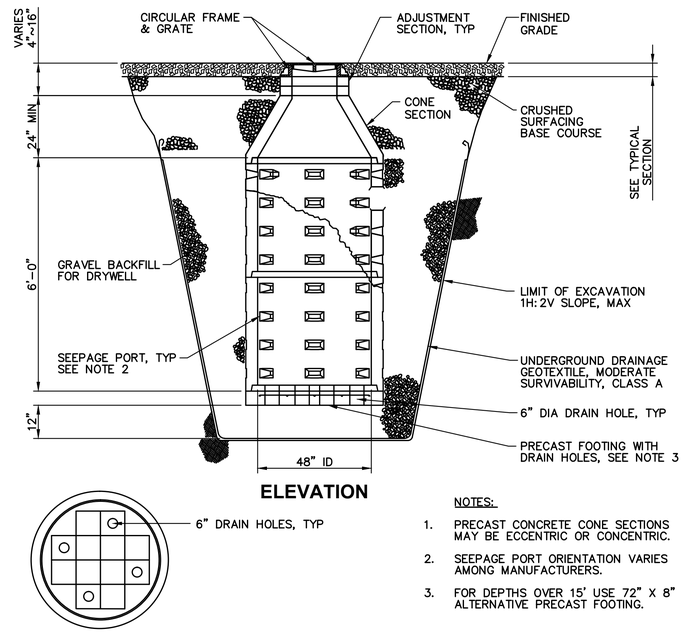
ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



NOTES:

1. PIPE CONNECTIONS TO MANHOLES SHALL BE AS FOLLOWS:
   PVC PIPE: CAST OR GROUT A MANHOLE COUPLING INTO WALL.
   D.I. PIPE: BELL AND SPIGOT JOINT OR FLEXIBLE COUPLING EITHER SHALL BE 12" MAXIMUM DISTANCE FROM MANHOLE WALL.
   PVC AND D.I. PIPE, OPTIONAL: CORE THE MANHOLE AND CONNECT SEWER PIPE WITH A WATER TIGHT FLEXIBLE RUBBER BOOT IN MANHOLE WALL, KOR-N-SEAL BOOT OR EQUAL.
2. MANHOLES SHALL BE SET PLUMB.
3. FOR MANHOLES WITH PROVISIONS FOR ADDITIONAL CHANNEL(S) AND KNOCKOUT(S), CORING WALLS AND INSTALLING FLEXIBLE BOOTS SHALL NOT BE ALLOWED.

MANHOLE
NTS



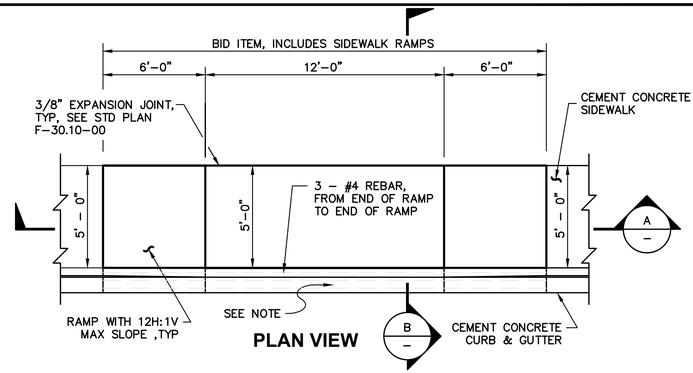
ELEVATION

PRECAST FOOTING DETAIL

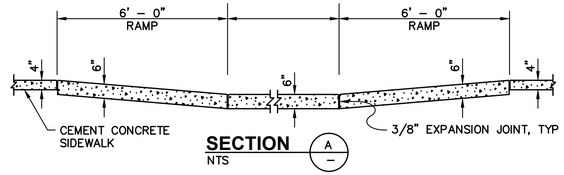
NOTES:

1. PRECAST CONCRETE CONE SECTIONS MAY BE ECCENTRIC OR CONCENTRIC.
2. SEEPAGE PORT ORIENTATION VARIES AMONG MANUFACTURERS.
3. FOR DEPTHS OVER 15' USE 72" X 8" ALTERNATIVE PRECAST FOOTING.

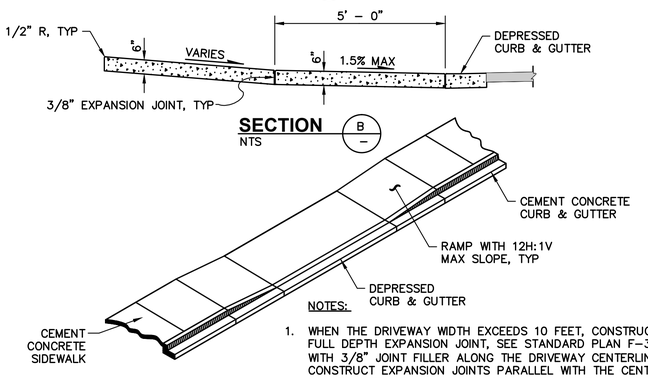
DRYWELL
NTS



PLAN VIEW



SECTION
NTS

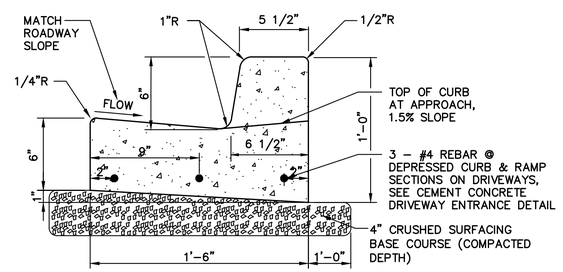


SECTION
NTS

NOTES:

1. WHEN THE DRIVEWAY WIDTH EXCEEDS 10 FEET, CONSTRUCT A FULL DEPTH EXPANSION JOINT, SEE STANDARD PLAN F-30.10-00 WITH 3/8" JOINT FILLER ALONG THE DRIVEWAY CENTERLINE. CONSTRUCT EXPANSION JOINTS PARALLEL WITH THE CENTERLINE AS REQUIRED AT 15' MAX SPACING WHEN DRIVEWAY WIDTHS EXCEED 30'.
2. COMPACT NATIVE MATERIAL TO 95%.
3. 6" CEMENT CONCRETE CLASS 4000.
4. 2" CRUSHED SURFACING TOP COURSE FOR BASE. CRUSHED SURFACING MATERIAL BENEATH CONCRETE DRIVEWAY NOT SHOWN FOR CLARITY. ALL COSTS FOR THIS MATERIAL SHALL BE INCIDENTAL TO THE UNIT COST FOR DRIVEWAY ENTRANCE AS FOUND IN THE PROPOSAL.

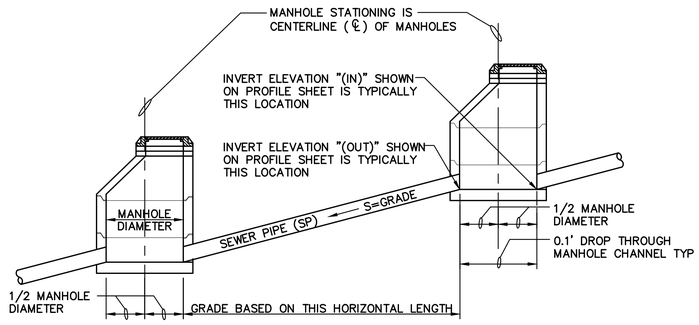
CEMENT CONCRETE DRIVEWAY ENTRANCE
NTS



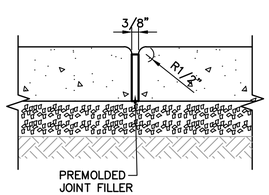
NOTES:

1. EXPANSION JOINT MATERIAL SHALL BE 3/8" THICK PREMOLDED JOINT FILLER FULL THICKNESS OF CONCRETE SPACING.
2. FORMS AND SUBGRADE INSPECTION AND APPROVAL BY THE OWNER REQUIRED PRIOR TO POURING CONCRETE.

CEMENT CONCRETE TRAFFIC CURB AND GUTTER
NTS



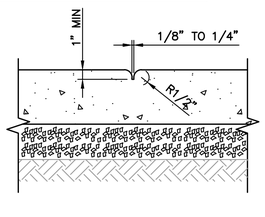
DATA FOR SEWER LINE STATIONING & GRADE CALCULATIONS
NTS



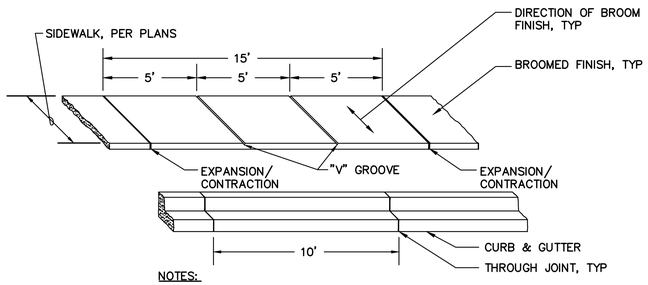
EXPANSION JOINT
NTS

NOTE:

CONTRACTOR SHALL TRANSITION SIDEWALKS AS NECESSARY TO MATCH EXISTING AND CONSTRUCT AN EXPANSION JOINT AT TERMINATION. ALL COSTS OF PROVIDING THIS WORK INCLUDING ANY BASE MATERIAL SHALL BE INCIDENTAL TO CEMENT CONCRETE SIDEWALK.



CONSTRUCTION JOINT
NTS



NOTES:

1. EXPANSION/CONTRACTION JOINTS SHALL BE 3/8" ASPHALT SATURATED FELT TO FULL DEPTH OF CONCRETE PLACED AT 15' O.C. AND AT POINTS OF TANGENCY ON CURVES, AT CATCH BASINS/INLETS, AND AT EDGES OF ALLEYS, DRIVEWAYS, AND CURB RAMPS.
2. V-GROOVE MARKS SHALL BE 1/8" DEEP AND 1/4" WIDE PLACED AT 5' OC FOR 5' SIDEWALKS.
3. ALL JOINTS SHALL BE CLEAN AND EDGED TO A 1/4" RADIUS. JOINTS SHALL BE FLUSH WITH THE FINISHED SURFACE.
4. SIDEWALK SHALL CONSIST OF 4" CEMENT CONC. PLACED ON 2" COMPACTED DEPTH CRUSHED SURFACING TOP COURSE.

CEMENT CONCRETE SIDEWALK
NTS

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

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DATE: JULY 2014	SCALE: NOTED	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014
By: AEE
Checked By: DWC

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JEFFREY W. STEVENS — STATE OF WASHINGTON — 39456 — REGISTERED PROFESSIONAL ENGINEER

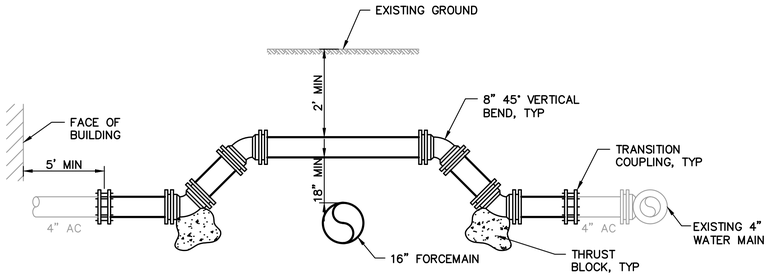
CITY OF CHELAN
CHELAN COUNTY WASHINGTON
LIFT STATION NO. 2
MISCELLANEOUS DETAILS

RECORD DRAWINGS SHEET: G-14 OF: 18 RECORD DRAWINGS

JOB NO.: 11047
DWG: DETAILS

J:\CHELAN\11047 LIFT STATION 2\RECORD DRAWINGS\LI-SHEETS\DETAILS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES

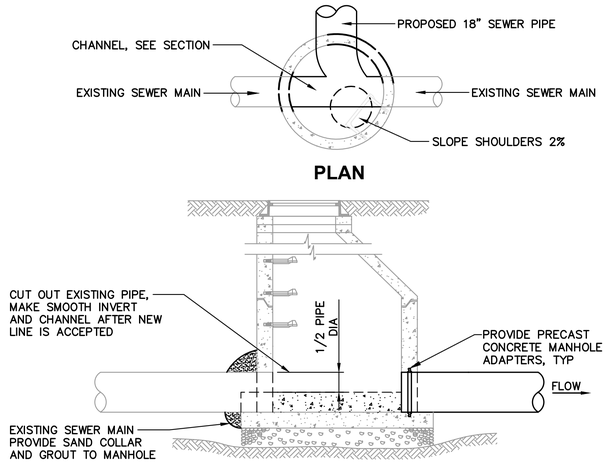


NOTES:

1. ALL FITTINGS, EXCEPT TRANSITION COUPLINGS, SHALL BE RESTRAINED.
2. FORCE MAIN BEDDING ±10' SHALL BE CDF.
3. VERIFY EXISTING PIPE SIZE & MATERIAL ONE WEEK PRIOR TO CONSTRUCTION.

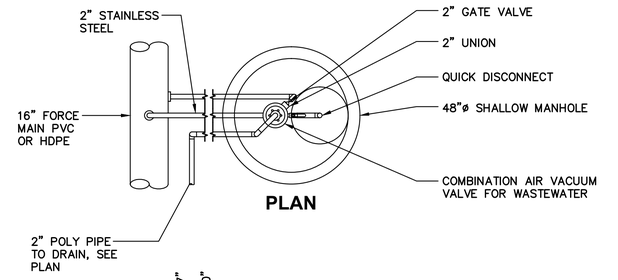
WATER MAIN CROSSING ENLARGEMENT

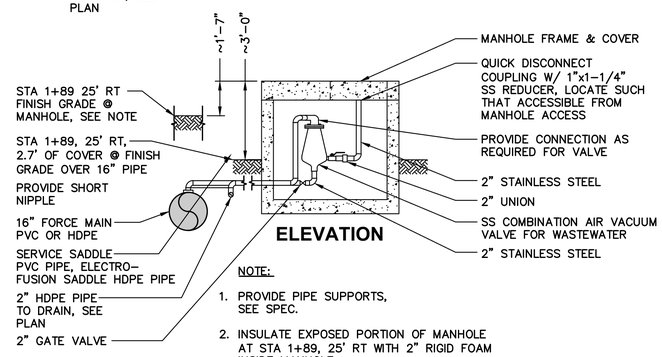
NTS



SADDLE MANHOLE

NTS



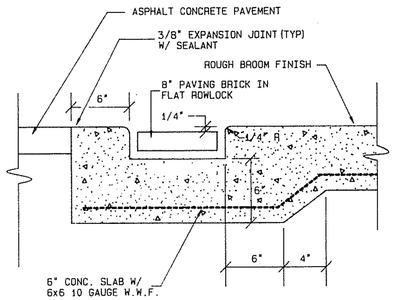


NOTE:

1. PROVIDE PIPE SUPPORTS, SEE SPEC.
2. INSULATE EXPOSED PORTION OF MANHOLE AT STA 1+89, 25' RT WITH 2" RIGID FOAM INSIDE MANHOLE.
3. MANHOLE @ 1+89, 25' RT SHOWN. MANHOLE @ STA 13+31, 5' LT SIMILAR EXCEPT MANHOLE FLUSH WITH FINISH GRADE.

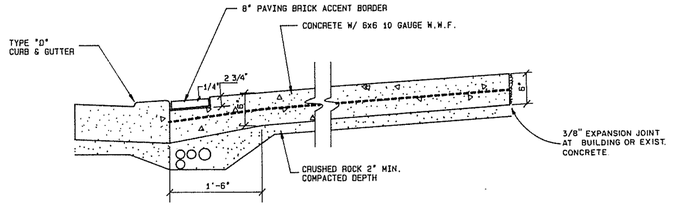
COMBINATION AIR AND VACUUM RELEASE ASSEMBLY

NTS



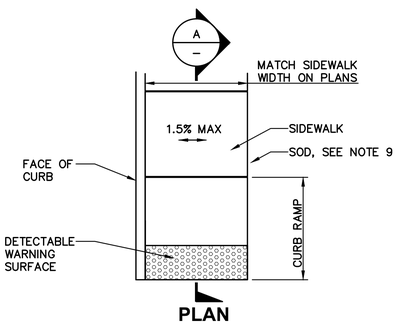
CROSSWALK BRICK DETAIL

NTS



DRIVEWAY SECTION

NTS

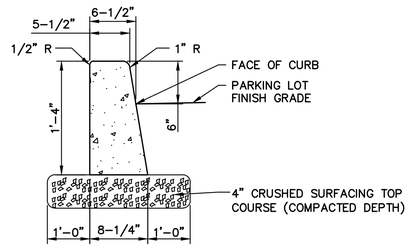


NOTES:

1. PROVIDE A SEPARATE CURB RAMP FOR EACH MARKED OR UNMARKED CROSSWALK. CURB RAMP LOCATION SHALL BE PLACED WITHIN THE WIDTH OF THE ASSOCIATED CROSSWALK, OR AS SHOWN IN THE CONTRACT PLANS.
2. WHERE "GRADE BREAK" IS CALLED OUT, THE ENTIRE LENGTH OF THE GRADE BREAK BETWEEN THE TWO ADJACENT SURFACE PLANES SHALL BE FLUSH.
3. DO NOT PLACE GRATINGS, JUNCTION BOXES, ACCESS COVERS, OR OTHER APPURTENANCES IN FRONT OF THE CURB RAMP OR ON ANY PART OF THE CURB RAMP OR LANDING.
4. SEE CONTRACT PLANS FOR THE CURB DESIGN SPECIFIED. SEE CONTRACT PLANS FOR CURB, CURB AND GUTTER, AND PEDESTRIAN CURB DETAILS.
5. SEE CONTRACT PLANS FOR CONCRETE SIDEWALK DETAILS. SEE CONTRACT PLANS FOR WIDTH AND PLACEMENT OF SIDEWALK.
6. THE BID ITEM "CEMENT CONCRETE CURB RAMP TYPE___" DOES NOT INCLUDE THE ADJACENT CURB, CURB AND GUTTER, PEDESTRIAN CURB OR SIDEWALKS.
7. THE CURB RAMP MAXIMUM RUNNING SLOPE SHALL NOT REQUIRE THE RAMP LENGTH TO EXCEED 15 FEET TO AVOID CHASING THE SLOPE INDEFINITELY WHEN CONNECTING TO STEEP GRADES. WHEN APPLYING THE 15 FOOT MAX LENGTH, THE RUNNING SLOPE OF THE CURB RAMP SHALL BE AS FLAT AS FEASIBLE.
8. CURB RAMP, LANDING, & FLARES SHALL RECEIVE BROOM FINISH, SEE SPEC.
9. ADJUST GRADE OF SOD TO MATCH BACK OF SIDEWALK ELEVATION.

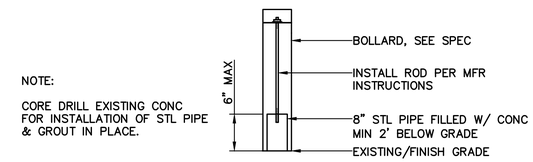
SIDEWALK CURB RAMP

NTS



CEMENT CONCRETE TRAFFIC CURB

NTS



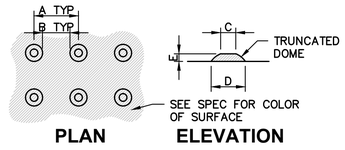
NOTE:

CORE DRILL EXISTING CONC FOR INSTALLATION OF STL PIPE & GROUT IN PLACE.

BOLLARD

NTS

	MIN	MAX
A	1.60"	2.40"
B	0.65"	—
C	0.45"	0.90"
D	0.9"	1.40"
E	0.2"	0.2"



NOTES:

1. THE DETECTABLE WARNING SURFACE SHALL EXTEND THE FULL WIDTH OF THE CURB RAMP (EXCLUSIVE OF FLARES) OR THE LANDING.
2. THE EDGE OF THE DETECTABLE WARNING SURFACE SHALL BE PLACED ALONG THE BACK OF THE CURB LINE.
3. THE ROWS OF TRUNCATED DOMES IN A DETECTABLE WARNING SURFACE SHALL BE PARALLEL WITH THE DIRECTION OF WHEEL CHAIR TRAVEL.
4. SEE STANDARD PLANS FOR SIDEWALK AND CURB RAMP DETAILS.
5. IF A CURB IS NOT PRESENT, PLACE THE DETECTABLE WARNING SURFACE AT THE EDGE OF THE PAVEMENT.
6. IF A CURB RAMP IS REQUIRED, THE LOCATION OF THE DETECTABLE WARNING SURFACE MUST BE AT THE BOTTOM OF THE RAMP AND WITHIN THE REQUIRED DISTANCE FROM RAIL.

DETECTABLE WARNING SURFACE

NTS

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

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YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: NOTED	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 09/2014
By: AEE
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DAVID VAN CLEVE — STATE OF WASHINGTON — 20048 — REGISTERED PROFESSIONAL ENGINEER

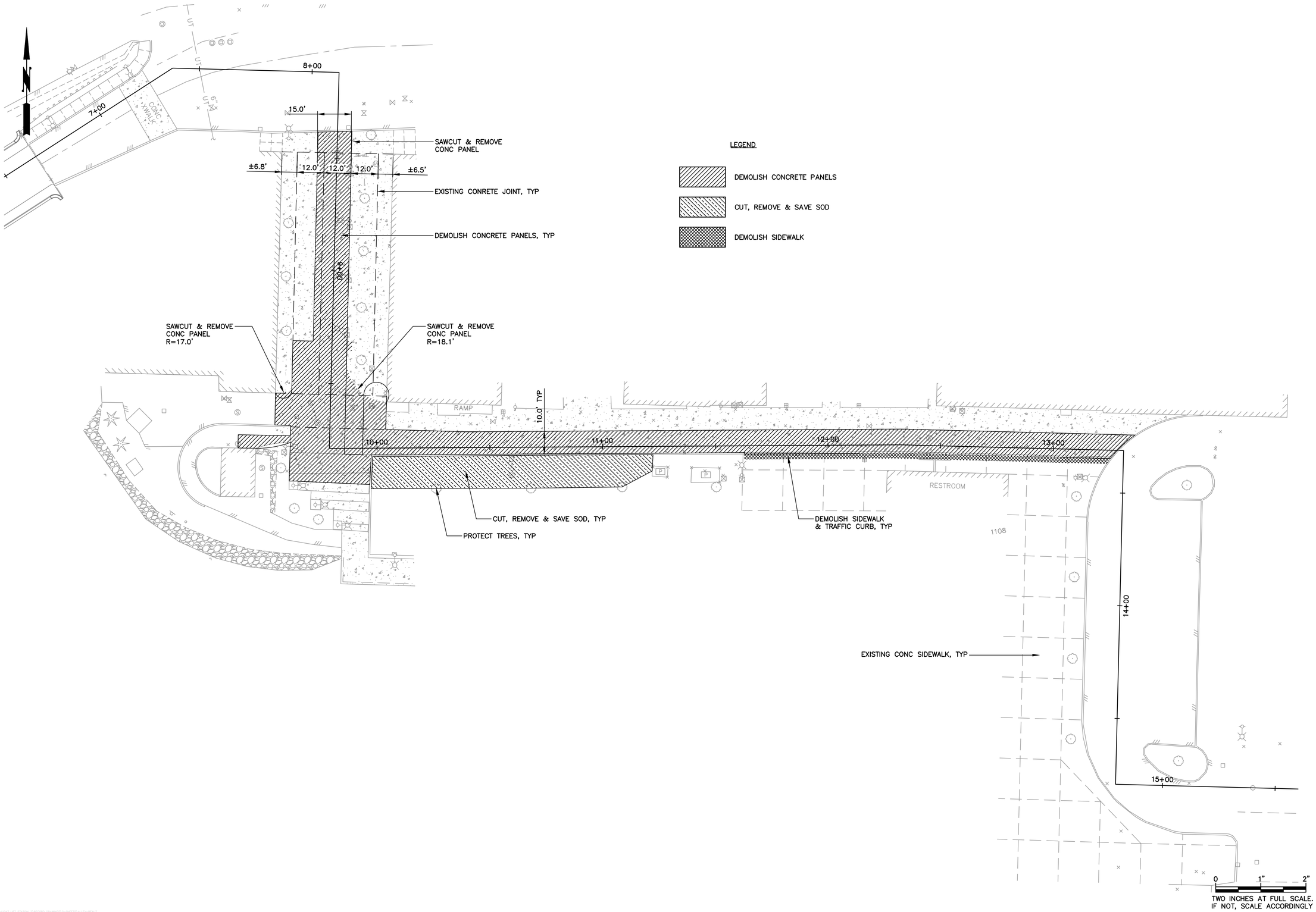
JEFFREY W. STEVENS — STATE OF WASHINGTON — 34645 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON
LIFT STATION NO. 2
MISCELLANEOUS DETAILS

RECORD DRAWINGS SHEET: G-15 OF: 18 RECORD DRAWINGS

JOB NO.: 11047
DWG: DETAILS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



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DATE:	JULY 2014
SCALE:	1"=20'
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: ASC
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DAVID VAN CLEVE — STATE OF WASHINGTON — 20708 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 39495 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

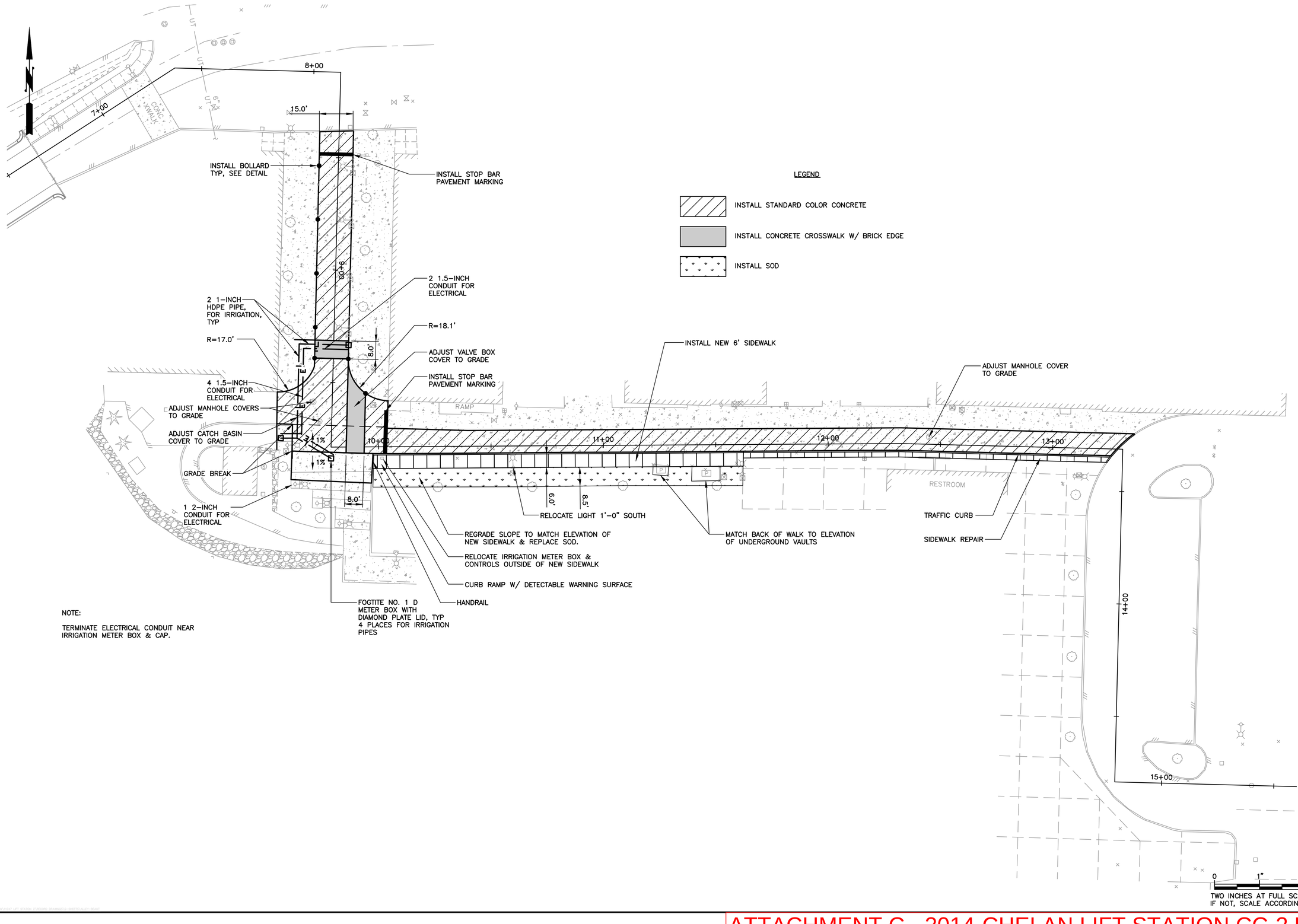
LIFT STATION NO. 2

RIVERFRONT PARK ALLEY - DEMOLITION PLAN

RECORD DRAWINGS
SHEET: G-16
OF: 18
RECORD DRAWINGS

JOB NO.: 11047
DWG: ALLEY–BEAUT

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



NOTE:

TERMINATE ELECTRICAL CONDUIT NEAR IRRIGATION METER BOX & CAP.

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DATE:	JULY 2014
SCALE:	1"=20'
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014
By: AEE
Checked By: DVC

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JEFFREY W. STEVENS — STATE OF WASHINGTON — 39495 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY
WASHINGTON

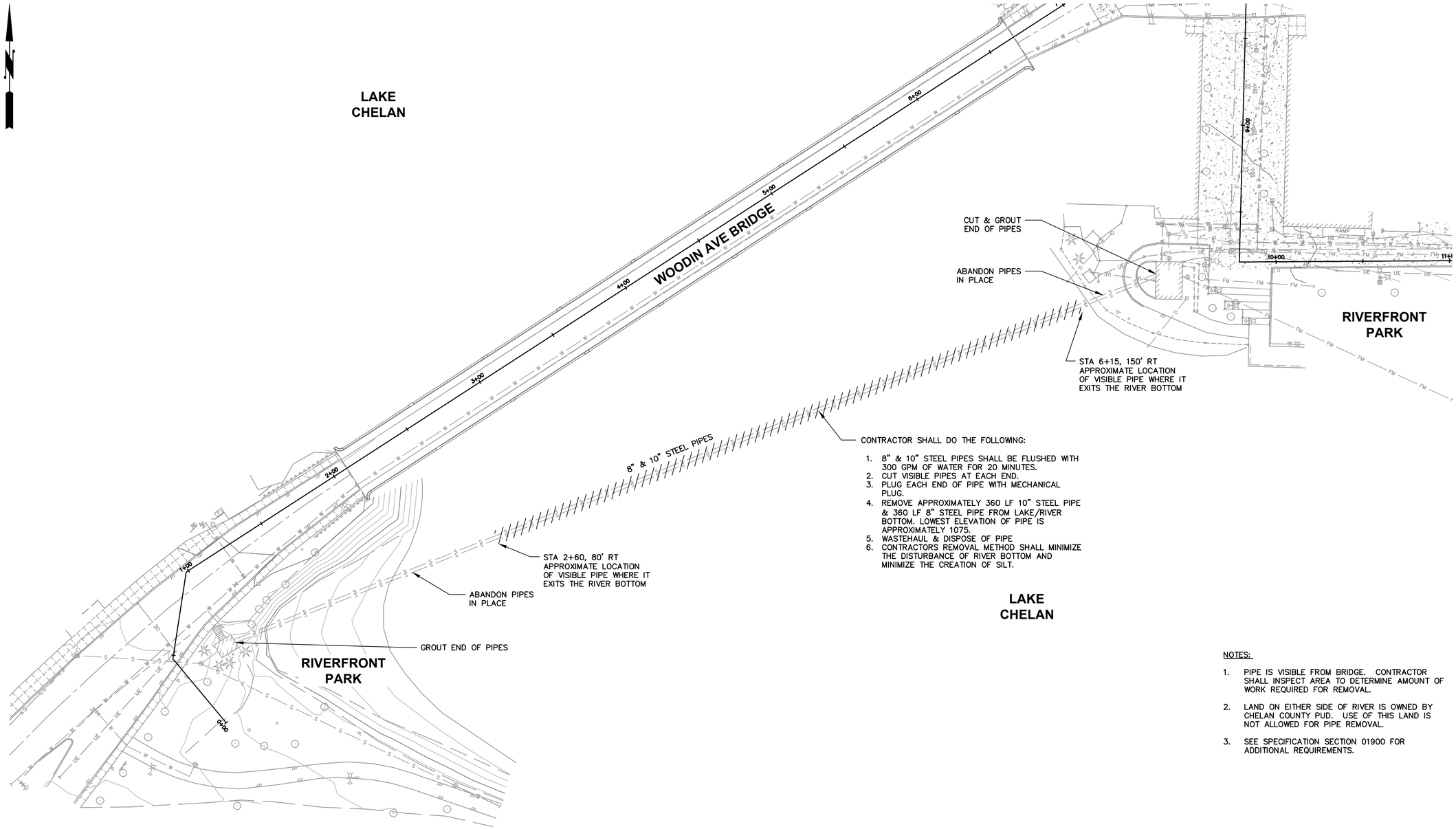
LIFT STATION NO. 2

RIVERFRONT PARK ALLEY - SURFACE RESTORATION PLAN

RECORD DRAWINGS
SHEET: G-17
OF: 18
RECORD DRAWINGS

JOB NO.: 11047
DWG: ALLEY–BEAUT

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



CONTRACTOR SHALL DO THE FOLLOWING:

1. 8" & 10" STEEL PIPES SHALL BE FLUSHED WITH 300 GPM OF WATER FOR 20 MINUTES.
2. CUT VISIBLE PIPES AT EACH END.
3. PLUG EACH END OF PIPE WITH MECHANICAL PLUG.
4. REMOVE APPROXIMATELY 360 LF 10" STEEL PIPE & 360 LF 8" STEEL PIPE FROM LAKE/RIVER BOTTOM. LOWEST ELEVATION OF PIPE IS APPROXIMATELY 1075.
5. WASTEHAUL & DISPOSE OF PIPE
6. CONTRACTORS REMOVAL METHOD SHALL MINIMIZE THE DISTURBANCE OF RIVER BOTTOM AND MINIMIZE THE CREATION OF SILT.

LAKE CHELAN

NOTES:

1. PIPE IS VISIBLE FROM BRIDGE. CONTRACTOR SHALL INSPECT AREA TO DETERMINE AMOUNT OF WORK REQUIRED FOR REMOVAL.
2. LAND ON EITHER SIDE OF RIVER IS OWNED BY CHELAN COUNTY PUD. USE OF THIS LAND IS NOT ALLOWED FOR PIPE REMOVAL.
3. SEE SPECIFICATION SECTION 01900 FOR ADDITIONAL REQUIREMENTS.

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

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DATE: JULY 2014	SCALE: 1"=30'	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: ASC
Checked By: DWC

DAVID VAN CLEVE — STATE OF WASHINGTON — 21578 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 39645 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

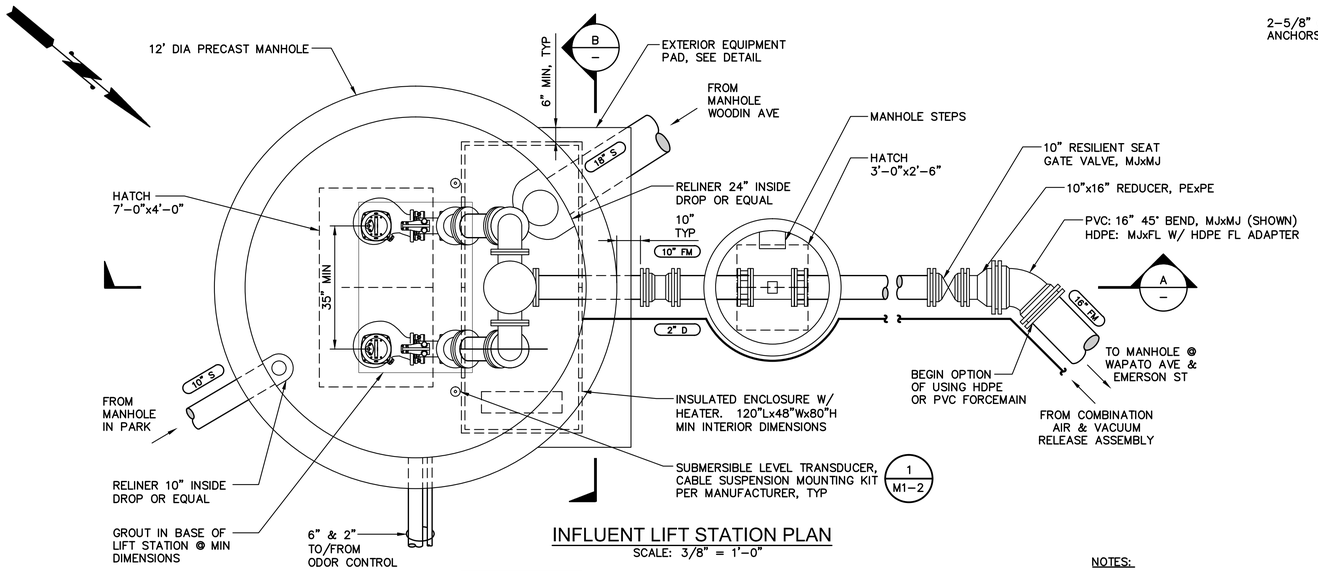
SIPHON DEMOLITION PLAN

RECORD DRAWINGS SHEET: G-18 OF: 18 RECORD DRAWINGS

JOB NO.: 11047

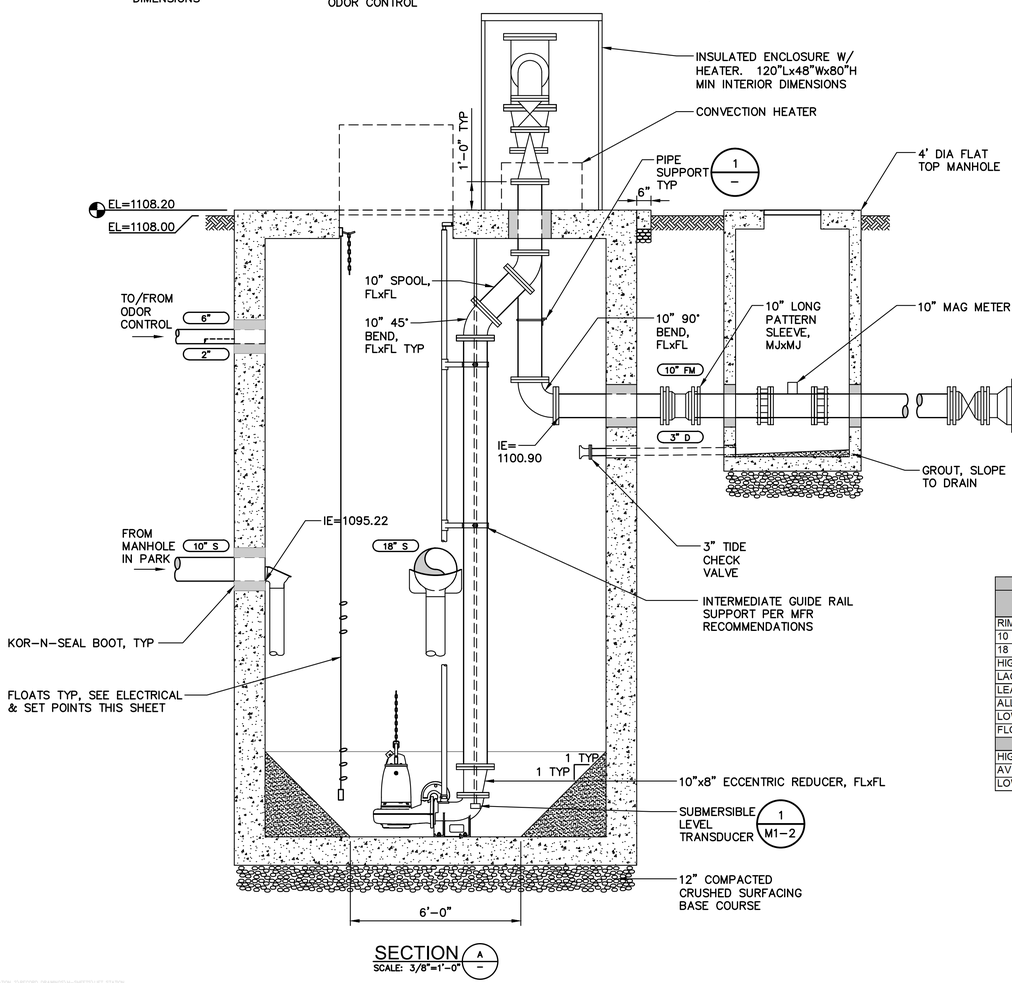
DWG: RIVER PIPE DEMO

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



INFLUENT LIFT STATION PLAN

SCALE: 3/8" = 1'-0"



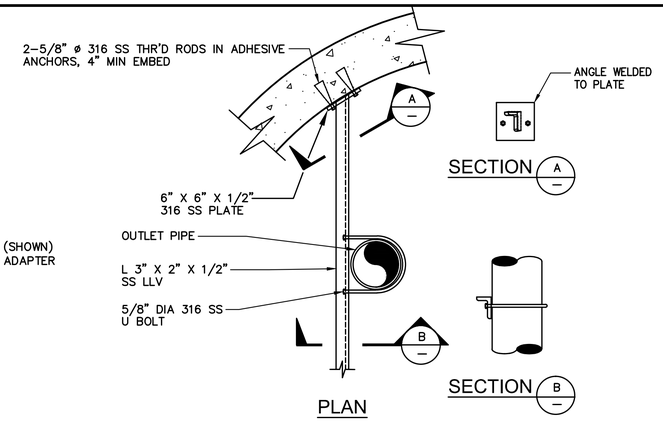
SECTION A

SCALE: 3/8"=1'-0"

NOTES:

1. PIPING IN SECTIONS NOT SHOWN IN TRUE POSITION FOR CLARITY
2. PROVIDE PIPE SUPPORTS FOR ALL PIPING
3. ALL FITTINGS AT LIFT STATION RESTRAINED
4. ALL PIPE AT LIFT STATION SHALL BE DUCTILE IRON
5. ADJUST THE FLOAT SWITCH POSITIONS AT DIRECTION OF ENGINEER

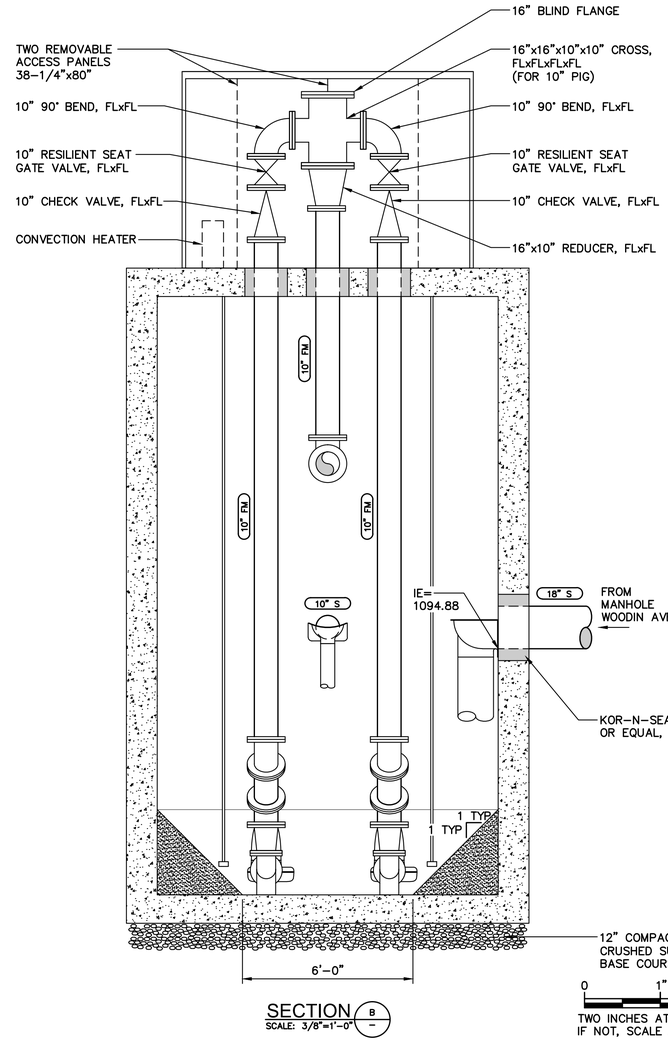
SET POINTS			
ITEM	CONTROL SET POINT	ELEVATION	NOTES
RIM ELEVATION	NO	1,108.08	
10 INCH PIPE INVERT	NO	1,095.22	
18 INCH PIPE INVERT	NO	1,094.88	
HIGH LEVEL ALARM	YES	1,094.38	FLOAT
LAG PUMP ON	YES	1,093.88	FLOAT
LEAD PUMP ON	YES	1,093.38	FLOAT
ALL PUMPS OFF	YES	1,088.72	FLOAT
LOW LEVEL ALARM	YES	1,088.22	
FLOOR OF WET WELL	NO	1,086.22	
LAKE LEVELS			
HIGH WATER LEVEL		1100.00	
AVERAGE ANNUAL WATER LEVEL		1086.00	
LOWEST WATER LEVEL		1079.00	



PIPE SUPPORT DETAIL

NTS

1



SECTION B

SCALE: 3/8"=1'-0"

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

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YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: NOTED	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: AEE
Checked By: DVC

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JEFFREY W. STEVENS — STATE OF WASHINGTON — 22815 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

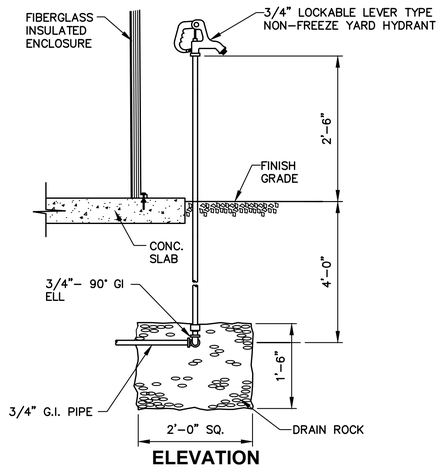
LIFT STATION PLAN & SECTIONS

RECORD DRAWINGS — SHEET: M1-1 — OF: 3 — RECORD DRAWINGS

JOB NO.: 11047

DWG: LIFT STATION

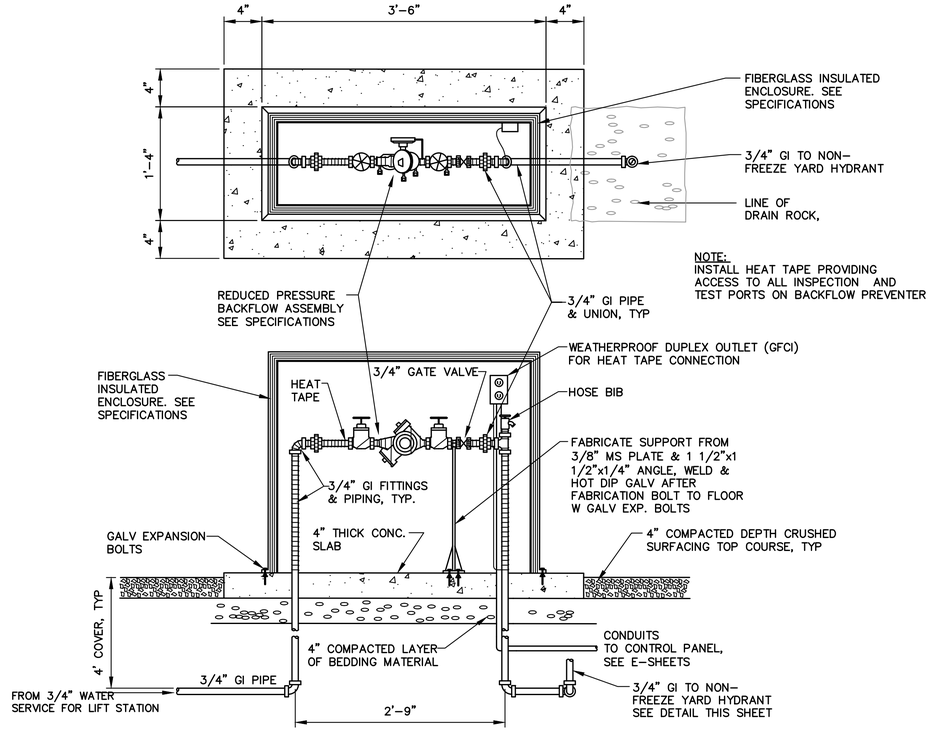
ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



ELEVATION

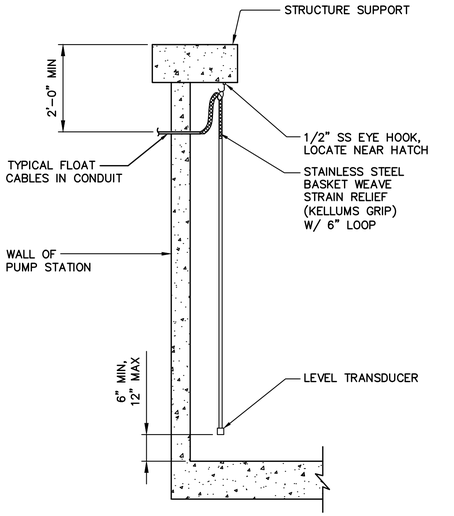
NON-FREEZE YARD HYDRANT DETAIL

NTS



REDUCED PRESSURE BACKFLOW ASSEMBLY INSTALLATION

NTS

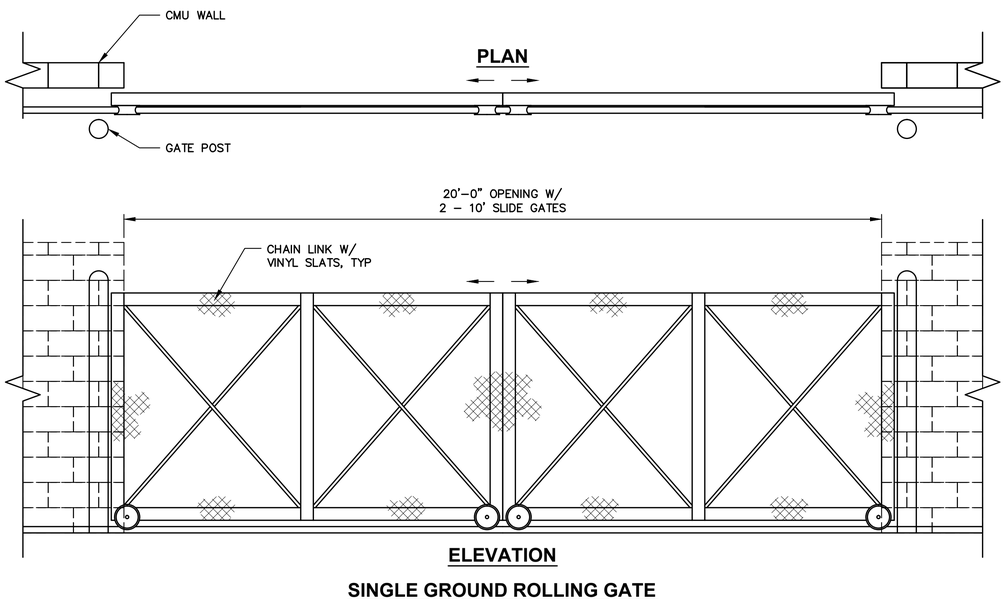


NOTE:

SEE ELECTRICAL SHEETS FOR LOCATION OF SEAL-OFFS IF REQUIRED.

LEVEL TRANSDUCER MOUNTING DETAIL

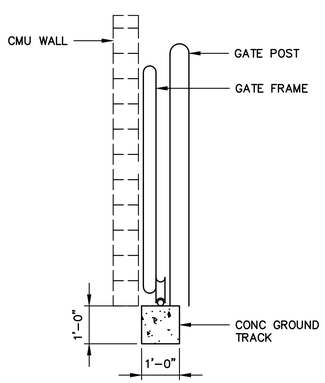
NTS



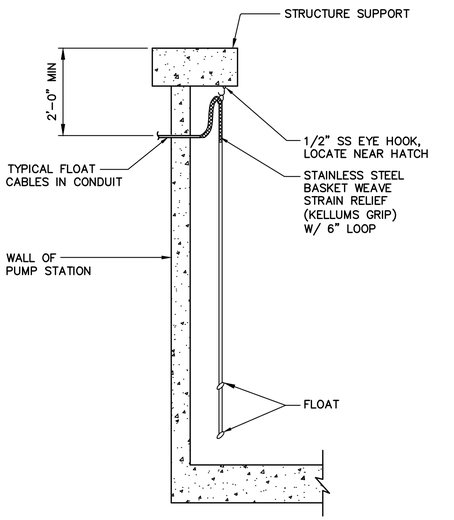
ELEVATION

SINGLE GROUND ROLLING GATE

NTS



SECTION



NOTE:

SEE ELECTRICAL SHEETS FOR LOCATION OF SEAL-OFFS IF REQUIRED.

FLOAT MOUNTING DETAIL

NTS

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE:	JULY 2014
SCALE:	NOTED
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 09/2014
By: AEE
Checked By: DWC

DAVID VAN CLEAVE — STATE OF WASHINGTON — 22015 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 43405 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

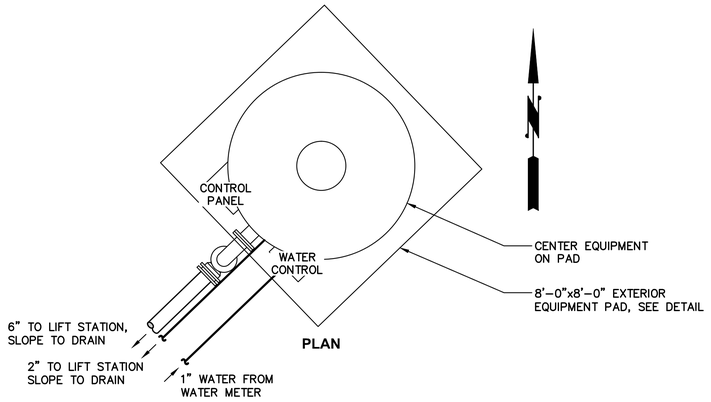
LIFT STATION SITE DETAILS

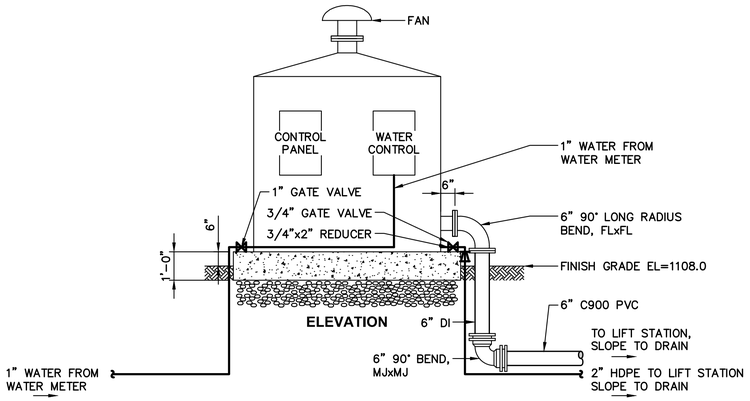
RECORD DRAWINGS SHEET: M1-2 OF: 3 RECORD DRAWINGS

JOB NO.: 11047

DWG: LIFT STATION

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES

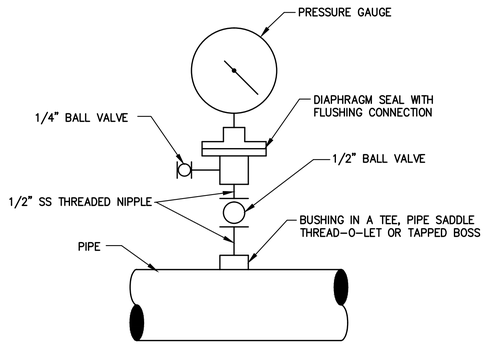




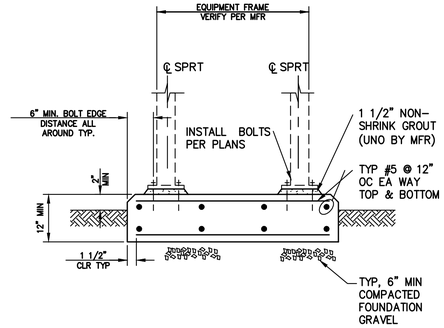
NOTE:

1. PIPING NOT SHOWN IN TRUE POSITION FOR CLARITY.
2. INSULATE & HEAT TAPE WATER AND DRAIN PIPING ABOVE GROUND.
3. ALL PIPING SHALL HAVE 3' COVER MINIMUM.

ODOR CONTROL SYSTEM
SCALE: 3/8"=1'-0"



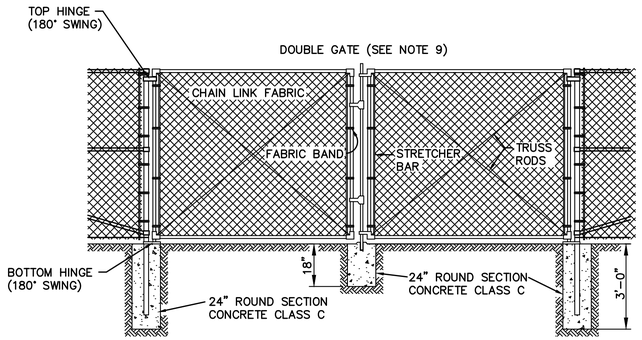
PRESSURE GAUGE (LIQUID SERVICE) DETAIL
NTS



NOTES:

1. CHAMFER ALL EXPOSED CORNERS.
2. EXTEND CONCRETE PAD 3'-0" CLEAR IN FRONT OF ALL ELECTRICAL ENCLOSURE PANELS.
3. FOR DIESEL GENERATOR EXTEND CONCRETE 3'-0" CLEAR ALL AROUND.

EXTERIOR EQUIPMENT PAD DETAIL
NTS



NOTES:

1. CHAIN LINK FENCE AND GATE SHALL BE FURNISHED AND INSTALLED ACCORDING TO SPECIFICATIONS AND SHALL HAVE 3 STRANDS OF BARBED WIRE ON TOP PROJECTIONG OUT ON EXTENSION ARMS AT APPROXIMATELY 45°. CHAIN LINK FENCE SHALL CONFORM TO WSDOT STANDARD PLANS TYPE 1 (LATEST EDITION).
2. CORNER POSTS SHALL BE INSTALLED AT ALL POINTS WHERE THE ALIGNMENT CHANGES 30° OR MORE AND AT ALL OTHER LOCATIONS AS DIRECTED BY THE ENGINEER.
3. GATE AND CORNER POSTS SHALL BE BRACED ACCORDING TO WASHINGTON STATE DEPARTMENT OF TRANSPORTATION STANDARD PLANS FOR CHAIN LINK FENCE TYPE 1.
4. ALL CONCRETE POST BASES SHALL BE CONCRETE CLASS C, 12" MINIMUM DIAMETER.
5. ALL POSTS SHALL BE SPACED AT 10' MINIMUM INTERVALS INLESS OTHERWISE DIRECTED BY ENGINEER.
6. BOTTOM TENSION WIRES SHALL BE PLACED WITHIN THE LIMITS OF THE FIRST FULL FABRIC WEAVE.
7. THE ILLUSTRATIVE DETAILS SHOWN HEREON SHALL NOT BE CONSTRUED AS LIMITING TO HARDWARE DESIGN OR POST SELECTION FOR ANY PARTICULAR FENCE TYPE.
8. THE EXACT ALIGNMENT OF THE FENCE AND THE LOCATION OF THE GATES WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.
9. SLIDING, SINGLE AND MAN GATES SIMILAR.

SWING GATE DETAIL
NTS

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

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DATE:	JULY 2014
SCALE:	NOTED
DRAWN:	ASC
CHECKED:	DVC
APPROVED:	JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014
By: ASC
Checked By: DWC

DAVID VAN CLEVE — STATE OF WASHINGTON — 22482 — REGISTERED PROFESSIONAL ENGINEER

JEFFREY W. STEVENS — STATE OF WASHINGTON — 23405 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY WASHINGTON

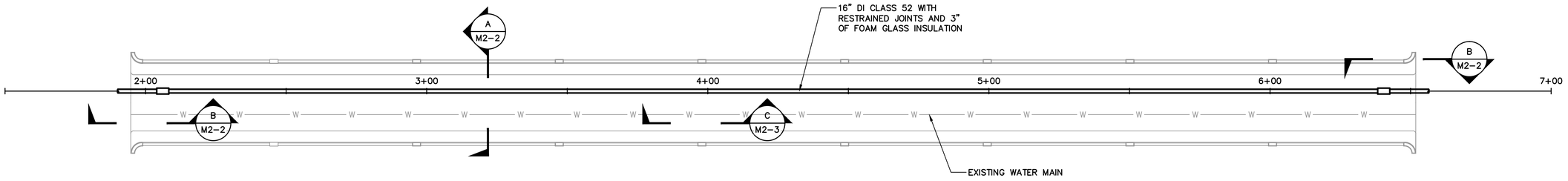
LIFT STATION NO. 2

LIFT STATION SITE DETAILS

RECORD DRAWINGS SHEET: M1-3
OF: 3
RECORD DRAWINGS

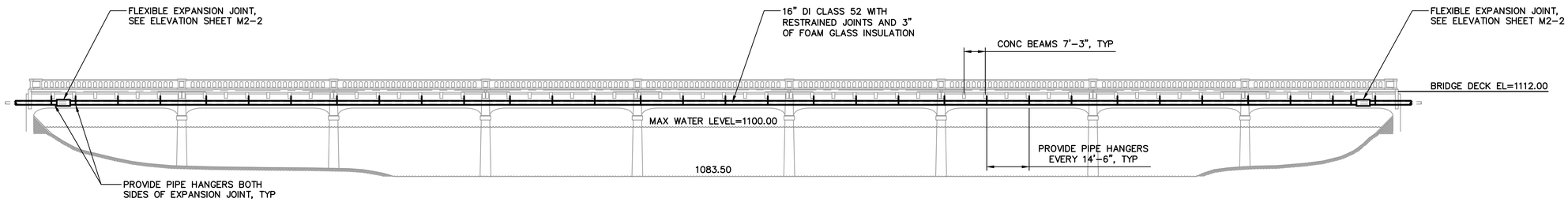
JOB NO.: 11047
DWG: LIFT STATION

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



WOODIN AVE BRIDGE PLAN

SCALE: 1"=20'



WOODIN AVE BRIDGE - ELEVATION

SCALE: 1"=20'

NOTE:

AT LAKE LEVEL 1083.50, A NOTICEABLE CURRENT IS PRESENT UNDER THE BRIDGE.

0 1" 2"

TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

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YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: NOTED	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014 AEE
By: DWC
Checked By:

GLENN M. MALLOBAY — STATE OF WASHINGTON — EXPIRES 9/16 — PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY
WASHINGTON

LIFT STATION NO. 2

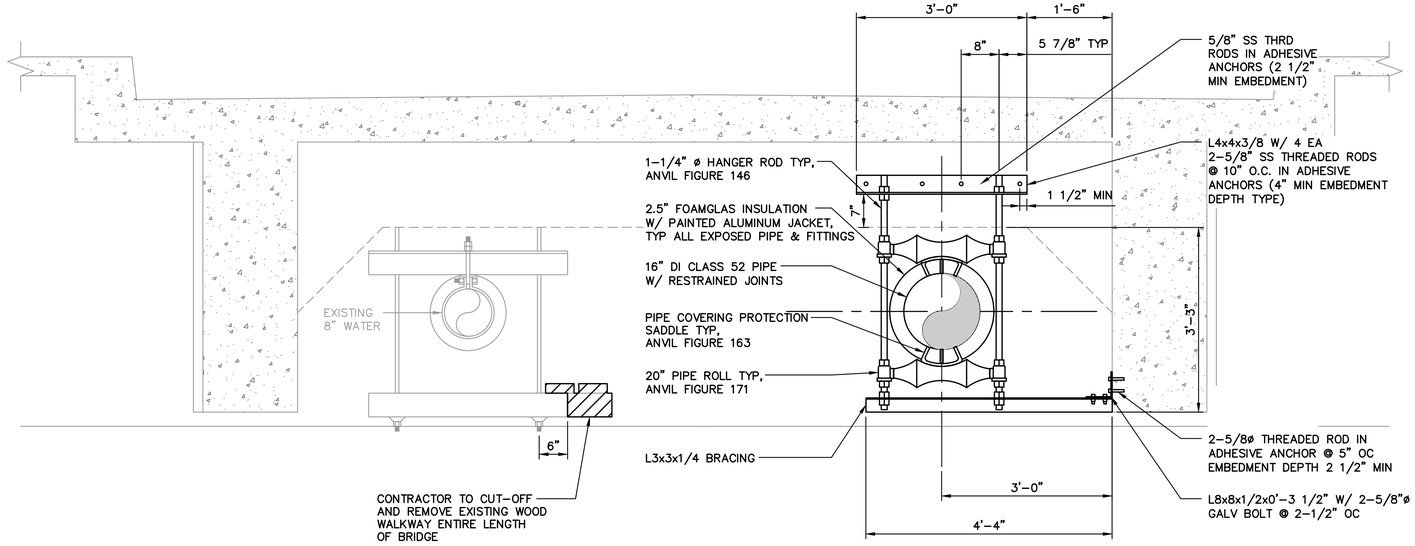
PLAN & ELEVATION - WOODIN AVE (SR 150) BRIDGE

RECORD DRAWINGS SHEET: M2-1 OF: 3 RECORD DRAWINGS

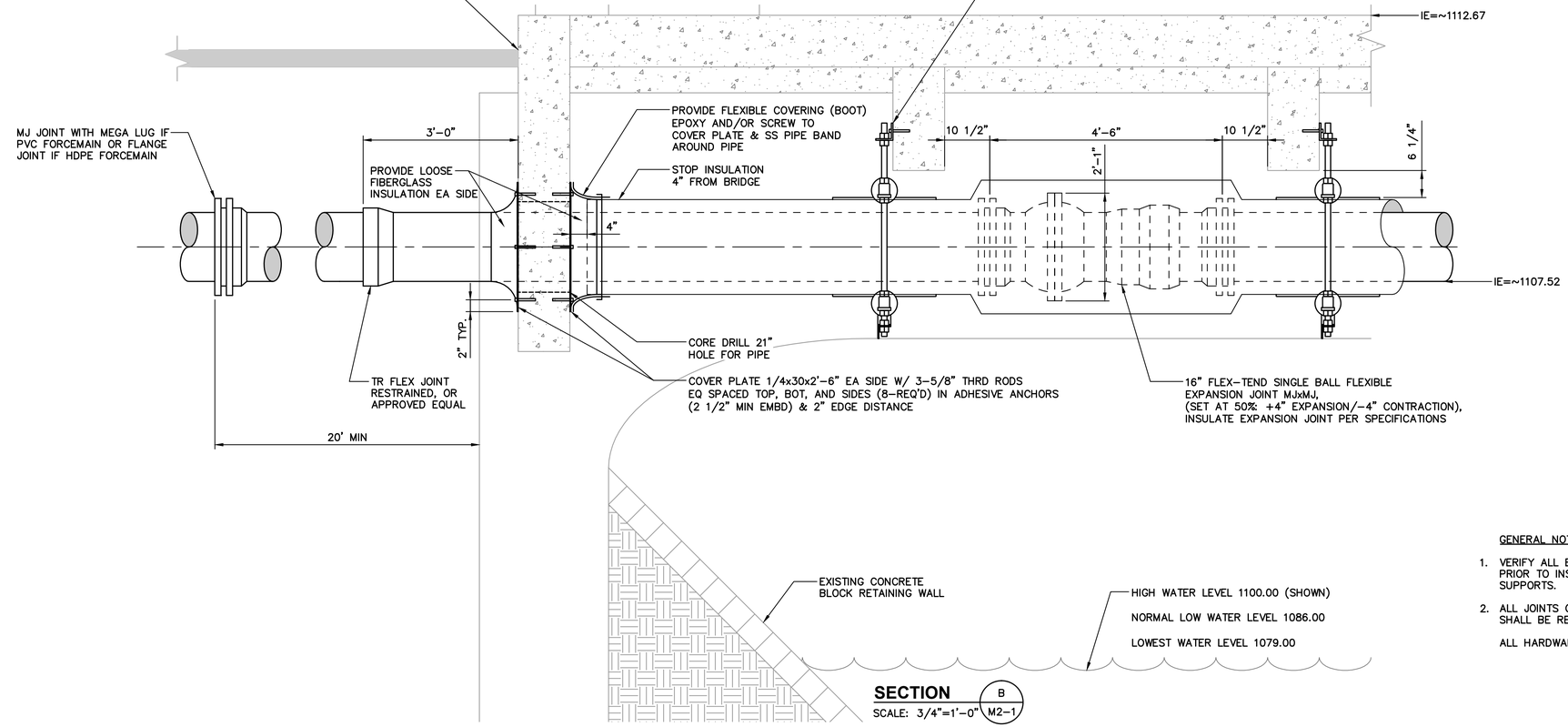
JOB NO.: 11047

DWG: BRIDGE DETAILS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



SECTION (A / M2-1)
SCALE: 3/4"=1'-0"



SECTION (B / M2-1)
SCALE: 3/4"=1'-0"

GENERAL NOTES:

1. VERIFY ALL EXISTING CONDITIONS & DIMENSIONS PRIOR TO INSTALLATION OF BRIDGE CROSSING SUPPORTS.
2. ALL JOINTS ON BRIDGE AND PIPE TRANSITION SHALL BE RESTRAINED.

   ALL HARDWARE HOT DIP GALVANIZED.

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

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DATE: JULY 2014
SCALE: NOTED
DRAWN: ASC
CHECKED: DVC
APPROVED: JWS

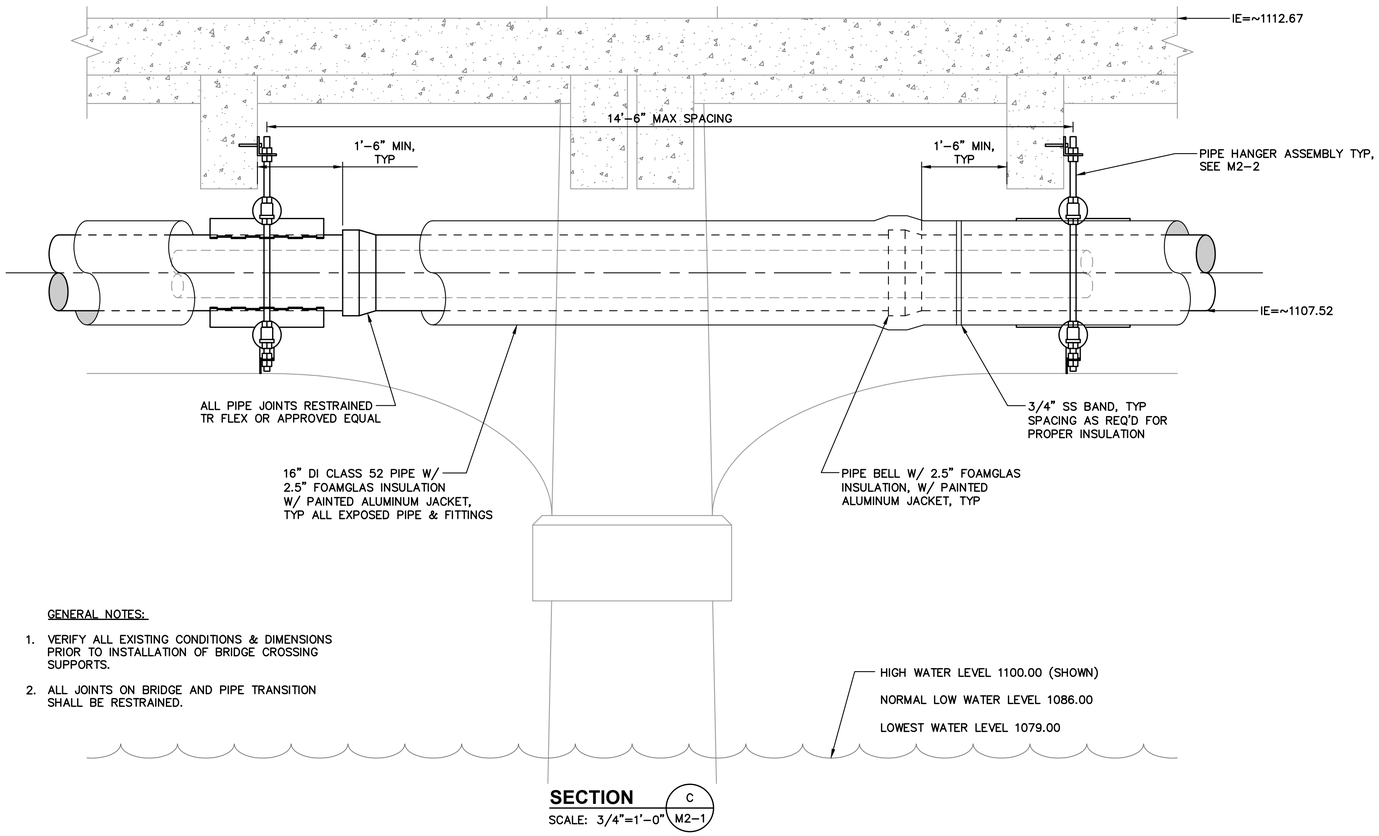
RECORD DRAWING
Based upon best available information obtained during construction.
Date: 05/2014
By: AEE
Checked By: DWC

GLENN M. MALLIBAY — STATE OF WASHINGTON — 19151 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY, WASHINGTON
LIFT STATION NO. 2
BRIDGE BENT SECTIONS & ELEVATIONS

RECORD DRAWINGS SHEET: M2-2 OF: 3 RECORD DRAWINGS
JOB NO.: 11047
DWG: BRIDGE DETAILS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



SECTION C
SCALE: 3/4"=1'-0" M2-1

GENERAL NOTES:

1. VERIFY ALL EXISTING CONDITIONS & DIMENSIONS PRIOR TO INSTALLATION OF BRIDGE CROSSING SUPPORTS.
2. ALL JOINTS ON BRIDGE AND PIPE TRANSITION SHALL BE RESTRAINED.

0 1" 2"
TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014
SCALE: NOTED
DRAWN: ASC
CHECKED: DVC
APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 09/2014
By: ASC
Checked By: DWC

GLENN M. MALLIBAY — STATE OF WASHINGTON — 19152 — REGISTERED PROFESSIONAL ENGINEER

CITY OF CHELAN
CHELAN COUNTY
WASHINGTON

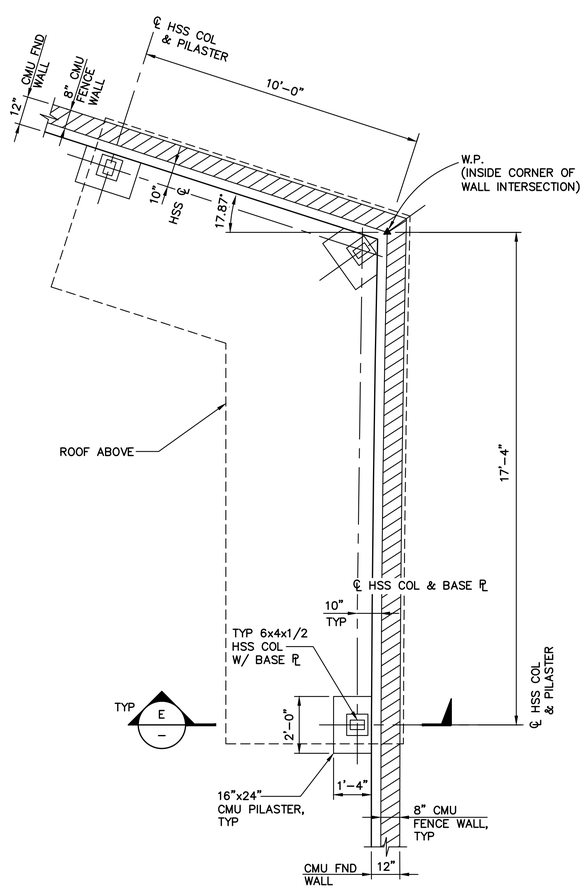
LIFT STATION NO. 2

BRIDGE BENT SECTIONS & ELEVATIONS, MISC DETAILS

RECORD DRAWINGS SHEET: M2-3 OF: 3 RECORD DRAWINGS

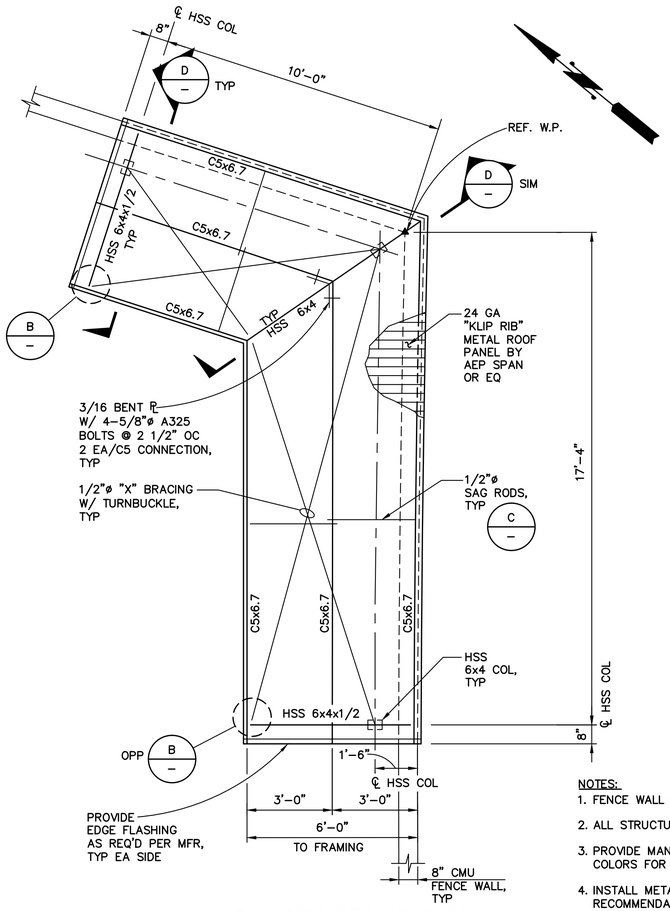
JOB NO.: 11047
DWG: BRIDGE DETAILS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



CANOPY FOUNDATION PLAN

SCALE: 3/8"=1'-0"

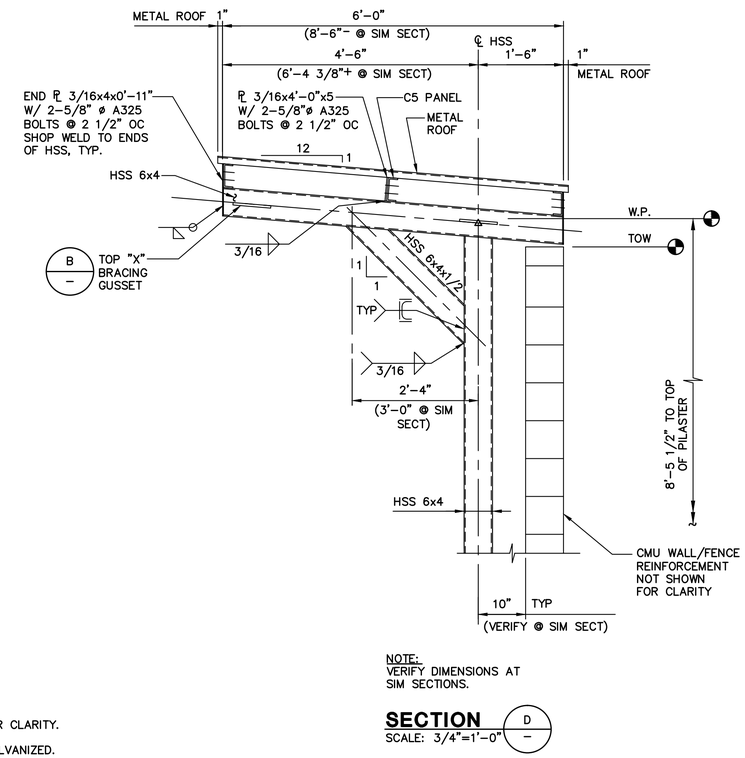


CANOPY FRAMING PLAN

SCALE: 3/8"=1'-0"

NOTES:

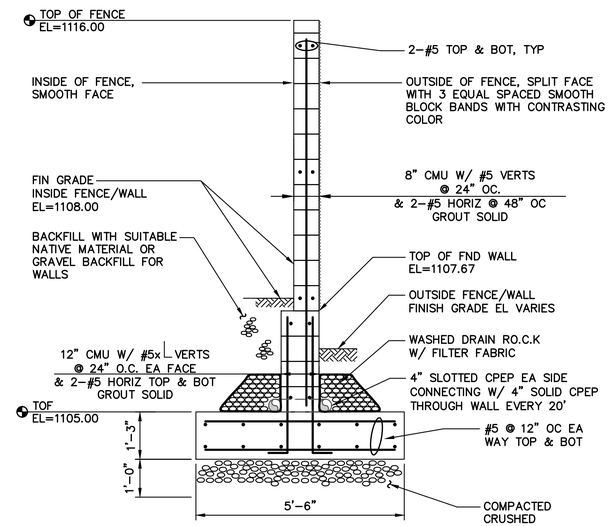
1. FENCE WALL FOOTING NOT SHOWN FOR CLARITY.
2. ALL STRUCTURAL MEMBERS TO BE GALVANIZED.
3. PROVIDE MANUFACTURER'S METAL PANEL STANDARD COLORS FOR COLOR SELECTION BY OWNER.
4. INSTALL METAL ROOF PANEL PER MANUFACTURER'S RECOMMENDATION AND PROVIDE NECESSARY FLASHING AS REQUIRED.



NOTE:
VERIFY DIMENSIONS AT SIM SECTIONS.

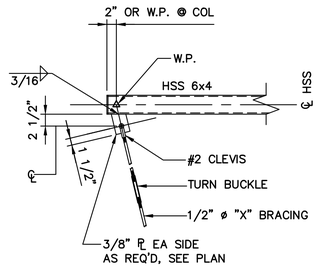
SECTION D

SCALE: 3/4"=1'-0"



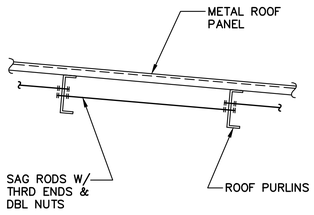
SECTION A

SCALE: 1/2"=1'-0" G-12



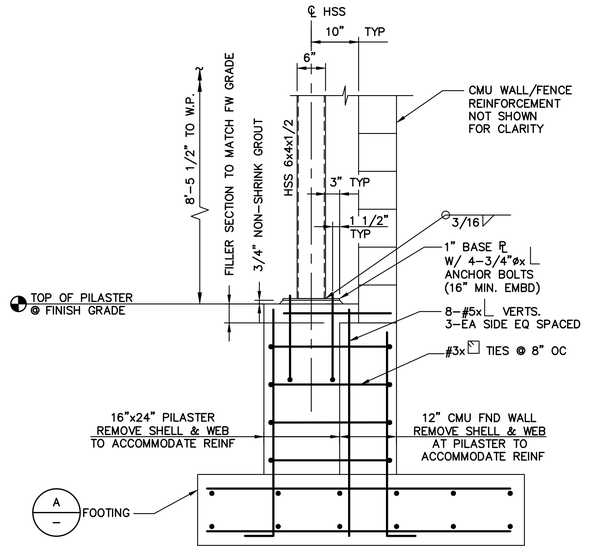
DETAIL B

SCALE: 3/4"=1'-0"



DETAIL C

SCALE: 3/4"=1'-0"



SECTION E

SCALE: 3/4"=1'-0"

0 1" 2"

TWO INCHES AT FULL SCALE. IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	SCALE: 1"=20' (H) 1"=5' (V)	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

RECORD DRAWING
Based upon best available information obtained during construction.
Date: 07/2014
By: AEE
Checked By: DWC

GLENN M. MALLORY — REGISTERED PROFESSIONAL ENGINEER — STATE OF WASHINGTON — 19114

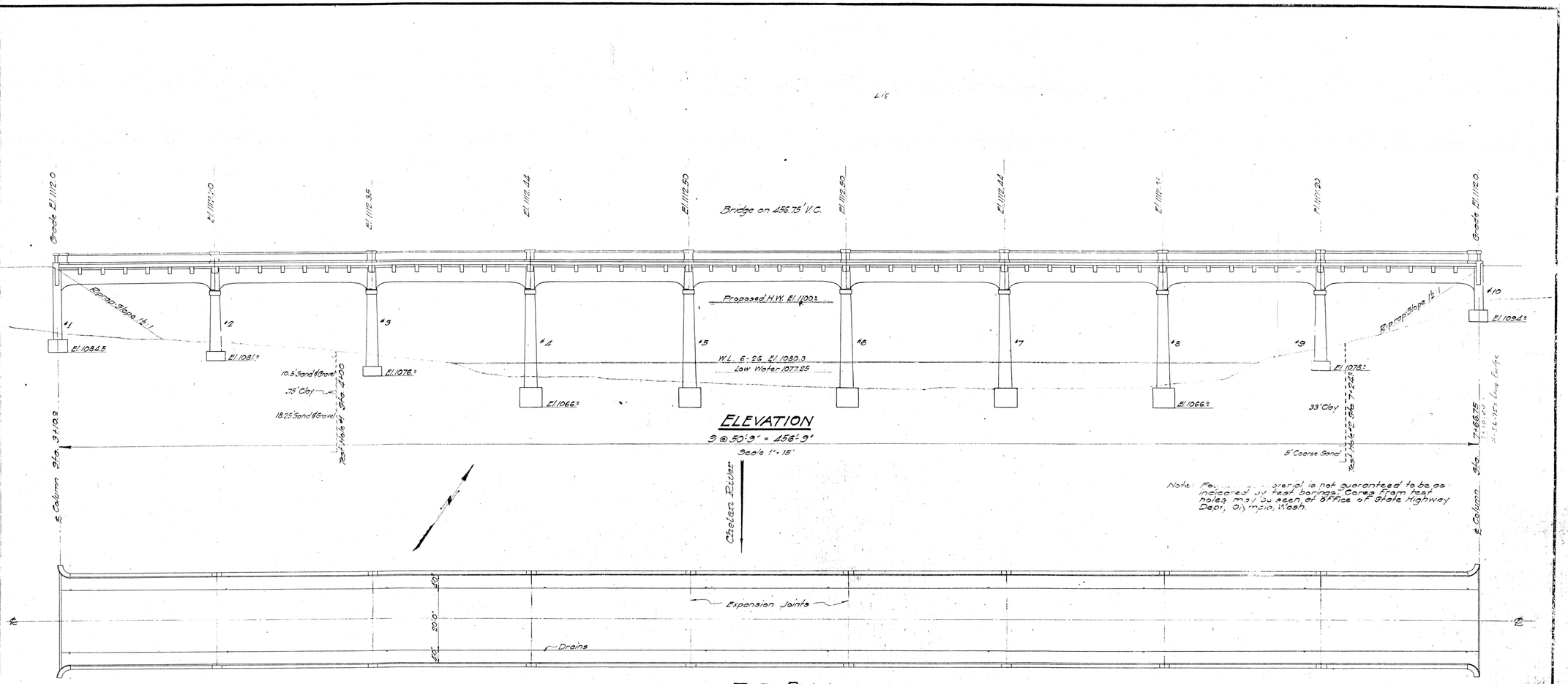
CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2
LIFT STATION STRUCTURAL CANOPY PLAN AND DETAILS

RECORD DRAWINGS — SHEET: S1-1 — OF: 1 — RECORD DRAWINGS

JOB NO.: 11047
DWG: S1_LS CPY P

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



ELEVATION

9 @ 50'-3" = 456'-3"

Scale 1" = 15'

Note: Foundation material is not guaranteed to be as indicated by test borings. Cores from test holes may be seen at Office of State Highway Dept., Olympia, Wash.

TOP PLAN

Scale 1" = 15'

APPROX. QUANTITIES

Structure Excavation	625 Cu. Yds.
Concrete Class "A"	665 Cu. Yds.
Concrete Class "B"	305 Cu. Yds.
Concrete Class "E"	280 Cu. Yds.
Reinforcing Steel	230000 Lbs.
Bronze Expansion Plates	4200 Lbs.

NOTES

Concrete in Rail, Roadway & Sidewalk Slabs, Girders, Cross Beams, Brackets, Bulkheads and Columns above bottom of Fillets to be Class "A" Concrete.
Concrete in Columns, Webs and Footings 1 & 10 to be Class "B" Conc.
Concrete in Footings 2 to 9 incl. to be Class "E" Concrete.
Maximum size of Aggregate to be 3" except in Rail to be 1½".
See Standard Specifications for Finishing.
All exposed corners to be chamfered ¾" except as noted.
All reinforcing bars to be deformed.
In forming hooks on ends of bars use radius equal to or less 3 diameters of bar and extend bar 8 diams. beyond bend.
Bars to be spaced not less than 3 diameters center to center nor less than 2 diams. from center of bar to surface of concrete, with minimum of 1½" except in top of Roadway Slab to be 2½".
Rail to be cast in place after falsework has been released.

APPROVED: _____ State Highway Engineer

APPROVED: _____ Design Engineer

OFFICE OF COUNTY ENGINEER
CHELAN COUNTY
WENATCHEE, WASH.

CONCRETE GIRDER BRIDGE
OVER CHELAN RIVER AT CHELAN, WASH.
SHEET 1 OF 3 SHEETS

APPROVED: _____ CHAIRMAN BOARD OF COUNTY COMMISSIONERS

APPROVED: _____ COUNTY ENGINEER

BRIDGE STRUCTURAL DRAWINGS PROVIDED FOR INFORMATION ONLY

0 1" 2"
TWO INCHES AT FULL SCALE.
IF NOT, SCALE ACCORDINGLY

Gray & Osborne, Inc.
CONSULTING ENGINEERS
107 SOUTH THIRD STREET
YAKIMA, WASHINGTON 98901 • (509) 453-4833

DATE: JULY 2014	
SCALE:	NOTED
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CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

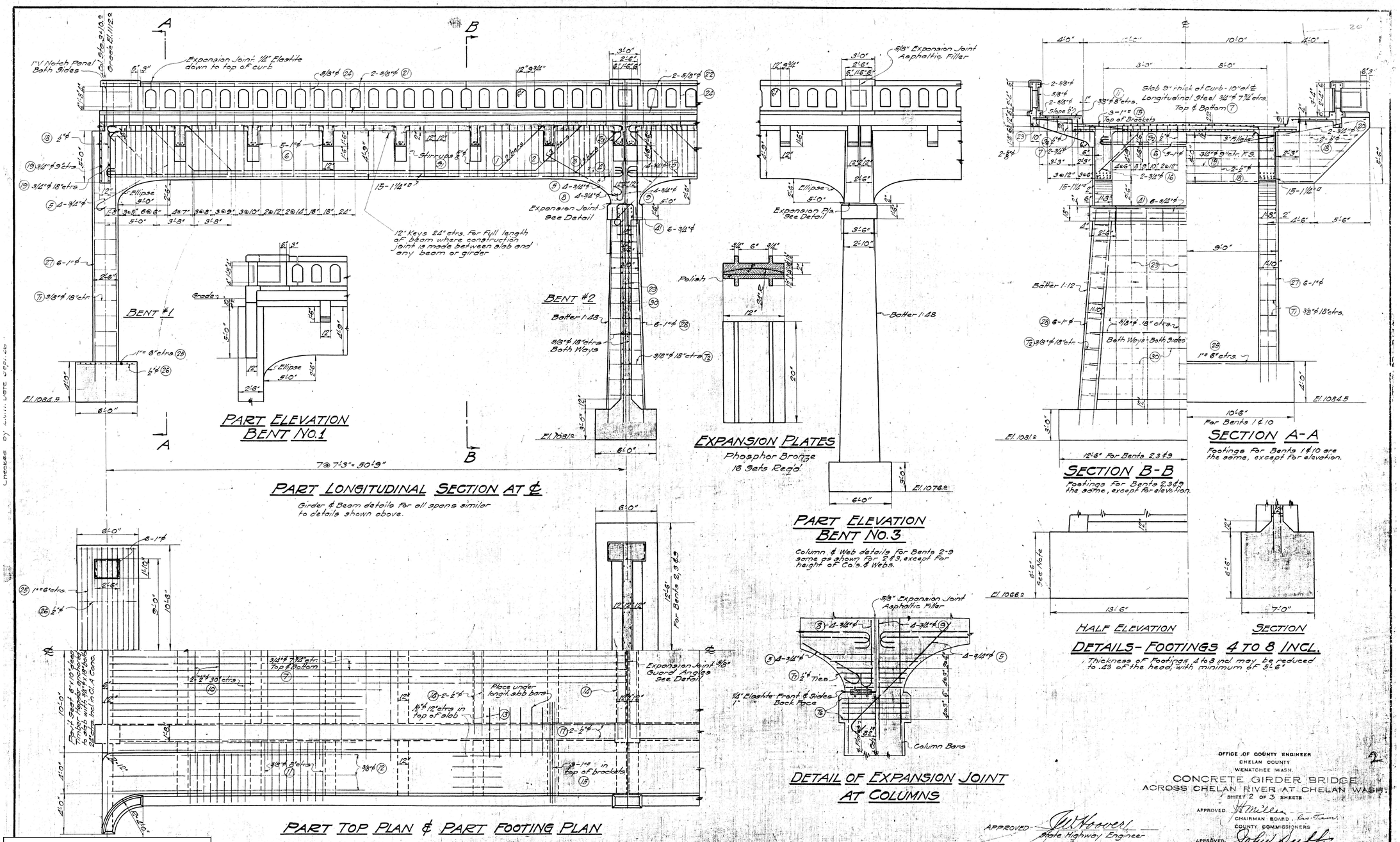
ORIGINAL BRIDGE STRUCTURAL PLAN SHEET 1 OF 3

RECORD DRAWINGS SHEET: S2-1 OF: 3 RECORD DRAWINGS

JOB NO.: 11047

DWG: BRIDGE SCANS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES



BRIDGE STRUCTURAL DRAWINGS PROVIDED FOR INFORMATION ONLY

Checked by Unit Date 7-20-10

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DATE: JULY 2014	SCALE: NOTED	DRAWN: ASC	CHECKED: DVC	APPROVED: JWS

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CITY OF CHELAN
CHELAN COUNTY WASHINGTON

LIFT STATION NO. 2

ORIGINAL BRIDGE STRUCTURAL PLAN SHEET 2 OF 3

RECORD DRAWINGS SHEET: S2-2 OF: 3 RECORD DRAWINGS

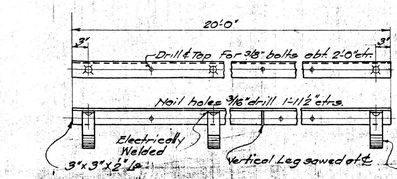
JOB NO.: 11047

DWG: BRIDGE SCANS

ATTACHMENT C - 2014-CHELAN LIFT STATION CC-2 UPGRADES

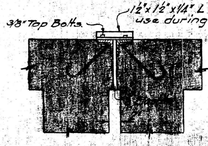
BAR LIST

MARK	LOCATION	NO.	SIZE	LENGTH	BENDING DIAGRAM
(1)	Girders	36	1 1/8"ø	46'-11"	4'-2" 4'-5" 26'-1" 4'-5" 4'-2"
(2)	do	52	1 1/8"ø	56'-5"	3'-8" 4'-5" 33'-5" 4'-5" 3'-8"
(3)	"	52	1 1/8"ø	55'-3"	4'-0" 40'-3" 4'-0"
(4)	"	126	1 1/8"ø	52'-10"	49'-8"
(5)	Girder Fillets	144	3/4"ø	9'-0"	8'-0"
(6)	Cross Beams	350	1"ø	18'-6"	16'-0"
(7)	Slab - Longitudinal	504	3/4"ø	52'-0"	50'-0"
(8)	Column Tops	64	3/4"ø	7'-3"	6'-3"
(9)	" "	128	3/4"ø	9'-6"	Straight
(10)	Slab - Transverse	378	1/2"ø	29'-10"	
(11)	Sidewalk Slab	1134	3/8"ø	4'-10"	
(12)	" "	108	3/8"ø	25'-10"	
(13)	Top of S.W. & Rdy Slab	1188	1/2"ø	5'-0"	
(14)	Cross Beam Hangers	140	1/2"ø	16'-0"	
(15)	Top of Brackets	420	1"ø	10'-0"	
(16)	Cross Beam Fillets	280	3/4"ø	5'-0"	
(17)	Girder-Hangers.	72	1/2"ø	25'-10"	
(18)	Bulkhead - Ver.	28	1/2"ø	4'-9"	
(19)	" Hor.	20	3/4"ø	Shop	
(20)	"	8	3/4"ø	13'-0"	
(21)	Rail & Curb - End Spans	32	5/8"ø	26'-4"	Cut at Exp. Joints in Field
(22)	" " Int. "	112	5/8"ø	25'-10"	" " " " (23) "
(23)	Beam under Rail	72	5/8"ø	26'-10"	25'-10"
(24)	Rail - Vertical	326	5/8"ø	4'-0"	
(25)	Footings 1 & 10	22	1"ø	20'-3"	
(26)	" "	10	5/8"ø	5'-9"	
(27)	Columns Bent #1	12	1"ø	22'-0"	
(28)	" " #2	12	1"ø	21'-6"	
(29)	Web (Ver.) " #2	20	5/8"ø	21'-6"	
(30)	" (Hor.) " #2	24	5/8"ø	Shop	
(31)	Columns Bent #3	12	1"ø	26'-6"	
(32)	Web (Ver.) " "	20	5/8"ø	26'-6"	
(33)	" (Hor.) " "	30	5/8"ø	Shop	
(34)	Columns - Banks 4 to 8	60	1"ø	33'-0"	
(35)	Web (Ver.) " " "	120	5/8"ø	33'-0"	
(36)	" (Hor.) " " "	190	5/8"ø	Shop	
(37)	Columns Bent #9	12	1"ø	22'-0"	
(38)	Web (Ver.) " "	20	5/8"ø	22'-0"	
(39)	" (Hor.) " "	28	5/8"ø	Shop	
(40)	Columns Bent #10	12	1"ø	12'-0"	
(41)	Web Caps Banks 2 to 9	48	3/4"ø	18'-0"	
(51)	Girder Stirrups	1080	5/8"ø	12'-5"	
(52)	'X' Beam Stirrups	972	1/2"ø	3'-5"	
(53)	" " at Columns	288	1/2"ø	5'-5"	
(54)	Sidewalk Brackets	840	1/2"ø	Field	
(71)	Columns Banks 1 & 10	32	3/8"ø	8'-8"	
(72)	" " 2	24	do	Field	
(73)	" " 3	30	"	"	
(74)	" " 4 to 8	200	"	"	
(75)	" " 9	28	"	"	
(76)	Col. Caps " 2 to 9	80	1/2"ø	12'-0"	
(77)	Fillets " 2 to 9	224	1/2"ø	Field	

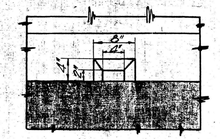


GUARD ANGLES

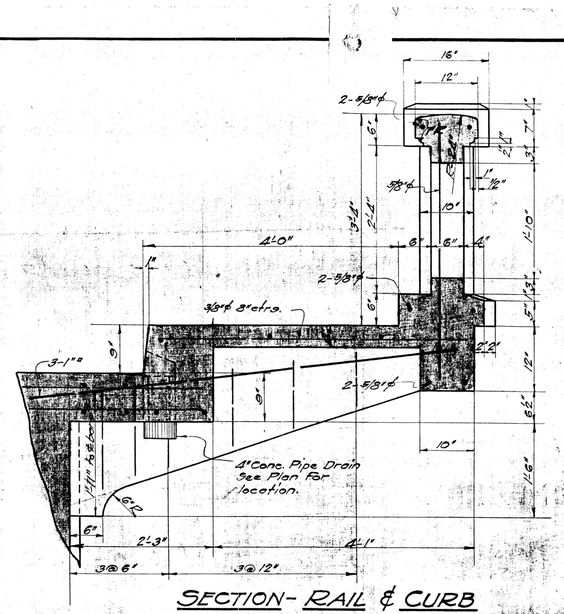
8 Pair Reqd.
To be included in Reinf. Steel



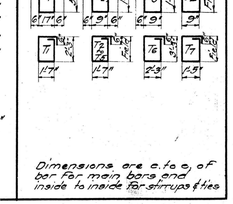
Note: Guard L's to be set as follows:- Angle to be nailed to form of slab first poured. Second L then to be attached to first by means of clip L's and top bolts, until remainder of slab is poured.



DRAIN OPENING



SECTION - RAIL & CURB


S1
S2
S3
S4
6'-11"
6'-9"
6'-9"
9"
11"
11"
11"
11"
6"
6"
11"
11"
11"
11

City of Chelan

2019-048X

CITY COUNCIL July 28, 2026

Subject/Title:	Shea, Carr & Jewell, Inc dba SCJ Alliance Amendment No. 6 to the Professional Services Agreement for the Lakeside Trail Project (Public Works Director Youngren)
Department:	Public Works
Staff Contact:	Jake Youngren
Guiding Principles:	Visionary & Strategic
Initiatives:	Enhance Youth and Family Well-being
Reviewed By:	
Number of Looks:	Look No. 1 of 1

PREVIOUS ACTION TAKEN

OVERVIEW

Shea, Carr & Jewell, Inc dba SCJ Alliance (SCJ Alliance) is under contract with the City to provide professional services for the Lakeside Trail Project. Staff is bringing forward amendment no. 6 to that agreement, which would provide additional construction administration services needed to close out the project. This request is the result of an extended construction schedule and City staff turnover, which led to a re-delegation of administrative responsibilities.

The additional scope of work covers four (4) task areas: Project Management (additional coordination between the City, SCJ Alliance , and the Contractor, Washington State Department of Transportation (WSDOT) progress billing, and schedule and budget management);

Construction Administration (support for additional Change Orders, Requests for Proposals, and Field Directives beyond what was originally estimated, pay estimate development and review, force account work review, apprenticeship goal review, and punch list coordination);

Project Closeout (review of Contractor affidavits, physical completion notification, and coordination with WSDOT and TIB on project acceptance);

Property Owner Coordination (additional coordination with the property owner at 1210

West Woodin Ave regarding driveway modifications, including design exhibits and site meetings).

Working days under the contract were extended by 19 days beyond the original contract to allow for additional punch list work, and construction services have been extended through November 2026. SCJ has noted that no additional construction inspection on site is estimated at this time, nor will it be performed by City staff.

FINANCIAL IMPLICATIONS

This Amendment No. 6 adds $28,597.50 to the contract, bringing the total contract amount to $916,310.93. Adequate funds are available.

ATTACHMENTS

1. Shea, Carr & Jewell, Inc dba SCJ Alliance Amendment No. 6 to the Professional Services Agreement for the Lakeside Trail Project

SUGGESTED MOTION

I move to authorize the Mayor to finalize and execute Shea, Carr & Jewell, Inc dba SCJ Alliance Amendment No. 6 to the Professional Services Agreement for the Lakeside Trail Project.

AMENDMENT NO. 06
TO AGREEMENT FOR PROFESSIONAL SERVICES
BETWEEN

Firm: **Shea, Carr & Jewell, Inc (dba SCJ Alliance)** **("SCJ")**
Address: **8730 Tallon Lane NE, Suite 200, Lacey, WA 98516**
Telephone: **360-352-1465**

and

Client: **City of Chelan** **("Client")**
Address: **P.O. Box 1669, Chelan, WA 98816**
Telephone: **509.682.8032**
Email: **tdenham@cityofchelan.us**

The terms and provisions of the Agreement for Professional Services apply herein unless otherwise specifically revised.

Date: July 13, 2026
Project Name: Chelan Lakeside Trail Project
Project No.: 23-000855

Amendment Description and/or Reason:
Provide additional construction administration services.

Contract Price		**Period of Performance**	
Original Contract:	$ 388,996.51	Original Contract:	N/A
Prior Amendments:	$ 548,716.92	Prior Amendment:	12/31/2026
This Amendment:	$ 28,597.50	This Amendment:	12/31/2026
Total Contract:	$ 916,310.93		

Approved By:

SCJ Alliance

By: _____

Title: Principal

Date: 7/14/2026

City of Chelan

By: _____

Title: _____

Date: _____

Exhibit A
Scope of Work
Chelan Lakeside Trail Project – Amendment 6
Chelan, WA

Prepared For: Travis Denham, City of Chelan

Prepared By: Caitlin Mehall, SCJ Alliance

Date Prepared: July 07, 2026

Introduction

The following Scope of Work is to amend the Chelan Lakeside Trail contract between SCJ Alliance and the City of Chelan to extend the duration and provide additional construction administration services to close out the project. This request is the result of an extended construction schedule and City staff turnover, which led to a re-delegation of administrative responsibilities.

Phase 13 Construction Management (SCJ)

Task 1 Project Management

1) Additional construction coordination between City, SCJ, and Contractor
2) WSDOT Progress Billing (3)
3) Schedule and budget management (January-November 2026)

Task 4 Construction Administration

1) Support for additional Change Orders (CO), Request for Proposals (RFP), and Field Directives than originally estimated. This includes completing Change Order processes that are currently in place to be completed.
2) Pay Estimate development and review (3)
3) Force Account work review and fee calculation
4) Review Apprenticeship goals and payment
5) Punch list coordination.

Task 6 Project Closeout

1) Review project affidavits as completed by the Contractor.
2) Physical completion notification.
3) Coordinate with WSDOT and TIB on project acceptance.

Task 7 Property Owner Coordination

1) Additional coordination with the property owner at 1210 W Woodin Ave on driveway modifications.
2) Additional owner-requested design exhibits to modify private driveway.
3) Additional site meeting with Property Owner (estimate 2).
4) Additional ongoing coordination with the Contractor (8 hrs) for changes to the driveway entrance.

Phase 13 Understanding

- Working days were extended by 19 days beyond the original contract, with additional time for punch list work.
- Construction services have been extended through November 2026.
- We assume the Contractor is prepared to provide the necessary documents promptly when requested for project closeout.
- No additional construction inspection on-site is estimated at this time or will be performed by City staff.

Subconsultant Fee Determination Summary

SCJ Alliance

Client: City of Chelan
Project: US-97A Lakeside Trail
Job #: 23-000855
File Name: Amendment 6- Labor Est.xlsm

Template Version: 6/19/2026
Contract Type: Billing Rate Schedule

Consultant Fee Determination

DIRECT SALARY COST

Classification	Hours	Fully Burdened Rate	Amount
Principal	2.0	$285.00	$570.00
PM1 Project Manager	134.0	$195.00	$26,130.00
Project Accountant	12.0	$140.00	$1,680.00

TOTAL SALARY COST

Total Salary Cost **$28,380.00**

SUBCONSULTANTS

Subconsultant Fee Subtotal:	$0	**$0.00**
Subconsultant Markup:	0%	**$0.00**

REIMBURSABLE EXPENSES

Copies, Printing, etc.	0.0%	of the Total Salary Costs			$0.00
Mileage	300	miles at	$0.725	per mile	$217.50
Expenses Subtotal:					**$217.50**
Expenses Markup:	0%				**$0.00**

SUBTOTAL (SALARY, SUBCONSULTANTS AND EXPENSES)

Subtotal (Salary, Subconsultants and Expenses) **$28,597.50**

MANAGEMENT RESERVE FUND (MRF)

Management Reserve: $0 **$0.00**

Total Estimated Budget: **$28,597.50**

Subconsultant Labor Hour Estimate

SCJ Alliance

Client: City of Chelan **Template Version:** 6/19/2026

Project: US-97A Lakeside Trail **Billing Rate Schedule**

Job #: 23-000855

File Name: Amendment 6- Labor Est.xlsm

Phase & Task No.	Phase & Task Title	Dan Ireland Principal	Caitlin Mehall PM1 Project Manager	Aaron Lang Project Accountant	Total Direct Labor Hours & Cost	Total Cost
PH 13	**CONSTRUCTION MANAGEMENT**					
Task 1	**Project Management**					$ 9,660.00
1	Construction coordination		12.0		12.0	$ 2,340.00
2	WSDOT Progress Billing		10.0		10.0	$ 1,950.00
3	Schedule and budget management	2.0	16.0	12.0	30.0	$ 5,370.00
4					0.0	$ -
5					0.0	$ -
	Subtotal Hours:	2.0	38.0	12.0	52.0	$ 9,660.00
Task 4	**Construction Administration**					$ 12,870.00
1	Change Orders		8.0		8.0	$ 1,560.00
2	RFPs		12.0		12.0	$ 2,340.00
3	Field direction		8.0		8.0	$ 1,560.00
4	Pay estimates (3)		16.0		16.0	$ 3,120.00
5	Force account review		16.0		16.0	$ 3,120.00
6	Apprenticeship review		2.0		2.0	$ 390.00
7	Punch list coordination		4.0		4.0	$ 780.00
8					0.0	$ -
9					0.0	$ -
10					0.0	$ -
	Subtotal Hours:	0.0	66.0	0.0	66.0	$ 12,870.00
Task 6	**Project Closeout**					$ 1,170.00
1	Affadavits		1.0		1.0	$ 195.00
2	Physical completion		1.0		1.0	$ 195.00
3	WSDOT/TIB coordination		4.0		4.0	$ 780.00
4					0.0	$ -
5					0.0	$ -
	Subtotal Hours:	0.0	6.0	0.0	6.0	$ 1,170.00
Task 7	**Property Owner Coordination**					$ 4,680.00
1	Coordination with 1210 property owner		4.0		4.0	$ 780.00
2	Design exhibit		8.0		8.0	$ 1,560.00
3	Construction coordination		4.0		4.0	$ 780.00
4	Site visits (2)		8.0		8.0	$ 1,560.00
5					0.0	$ -
	Subtotal Hours:	0.0	24.0	0.0	24.0	$ 4,680.00
	Total Phase Hours:	2.0	134.0	12.0	148.0	148.0
	Total Phase Direct Labor:	$570.00	$26,130.00	$1,680.00	$28,380.00	$ 28,380.00
	Total Hours All Phases	2.0	134.0	12.0	148.0	148.0
	Total Direct Labor Estimate All Phases	$570.00	$26,130.00	$1,680.00	$28,380.00	**$ 28,380.00**

City of Chelan

2026-059

CITY COUNCIL July 28, 2026

Subject/Title:	Washington State Department of Transportation United States Highway 97A Chelan Multimodal Improvements (Public Works Director Youngren)
Department:	Public Works
Staff Contact:	Jake Youngren
Guiding Principles:	Accessible & Welcoming
Initiatives:	Increase Community Engagement
Reviewed By:	City Administrator
Number of Looks:	Look No. 2 of X

PREVIOUS ACTION TAKEN

Ted Snodgrass, Transportation Engineer 2 of Washington State Department of Transportation (WSDOT), presented an overview of the United States Highway 97A Chelan Multimodal Improvements Project to Council during the July 14, 2026 meeting.

OVERVIEW

Staff will provide a continuation of discussion from the last City Council meeting regarding the Washington State Department of Transportation's proposed trail, and will provide details for the meeting.

FINANCIAL IMPLICATIONS

$60,000

ATTACHMENTS

None

SUGGESTED MOTION

None.

City of Chelan

2025-055M

CITY COUNCIL July 28, 2026

Subject/Title:	Second Quarter Financial Report (Finance Director Evans)
Department:	Finance
Staff Contact:	Heidi Evans
Guiding Principles:	Healthy & Sustainable
Initiatives:	Establish a Long-Range Economic Strategy Manage Growth Modernize Resource
Reviewed By:	City Administrator and Finance Director
Number of Looks:	Look No. 1 of 1

PREVIOUS ACTION TAKEN

Council approved Ordinance No. 2025-1645, adopting the 2026 Operating Budget. On March 24, 2026, Council approved Budget Amendment No. One. On April 28, 2026, Council approved Ordinance No. 2026-1655 and was presented with the first-quarter financial update.

OVERVIEW

After a thorough analysis of the second quarter financials and year-to-date figures through June 30, 2026 the City is on track to meet its 2026 adopted budget of revenues, and it is not expected to surpass the budgeted expenditures. Several additional events, staffing issues, and operational challenges have occurred this year and staff have been in communication with Council about departmental challenges. With that being stated, staff are also working diligently to work within the confines of the previously adopted budget despite fiscal constraints and challenges that are unavoidable and/or unforeseen and/or unbudgeted.

Sales tax revenue saw an increase compared to this period last year. However, when we review the lodging tax data and the decline in revenue collection associated in this quarter as compared to the year prior, it further reinforces that sales tax dollars are being supported by construction efforts. Staff will be monitoring sales tax and lodging tax data closely during quarter three when the majority share of the tourist season revenue is realized to determine further, if any, correlation, and to generally review revenue tied to the 2027 tourist season.

All interfund transfers through quarter two have been posted, and the newly adopted 2026 policy is working as designed to stabilize the general fund and reduce the general fund

deficit. The supporting departments are meeting their revenue and expense targets, making the policy a success in its operational design and execution, despite additional administrative oversight. The long-term concerns and likely impacts from this policy are expected to be reduced monies available for capital projects, or at a minimum, a greater need for a planned budget strategy to address capital needs in a thoughtful way as opposed to funding via excess operational revenue.

The City saw its first disbursements from the County from the Tax Incremental Financing (TIF) District. Due to the County's malware attack, many of the county remittances were delayed in the second quarter. Staff will be reviewing the third quarter closely to ensure pre-malware revenue totals have returned.

Utility funds (Water, Sewer, Sanitation) operational and capital have projects that are being funded through a combination of revenues, beginning fund balance, and outside funding. These multi-year projects mean that available fund balance can vary, especially during times when the City is awaiting funds from a reimbursable grant. Sanitation fund expenditures and fund balance continues to be tumultuous situation due to the increased costs associated with the removal of both garbage and recycling debris through the Chelan County Transfer Station. Until such a time when the recycling center is rebuilt, and the proposed scales are installed at the transfer station, a new baseline cannot be established, and that fund remains in a reactionary pattern.

FINANCIAL IMPLICATIONS

None.

ATTACHMENTS

1. Q2 2026 City Financial Report

SUGGESTED MOTION

None.

2026 Q2 Revenue Report

Summary: Based on our seasonality and conservative estimating of key revenue areas, the City is on track at the end of Q2 to meet its revenue goals per the adopted 2026 budget.

Sales Tax - YTD 2026 sales tax revenue totaled $1,030,176, which is an increase of $51,471 when compared to YTD revenue received through 6/30/2025. That is an increase of 5.2%. The City is on track to meet the conservative budget estimates of $2,570,629 given the seasonality of sales tax revenue and early fall collection months remaining.

Revenue	2023 YTD	2024 YTD	2025 YTD	2026 YTD
Sales Tax	$1,156,494	$1,068,867	$978,705	$1,030,176

Lodging Tax – Overall, lodging tax revenue are on track to exceed 2026 budgeted revenues due to budgeting conservatively and timing of the tourist season and receipt of revenue. Staff will be monitoring closely as lodging tax revenues trending more closely to 2024 actuals, which is a decline from 2025 figures. When reviewed at a monthly level, Q1 2026 outperformed Q2 when compared to their 2025 counterparts, indicating efforts such as Winterfest and other Q1 events were successful at bringing "heads-in-beds". However, Q2 decline in lodging tax remittance translates to tourism sales tax revenue and further putting emphasis and reliance on construction sales tax remittance.

Revenue	2026 YTD	2026 BUDGET
Tourism Impact Fund (2%)	$ 153,216	$ 600,000
Destination Development (3%)	$ 232,040	$ 800,000

Real Estate Excise Tax (REET) - REET will need to be reviewed and analyzed at the end of quarter three as revenues are trending downward, however this is due to the unforeseen malware attack that occurred at Chelan County who is the organization responsible for issuing payment to the City. July 2026 revenue showed a strong return, likely showing this will smooth out and return to 2024/2025 levels.

Revenue	2023 YTD	2024 YTD	2025 YTD	2026 YTD
Real Estate Excise Tax	$ 128,617	$165,064	$201,546	$132,825

Community Development Fees – Currently track to meet their 2025 budgeted revenue. Due to the timing of STR license renewals, revenue is usually received in Q1 & Q4, which helps to explain the current variance.

Description	YTD June 2026	Budget
Short Term Rental License	$17,525	$133,500
Building Permits	$107,775	$187,960
Zoning & Subdivision Fees	$17,383	$20,000
Plan Checking Fees	$72,596	$125,992
Hearing Examiner Fees	$125	$3,267
Special Assessment-Tech Fee	$6,452	$18,691
Totals	**$221,856**	**$489,409**

2026 Q2 Revenue Report Continued

Parks – Totals Parks revenue is in alignment with 2025 actuals from a global perspective, which is excellent as there was tremendous growth in revenue last year during this same period as compared to years prior.

The following divisions are seeing increases over last year: RV Park +4.9%; Golf +3.3%; Marina +3.4%. Due to recently developing smoky conditions, staff are attempting to remain hopefully optimistic that this positive trend line will not be adversely impacted, but Q3 should reveal any potential adverse fiscal impacts related to PNW wildfires.

General Parks budgeted revenue is largely based off payments for contractual agreements and parking revenue, of which 2026 actuals are trending close to 2025 actuals. For these reasons, general parks revenue is on track to meet budget.

Putting Course saw a decline (-3.8%) from last year. When realized in dollars, the decline is a negligible amount for the Parks Department as a whole, however when viewed from a departmental sense with thin margins, this department will require further strategy and planning to ensure both operational and capital health for future success.

Parks & Recreation						
Description	**YTD June 2026 *adj**	**Budget**	**% of Budget**	**YTD Actuals as of 6/30/25**	**YTD Actuals as of 6/30/24**	**YTD Actuals as of 6/30/23**
General Parks	$202,893	$623,508	32.54%	$310,558	$132,524	$164,002
RV Park	$631,242	$1,664,662	37.92%	$601,780	$552,737	$470,959
Putting Course	$55,317	$232,000	23.84%	$57,513	$31,504	$30,989
Marina	$94,116	$206,534	45.57%	$91,012	$79,554	$73,424
Golf Course	$994,332	$1,766,100	56.30%	$962,938	$871,570	$800,092
Totals	**$1,977,899**	**$4,492,804**	**44%**	**$2,023,800**	**$1,667,889**	**$1,539,466**

**Adjusted to remove transfers in from fund balance redistribution and lodging tax transfers.*

2026 Q2 Expenditure Report

Summary: Based on our seasonality and conservative estimating of anticipated expenditures, the City is not expected to surpass expenditure estimates that were adopted for the 2026 budget, though Streets Operating and Airport will be thoroughly reviewed in advance of the 2027 budget season due to razor-thin margins expected for this fiscal year. Staff are working diligently to work within the constraints of the budget figures previously adopted by city council despite unavoidable and unforeseen fiscal, staffing, and other operational challenges that have occurred this fiscal year. In areas where it appears that more than half the budget has already been expended is tied transfers-out and timing of large-value contractual agreement payments.

Operating Funds	JUNE YTD 2026	BUDGET	Budget
Fund	**Expense**	**Expense**	**Remaining**
General Fund	$ 4,113,427.33	$ 7,839,130.43	$ 3,725,703.10
PW - Streets Operating	$ 1,322,818.97	$ 2,356,054.56	$ 1,033,235.59
Airport	$ 297,196.25	$ 441,100.00	$ 143,903.75
Parks - Operating	$ 1,628,031.56	$ 2,909,834.65	$ 1,281,803.09
Parks - Golf Operating	$ 1,258,104.09	$ 2,405,427.24	$ 1,147,323.15
Parks - Marina Operating	$ 69,031.19	$ 203,466.84	$ 134,435.65
Parks - RV Operating	$ 542,130.42	$ 1,608,129.27	$ 1,065,998.85
Parks - Putting Course Operating	$ 135,211.36	$ 303,996.89	$ 168,785.53
PW - Sewer Operating	$ 2,138,790.87	$ 3,658,992.94	$ 1,520,202.07
PW - Water Operating	$ 2,491,450.44	$ 4,500,575.05	$ 2,009,124.61
PW - Sanitation	$ 872,160.23	$ 2,449,599.64	$ 1,577,439.41
PW - Shop	$ 1,170,710.27	$ 1,921,852.95	$ 751,142.68
TOTALS	**$ 16,039,062.98**	**$ 30,598,160.46**	**$14,559,097.48**

Capital Funds	JUNE YTD 2026	BUDGET	Budget
Fund	**Expense**	**Expense**	**Remaining**
General Fund Capital	$ 209,728.35	$ 1,154,365.71	$ 944,637.36
Airport Capital	$ 7,500.00	$ 318,562.40	$ 311,062.40
PW - Streets Capital	$ 793,198.78	$ 4,456,699.09	$ 3,663,500.31
PW - TBD	$ -	$ 900,000.00	$ 900,000.00
Parks - Capital	$ 1,322,721.21	$ 1,907,435.35	$ 584,714.14
Parks - Golf Capital	$ 37,929.99	$ 75,500.00	$ 37,570.01
Parks - Marina Capital	$ 4,540.44	$ 8,035.10	$ 3,494.66
Parks - RV Capital	$ 50,046.73	$ 59,800.00	$ 9,753.27
Parks - Putting Course Capital		$ -	$ -
PW - Water Capital	$ 1,008,043.34	$ 18,056,578.30	$17,048,534.96
PW - Sewer Capital	$ 3,628,450.04	$ 8,374,776.57	$ 4,746,326.53
TOTALS	**$ 7,062,158.88**	**$ 35,311,752.52**	**$28,249,593.64**

City of Chelan

2026 Q2 Expenditure Report Continued

Other Funds	JUNE YTD 2026	BUDGET	Budget
Fund	**Expense**	**Expense**	**Remaining**
Tourism (2%)	$ 3,299,011.24	$ 4,472,996.20	$ 1,173,984.96
Destination Development (3%)	$ 398,968.64	$ 812,500.00	$ 413,531.36
Affordable Housing	$ -	$ -	$ -
Tax Incremental Financing (TIF)	$ -	$ -	$ -
Retainage	$ -	$ -	$ -
Refundable Deposits	$ 96,714.82	$ -	$ (96,714.82)
Debt Service	$ 192,941.73	$ 526,793.00	$ 333,851.27
Water & Sewer Bond	$ 715,667.64	$ 739,110.25	$ 23,442.61
LCSD	$ 125,189.45	$ 362,325.14	$ 237,135.69
External Taxes	$ 98,038.02	$ 381,000.00	$ 282,961.98
TOTALS	**$ 4,926,531.54**	**$ 7,294,724.59**	**$ 2,368,193.05**

June YTD Financial Report

City of Chelan

Operating Funds

Fund	Beginning Balance	JUNE YTD 2026 Revenue	JUNE YTD 2026 Expense	JUNE YTD 2026 Variance	Fund Balance As of 6/30/26	BUDGET Revenue	BUDGET Expense	BUDGET Variance
General Fund	$ 4,278,477.58	$ 2,391,081.52	$ 4,113,427.33	$ (1,722,345.81)	$ 2,556,131.77	$ 5,521,517.79	$ 7,839,130.43	$ (2,317,612.64)
PW - Streets Operating	$ 983,189.72	$ 1,015,017.48	$ 1,322,818.97	$ (307,801.49)	$ 675,388.23	$ 1,845,432.72	$ 2,356,054.56	$ (510,621.84)
Airport	$ 15,493.36	$ 202,892.51	$ 297,196.25	$ (94,303.74)	$ (78,810.38)	$ 441,100.00	$ 441,100.00	$ -
Parks - Operating	$ 1,951,132.69	$ 207,938.62	$ 1,628,031.56	$ (1,420,092.94)	$ 531,039.75	$ 1,415,521.00	$ 2,909,834.65	$ (1,494,313.65)
Parks - Golf Operating	$ -	$ 1,418,821.59	$ 1,258,104.09	$ 160,717.50	$ 160,717.50	$ 2,893,623.78	$ 2,405,427.24	$ 488,196.54
Parks - Marina Operating	$ -	$ 121,839.91	$ 69,031.19	$ 52,808.72	$ 52,808.72	$ 235,996.57	$ 203,466.84	$ 32,529.73
Parks - RV Operating	$ -	$ 843,513.21	$ 542,130.42	$ 301,382.79	$ 301,382.79	$ 1,876,933.62	$ 1,608,129.27	$ 268,804.35
Parks - Putting Course Oper	$ -	$ 91,571.16	$ 135,211.36	$ (43,640.20)	$ (43,640.20)	$ 386,429.17	$ 303,996.89	$ 82,432.28
PW - Sewer Operating	$ 1,500,537.59	$ 1,868,803.15	$ 2,138,790.87	$ (269,987.72)	$ 1,230,549.87	$ 3,552,514.08	$ 3,658,992.94	$ (106,478.86)
PW - Water Operating	$ 1,368,001.68	$ 1,892,113.70	$ 2,491,450.44	$ (599,336.74)	$ 768,664.94	$ 4,233,985.32	$ 4,500,575.05	$ (266,589.73)
PW - Sanitation	$ 1,683,215.40	$ 1,123,508.16	$ 872,160.23	$ 251,347.93	$ 1,934,563.33	$ 2,102,832.98	$ 2,449,599.64	$ (346,766.66)
PW - Shop	$ 2,081,475.46	$ 344,482.30	$ 1,170,710.27	$ (826,227.97)	$ 1,255,247.49	$ 1,648,783.56	$ 1,921,852.95	$ (273,069.39)
TOTALS	**$ 13,861,523.48**	**$ 11,521,583.31**	**$ 16,039,062.98**	**$ (4,517,479.67)**	**$ 9,344,043.81**	**$ 26,154,670.59**	**$ 30,598,160.46**	**$ (4,443,489.87)**

Capital Funds

Fund	Beginning Balance	JUNE YTD 2026 Revenue	JUNE YTD 2026 Expense	JUNE YTD 2026 Variance	Fund Balance As of 6/30/26	BUDGET Revenue	BUDGET Expense	BUDGET Variance
General Fund Capital	$ 2,249,898.23	$ 2,584,957.47	$ 209,728.35	$ 2,375,229.12	$ 4,625,127.35	$ 2,838,691.47	$ 1,154,365.71	$ 1,684,325.76
Airport Capital	$ -	$ -	$ 7,500.00	$ (7,500.00)	$ (7,500.00)	$ 318,562.40	$ 318,562.40	$ -
PW - Streets Capital	$ (121,802.45)	$ 654,782.98	$ 793,198.78	$ (138,415.80)	$ (260,218.25)	$ 7,150,441.89	$ 4,456,699.09	$ 2,693,742.80
PW - TBD	$ 657,500.02	$ 376,148.08	$ -	$ 376,148.08	$ 1,033,648.10	$ 719,219.70	$ 900,000.00	$ (180,780.30)
Parks - Capital	$ 1,579,999.52	$ 400,277.19	$ 1,322,721.21	$ (922,444.02)	$ 657,555.50	$ 438,090.65	$ 1,907,435.35	$ (1,469,344.70)
Parks - Golf Capital	$ -	$ 78,500.00	$ 37,929.99	$ 40,570.01	$ 40,570.01	$ 78,500.00	$ 75,500.00	$ 3,000.00
Parks - Marina Capital	$ -	$ 8,035.10	$ 4,540.44	$ 3,494.66	$ 3,494.66	$ 8,035.10	$ 8,035.10	$ -
Parks - RV Capital	$ -	$ 203,050.00	$ 50,046.73	$ 153,003.27	$ 153,003.27	$ 203,050.82	$ 59,800.00	$ 143,250.82
Parks - Putting Course Capi	$ -	$ -		$ -	$ -	$ -	$ -	$ -
PW - Water Capital	$ 7,289,682.75	$ 1,375,916.28	$ 1,008,043.34	$ 367,872.94	$ 7,657,555.69	$ 12,522,214.00	$ 18,056,578.30	$ (5,534,364.30)
PW - Sewer Capital	$ 4,111,762.24	$ 1,096,411.74	$ 3,628,450.04	$ (2,532,038.30)	$ 1,579,723.94	$ 6,458,462.10	$ 8,374,776.57	$ (1,916,314.47)
TOTALS	**$ 15,767,040.31**	**$ 6,778,078.84**	**$ 7,062,158.88**	**$ (284,080.04)**	**$ 15,482,960.27**	**$ 30,735,268.13**	**$ 35,311,752.52**	**$ (4,576,484.39)**

Other Funds

Fund	Beginning Balance	JUNE YTD 2026 Revenue	JUNE YTD 2026 Expense	JUNE YTD 2026 Variance	Fund Balance As of 6/30/26	BUDGET Revenue	BUDGET Expense	BUDGET Variance
Tourism (2%)	$ 6,323,106.11	$ 367,370.83	$ 3,299,011.24	$ (2,931,640.41)	$ 3,391,465.70	$ 745,000.00	$ 4,472,996.20	$ (3,727,996.20)
Destination Development (	$ -	$ 3,393,593.04	$ 398,968.64	$ 2,994,624.40	$ 2,994,624.40	$ 3,961,553.06	$ 812,500.00	$ 3,149,053.06
Affordable Housing	$ 132,027.76	$ 1,186.96	$ -	$ 1,186.96	$ 133,214.72	$ 13,457.58	$ -	$ 13,457.58
Tax Incremental Financing (	$ -	$ 57,170.82	$ -	$ 57,170.82	$ 57,170.82	$ -	$ -	$ -
Retainage	$ 113,759.07	$ 16,424.73	$ -	$ 16,424.73	$ 130,183.80	$ -	$ -	$ -
Refundable Deposits	$ 867,771.68	$ 9,700.00	$ 96,714.82	$ (87,014.82)	$ 780,756.86	$ -	$ -	$ -
Debt Service	$ 4,640.39	$ 298,045.57	$ 192,941.73	$ 105,103.84	$ 109,744.23	$ 526,794.06	$ 526,793.00	$ 1.06
Water & Sewer Bond	$ 896.02	$ 739,112.37	$ 715,667.64	$ 23,444.73	$ 24,340.75	$ 739,110.37	$ 739,110.25	$ 0.12
LCSD	$ 959,190.18	$ 319,504.90	$ 125,189.45	$ 194,315.45	$ 1,153,505.63	$ 378,341.64	$ 362,325.14	$ 16,016.50
External Taxes	$ 56,750.85	$ 164,682.80	$ 98,038.02	$ 66,644.78	$ 123,395.63	$ 381,000.00	$ 381,000.00	$ -
TOTALS	**$ 8,458,142.06**	**$ 5,366,792.02**	**$ 4,926,531.54**	**$ 440,260.48**	**$ 8,898,402.54**	**$ 6,745,256.71**	**$ 7,294,724.59**	**$ (549,467.88)**

Notes:

1. Airport negative fund balance in operating and capital expected to resolve itself with City transfers in Q3 and additional revenue anticipated from the port.
2. PW Streets Capital negative fund balance will be resolved as that is related to grant revenue in transit to the City from award holders.
3. The Putting Course is expected to receive up to a $118,175.38 transfer-in from lodging tax to subsidize operations. Staff will continue to monitor revenue & expenditures closely to ensure that target is attainable.

City of Chelan

2026-003C

CITY COUNCIL July 28, 2026

Subject/Title:	2026 Comprehensive Plan Update: Chapter 3 Sub-Area Plans & Chapter 4 Housing and ESHB 2266 STEP Housing Code Amendments (Community Development Director Ajax)
Department:	Community Development
Staff Contact:	John Ajax
Guiding Principles:	Visionary & Strategic
Initiatives:	Manage Growth
Reviewed By:	City Administrator
Number of Looks:	Look No. 1 of 1

PREVIOUS ACTION TAKEN

Chapter One (1) and Two (2) were discussed during the June 17, 2026 Planning Commission meeting and presented to City Council during the July 14, 2026 meeting. Chapter Three (3) and Four (4) were discussed during the July 15, 2026 Planning Commission meeting.

OVERVIEW

The Planning Commission held its second public hearing on the 2026 to 2046 Comprehensive Plan update, covering Chapter 3 (Sub-Area Plans) and Chapter 4 (Housing). The hearing was for testimony only; no action was taken. Written comments entered into the record included CRC comments on Chapters 3 and 4, letters supporting a short-term rental (STR) cap, a Campbell's Lodge comment on height limits, and a CRC letter with a 713-signature petition largely concerning short-term rentals. A comment tracking matrix is posted on the City website.

Chapter 3, Sub-Area Plans. This new chapter replaces the 2010 Downtown Master Plan and sets a framework for detailed future planning in four areas: the waterfront corridor (SR 97A western gateway), the parks-to-downtown corridor (SR 150), the downtown-to-Apple Blossom corridor along Woodin Avenue, and Apple Blossom Center East, where a large property owner has expressed interest in an age-in-place retirement community. The detailed plans would come later through separate public processes, roughly one every two years depending on funding.

Chapter 4, Housing. The Points Consulting analysis shows home values up roughly 150% since 2014 while incomes rose about 54%, with median household income more than

$20,000 below the state median. Roughly one in four renters and one in three owners are cost burdened. Consistent with HB 1220, the plan now addresses housing need at all income levels and adds a new anti-displacement goal. Through 2046 the City needs about 151 additional homes, nearly all serving households below 80% of area median income, pointing toward multifamily and affordable housing types.

Public testimony. Four (4) speakers testified: a request to elevate the Northwest architectural theme from the municipal code into the sub-area plans; a proposal to convert the municipal golf course to deed-restricted affordable housing, citing its ongoing operating losses and capital needs; a summary of the Citizens Review Committee's work and its petition supporting an STR cap, with a request that public comments carry meaningful weight; and a comment urging that wildfire risk be considered when siting hillside housing.

Next steps. SEPA review and the 60-day state Commerce review are expected to begin before the end of July. Public hearings on remaining chapters continue monthly, and staff noted interest in one or two joint Planning Commission and City Council sessions on the plan later this year.

FINANCIAL IMPLICATIONS

None.

ATTACHMENTS

1. Planning Commission Presentation July 15, 2026

SUGGESTED MOTION

None.

CITY OF CHELAN

PLANNING COMMISSION PUBLIC HEARING NO. 2: COMMUNITY & HOUSING

Comprehensive Plan Update

2026–2046

A walkthrough of Chapter 3 (Subarea Plans), Chapter 4 (Housing),
and the ESHB 2266 “STEP” housing code amendments — in plain English

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July 15, 2026 • 5:15 PM • Council Chambers, Chelan City Hall

TONIGHT

What we'll cover

1

Where we are in the process

A quick recap of Hearing 1 and the state reviews running in parallel.

2

Chapter 3 — Subarea Plans (proposed new chapter)

Four parts of town that get their own detailed plans — what that means and why.

3

Chapter 4 — Housing

Chelan's housing conditions and needs, and a full walk through the goals & policies.

4

ESHB 2266 “STEP” housing

What the new state housing law requires — and what it doesn't — in plain English.

WHERE WE ARE

Hearing 2 of 5 — and the state reviews ahead

Jun 17	Jul 15	Aug 19	Sep 16	Oct 21
Foundation	Community & Housing	Economy & Climate	Infrastructure & Services	Mobility & Final Comment
✓ Held	TONIGHT			

RUNNING IN PARALLEL

Commerce 60-day state review — the City submits the full draft to the State at the end of this month; the 60-day state-agency comment window runs through late September. Any state-agency comments come back to staff before adoption.

SEPA environmental review — the state-required environmental review also begins at the end of this month: the City publishes its determination, followed by a 14-day public comment period in August. Both reviews conclude well before Council adoption.

What is a subarea plan?

A subarea plan is a zoom-in. The Comprehensive Plan looks at the whole city; a subarea plan looks closely at one part of town — a corridor, a neighborhood, an activity center — and works out land use, streets, utilities, and design at that finer scale. State law (RCW 36.70A.080) allows them as an optional part of a comprehensive plan. Once a subarea plan is adopted, it becomes part of this Plan.

Why a new chapter?

The 2010 Downtown Master Plan did this kind of fine-grained work for the downtown core. Chapter 3 broadens that approach: the still-relevant goals from that plan are carried forward and distributed across four subareas, so coordinated improvements aren't limited to downtown.

What Chapter 3 does — and doesn't — do

Tonight's chapter establishes the framework: which four areas get plans, what each plan will cover, and the timeline. The detailed plans themselves come later (2027–2030), each with its own public process, technical analysis, and environmental review.

Four parts of town, four future plans

Waterfront Corridor

SR 150 & W. Woodin Ave — the western gateway

How the SR 150 entry into town can welcome people better: streetscapes, gateway features, safer walking and biking, and high-quality development that fits Chelan's character.

Parks to Downtown Corridor

Lakeside parks → downtown core

The busiest walking route in town each summer. Better sidewalks and crossings, seasonal parking management, shoreline access, and public art connecting the parks to Woodin Ave.

Downtown to Apple Blossom Corridor

SR 97A through town

Turning the highway spine into a community street: safer facilities for all travel modes, mixed-use infill, and protecting the historic Woodin Avenue core — in coordination with WSDOT.

Apple Blossom East

Willmorth Drive area — east Chelan

A chance to plan a complete, walkable neighborhood from the start: a mix of housing types, neighborhood shops, connected streets, and utilities phased to match buildout.

All four are at the "preliminary" stage — boundaries and maps will be finalized by City GIS staff as each plan is developed.

Every subarea plan answers the same three questions

How do people get around?

Complete streets, safer crossings, sidewalks and bike routes, transit, and — in the lakeside corridor — managing peak-season parking.

Can the pipes keep up?

Water, sewer, and stormwater capacity checked against growth and peak-season demand, with upgrades timed to street projects so pavement is only torn up once.

Do the zoning rules fit the vision?

Each plan reviews zoning and design standards so new development matches what the community wants for that corridor or neighborhood.

The chapter's ten goals, at a glance

SA-1 / SA-2	Waterfront Corridor: a welcoming western gateway; high-quality development that fits Chelan	**SA-6 – SA-8**	Downtown to Apple Blossom: a multi-modal SR 97A; quality mixed-use infill; historic core protected
SA-3 – SA-5	Parks to Downtown: stronger walk/bike links; protected open space & shoreline access; public art	**SA-9 / SA-10**	Apple Blossom East: a complete, walkable neighborhood, compatible with community character

Chelan's housing picture, by the numbers

2,957

housing units in the city — 36% held for seasonal or occasional use

150%

rise in county median home values since 2014 — incomes grew 54%

$72,000

median household income — over $20K below the state median

1 in 4

renters are cost-burdened (25.2%); a third of homeowners are too (33%)

28.8%

of residents are 65 or older — well above state & national averages

410

permitted short-term rentals — over 90% in developments purpose-built for STR use

Source: City of Chelan Housing Element Technical Report (Points Consulting, Nov 2025) — proposed for adoption as Appendix H of this Plan.

What state law asks — and what Chelan needs

THE LAW — HB 1220 (2021)

The Housing Element must:

- Count existing and projected housing needs
- Plan for housing at every income level — from extremely low-income to market-rate
- Show enough zoned land for all housing types, including shelters and supportive housing
- Assess racially disparate impacts and exclusion
- Identify displacement risk and adopt anti-displacement policies

THE NEED — THROUGH 2046

≈ 151 more homes

about 133 inside the city and 18 in the unincorporated UGA

Most of that need is affordable. The majority of needed units serve households earning below 80% of area median income — pointing to multifamily and affordable housing types.

And the land is there. The 2025 Land Capacity Analysis shows every part of the UGA, at every income level, has enough zoned land to meet its share.

The housing plan, in one slide

The vision

A healthy mix of housing types and prices, so the people who work here, grow up here, and retire here can live here — with thriving neighborhoods preserved along the way.

The priority

Grow the stock of homes affordable to households earning 110% of median income or less — while meeting HB 1220 obligations for extremely low, very low, and low-income households.

The City's role

The private market builds the homes; the City clears the path — regulations, incentives, and partnerships with nonprofits like the Chelan Valley Housing Trust and the county Housing Authority.

Already on the books: two ADUs allowed on every lot (HB 1337) • affordable-housing density bonuses • planned development districts that allow micro-units and cottage housing with affordable-housing contributions. Chapter 4 builds on these adopted tools.

Goal H-1: Affordable homes in good condition

The chapter's biggest goal — nine policies focused on residents earning 110% of median income or less.

H-1.1 / 1.2 Promote and keep affordable homes — ownership and well-maintained rentals — for full-time residents

H-1.3 Use incentives so affordable units stay affordable over time

H-1.4 Open the door to lower-cost home types: small lots, ADUs, duplexes, townhouses, multiplexes, manufactured homes, mixed-use housing

H-1.5 Keep ADU rules current so backyard cottages serve long-term rentals

H-1.6 Help nonprofit housing organizations build capacity — through program support, funding, or land

H-1.7 Minimize displacement when low-cost housing is lost — tools like tenant relocation assistance and right-to-return policies

H-1.8 No net loss: affordable homes removed by redevelopment get replaced in kind, in a location that serves the same residents

H-1.9 Encourage both for-profit and nonprofit production of homes affordable to lower-income households

Goals H-2 & H-3: Livable neighborhoods, diverse options

Goal H-2 — Livable neighborhoods

H-2.1 Use neighborhood planning to build locally-supported action plans, neighborhood by neighborhood

H-2.2 Allow neighborhood-specific design standards — including height and size limits where needed to protect views

H-2.3 Where neighborhoods want to keep existing homes, connect owners to rehabilitation programs that help maintain them

Goal H-3 — Diverse housing options

H-3.1 / 3.2 Encourage variety — cottage housing, ADUs, townhouses, zero-lot-line homes — where they fit neighborhood livability

H-3.3 Keep a place for mobile home parks, with standards and resident-support programs that keep them in good condition

H-3.4 Partner on ownership pathways: community land trusts and first-time homebuyer programs

H-3.5 Keep the housing-needs data current — including gaps in shelter, emergency housing, and permanent supportive housing

Goals H-4 & H-5: Special needs; the City's supporting role

Goal H-4 — Adequate special-needs housing

H-4.1 Keep enough appropriately-zoned land for special-needs housing — particularly for Chelan's aging population (nearly 29% of residents are 65+)

H-4.2 Set standards so special-needs housing is well integrated into the community and meets ADA accessibility requirements

Goal H-5 — Private industry builds; the City leads and supports

H-5.1 / 5.2 Regularly review the zoning map — and the size of the UGA — so there's always enough appropriately-zoned land

H-5.3 Staff take an active role: outreach, infill and incentive programs, and regulation updates

H-5.4 / 5.5 Partner with the county Housing Authority and put surplus public land (City, PUD) to work for affordable housing

Goal H-6: Preventing displacement

New with this update, responding to HB 1220 — keeping today's residents housed as the community grows.

H-6.1 Track where displacement risk is highest and respond — preserving existing affordable homes, targeted investment, and tenant protections

H-6.2 Check housing policies for racially disparate impacts, and fix disparities in access, cost burden, and displacement risk

H-6.3 Support the community organizations that provide shelter, transitional housing, and services for neighbors at risk

What the analysis found: displacement risk is lowest in the lakefront northwest and moderate in parts of downtown. And the burden isn't shared evenly — 30.2% of Hispanic renter households are severely cost-burdened, versus 16.5% of White renter households. Goal H-6 exists to close gaps like these.

CODE AMENDMENTS — ESHB 2266 (2026)

“STEP” housing, in plain English

A 2026 state law about four kinds of housing that help people move from crisis to stability. “STEP” is the shorthand:

S — **indoor emergency Shelter**
Overnight indoor shelter — the most immediate safety net

T — **Transitional housing**
Temporary housing with services while residents work toward a permanent home

E — **indoor Emergency housing**
Short-term indoor housing for people or families in crisis

P — **Permanent supportive housing**
Permanent affordable homes paired with voluntary support services

What the law requires

These housing types must be allowed in any zone inside the urban growth area where homes or hotels are already allowed — industrial zones excepted. Chelan's implementing amendments to the zoning code (Title 17) are part of tonight's hearing.

What it doesn't do

It doesn't fund, build, or site any facility — it only says where these homes may locate, the same way the code treats other housing. The City can still apply reasonable health and safety standards, like occupancy and spacing rules.

PROCESS — ADOPTION TARGET: EARLY DECEMBER 2026

Where we go from here

1

Tonight — Jul 15

Hearing 2 of 5: Community & Housing

Ch. 3 Subarea Plans, Ch. 4 Housing, and the ESHB 2266 STEP code amendments

2

Next — Aug 19

Hearing 3: Economy & Climate

Ch. 5 Economic Development and Ch. 10 Climate Change & Resiliency

3

Sep — Oct

Hearings 4–5

Sep 16: Utilities, Capital Facilities & Parks. Oct 21: Transportation, Peterson Place & final omnibus comment

4

Nov — Dec

City Council

Briefing Nov 10, public hearing Nov 24, adoption Dec 8 — early December 2026

Comment any time: at any hearing, in writing to Community Development, or online at cityofchelan.gov/compplan. The Commerce 60-day state review begins at the end of July and runs through late September.

?

Questions & discussion

City of Chelan Comprehensive Plan Update 2026–2046

Public Hearing No. 2 • July 15, 2026 • Council Chambers, Chelan City Hall

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Next hearing: August 19, 2026 — Economic Development & Climate Resiliency

Community Development Department • cityofchelan.gov/compplan • (509) 682-8017

City of Chelan

DRAFT

TENTATIVE ADVANCED AGENDA

For Planning Discussion Purposes Only - this is a work in progress;
items are tentative and subject to change.
July 21, 2026

August 04, 2026 City Council Workshop

1. Short Term Rental Discussion (Ajax)
2. Budget Workshop No. 1 (Evans)
3. Public Works Project Status Update (Youngren)

August 11, 2026 City Council Meeting

1. Consent Agenda
    a. Voucher / Minutes
    b. Resolution No. 2026-14XX Washington State Department of Health Water Use and Efficiency Goals (Youngren)
2. Special Presentations, Proclamations, and Awards
    a. Housing Authority of Chelan County & the City of Wenatchee Presentation (Vicki Carr & President & Sasha Sleiman/ McCardle)
3. Public Hearings
    a.
4. Motion Considerations
    a. Ordinance No. 2026-16XX Title 2 Administration and Personnel (McAloon) (L3-3)
    b. Chelan County Regional Justice Center Interlocal Agreement for Inmate Housing (Regional Justice Center Director Sharp / City Administrator McAloon) (L3-3)
    c. Noble Strategies LLC, dba Tower Consulting Amendment No. 4 to the Master Client Services Agreement for Grant Writing (McAloon) (L1-1)
5. Administrative Reports
    a. Living Stone Church Lease Agreement Extension (McAloon) (L1-2)
    b. Legislative Priorities (/Mayor/McAloon) (L1-3)
6. Informational Items
    a. Tentative Advanced Agenda (McAloon)
    b. Council Committee Reports (Various Councilmembers)
    c. Contract Intake Log (Gallucci)

August 25, 2026 City Council Meeting

1. Consent Agenda
    a. Voucher / Minutes
    b. Living Stone Church Lease Agreement Extension (McAloon) (L1-2)
2. Special Presentations, Proclamations, and Awards
    a. Our Valley Our Future Update Re: Insights from our Community Input Report (McCardle/Rachel Evey)
3. Public Hearings
    a.
4. Motion Considerations
    a. Facility Use Fee Waiver Agreement (Cooper) (L2-2)
5. Administrative Reports

a. Comprehensive Plan Update from the August 19th Planning Commission
Economy & Climate:
Chapter 5 (Economic Development)
Chapter 10 (Climate Change and Resiliency)
b. End of Summer Recap / Lakeside Lodge Parking Discussion (McAloon) (L2-2)
c. Council Guidance on Legislative Priorities (McAloon) (L2-3)

6. Informational Items
a. Tentative Advanced Agenda (McAloon)
b. Council Committee Reports (Various Councilmembers)
c. Contract Intake Log (Gallucci)
d. Lake Chelan Chamber of Commerce Financial Report (Evans)

<u>September 1, 2026 City Council Workshop</u>
1. Budget Workshop No. 2 (Evans)
2. Lake Chelan Chamber of Commerce Quarterly Update (Steele / McAloon) CONFIRMED

<u>September 8, 2026 City Council Meeting</u>
1. Consent Agenda
a. Voucher / Minutes
2. Special Presentations, Proclamations, and Awards
a. Boys & Girls Club of Snohomish County Recap of Summer Program (Chavez/Evans) (TENTATIVE DATE)
3. Public Hearings
a.
4. Motion Considerations
a. Resolution No. 2026-14XX Legislative Priorities (McAloon) (L3-3)
b. Facility Use Fee Waiver Agreement (Cooper) (L1-2)
5. Administrative Reports
a.
6. Informational Items
a. Tentative Advanced Agenda (McAloon)
b. Council Committee Reports (Various Councilmembers)
c. Contract Intake Log (Gallucci)

<u>September 22, City Council Meeting</u>
1. Consent Agenda
a. Voucher / Minutes
2. Special Presentations, Proclamations, and Awards
a. Finance & Account Week Proclamation – September 23 – 27, 2026 (Mayor)
3. Public Hearings
a.
4. Motion Considerations
a.
5. Administrative Reports

a. Comprehensive Plan Update from the September 16th Planning Commission Meeting
Infrastructure & Services:
Chapter 6 (Utilities)
Chapter 7 (Capital Facilities)
Chapter 8 (Parks and Recreation)

6. Informational Items
a. Tentative Advanced Agenda (McAloon)
b. Council Committee Reports (Various Councilmembers)
c. Contract Intake Log (Gallucci)
d. Lake Chelan Chamber of Commerce Financial Report (Evans)

Upcoming Proclamations:
Arbor Day – October 13, 2026 (CONFIRMED)
Breast Cancer Awareness Week – October

Upcoming Topics:
1. Chelan Fire Protection District No. 7 Interlocal Agreement for Fire Protection (McAloon)
2. Public Works Project Status Update
- October (Youngren)
3. Lake Chelan Airport Quarterly Reports (Evans)
– Q3 - October, Q4 – January 27
4. Lake Chelan Chamber of Commerce Quarterly Update (Steele / McAloon)
- Confirmed Scheduled Date: December 1
5. CDRPA / City Joint Meeting (McAloon)
– September 2026
6. Boys & Girls Club of Snohomish County (Evans) (CONFIRMED Months)
- September (Recap of Summer), November (Recap of Fall and into Winter)
7. Comprehensive Plan (CONFIRMED)
- October 27th – AR- Comprehensive Plan Update from the October 21st PC
Mobility & Final Comment:
Chapter 9 (Transportation),
the Peterson Place private comprehensive plan proposal,
omnibus public comment on the full plan
- November 10 – Briefing
- November 24 – Public Hearing
- December 8 – Adoption
8. [Company Name] Bid Award for Library Moisture Mitigation Project (McAloon) (L1-1)
9. Ordinance No. 2026-16XX Title 2 Administration and Personnel (McAloon) (L1-X)
-- Fix November 3 meeting or have motion to hold on 11/3
9. 2027 Budget Schedule (Tentative)

MONTH	DATE	TASK	DESIRED OUTCOME
August	8/4/2026	Council Budget Workshop #1	Staff provides outlooks on 2027 revenue projections & economic indicators. Council provides staff with direction.
September	9/1/2026	Council Budget Workshop #2	Presentation of interfund transfer models proposed for 2027. Council provides staff with direction.
September	9/15/2026-9/30/2026	Mayor, Finance Director & City Administrator Review Draft Budgets	Budgets are reviewed in preparation for presentation to Council. First round of feedback from Mayor given.
October	10/8/2026	Council Budget Workshop #3	Presentation of City Hall Departments & "Other" funds (lodging, housing, etc.) operating to City Council.
October	10/15/2026	Council Budget Workshop #4	Presentation of Parks and Public Works Operating and Enterprise fund budgets to City Council.
October	10/20/2026	Council Budget Workshop #5	Review of operating budgets. Presentation of Personnel scenarios, Rates & Fees, along with 301 General Fund capital requests to City Council.
October	10/27/2026	Preliminary Budget Public Hearing	Required public hearing
November	11/3/2026	Council Budget Workshop #6	Presentation of Capital Budgets
November	11/3/2026	Revenue Public Hearing	Required public hearing for revenue sources for the coming year; includes consideration of possible increase in property tax.
November	11/10/2026	Adoption of Tax Ordinance & Levy Certification	City Council votes to adopt the tax ordinance and levy certification.
November	11/12/2026	Council Budget Workshop #7	Final review of operating, capital, personnel, rates and fees and other funds to City Council for final feedback. Budget
November	11/13/2026	Final Draft Made Public	Final/complete draft of budget made available for public viewing.
November	11/24/2026	Final Budget Public Hearing	Required public hearing
December	12/1/2026	Council Budget Workshop #8	Review projected year-end fund balances.
December	12/8/2026	Adoption of Final Budget	City Council votes to adopt 2027 Budget
December	12/8/2026	Adoption of Rates and Fees	City Council votes to adopt 2027 Rate & Fee Schedule.

Liaison Committee Report

Name of Meeting: *
Cascadia Conservation District July Board Mtg

Date of Meeting: *
2026-07-10

Key Meeting Notes: *

Meeting notes should consist of key agenda items that had significant discussion. Each item can be briefly summarized in 2 - 4 sentences.

Called to order 1:33pm

3 board members present. 2 in person, 1 online

No reports from NRCS or WSCC. - Ryan gave brief unofficial report for each on what they have going on.

Grant applications discussed. More detail on amounts in June minutes.

Rates and charges discussed. Ryan had feedback for board members on his discussions with Chelan Co. Commissioners. Primarily Comm. Overbay

ED Report

Board Comments

Upload applicable meeting documents here if available:

Max upload is 25MB per file

07-10-26 Regular CD Mtg Agenda.pdf	176.88KB
6-11-26 DRAFT Regular CD Mtg Minutes.pdf	180.94KB

Submitted By

Signature *
Shane Collins

Signature Date *
2026-07-13

CASCADIA CONSERVATION DISTRICT
REGULAR DISTRICT MEETING
1350 McKittrick St.
Wenatchee, WA 98801
Friday June 12, 2026
1:30 p.m.

Please Note: Cascadia Conservation District meetings are open to the public; however, ***due to limited seating, meeting attendance may be available by Zoom video or call-in only. Instructions are at the end of the agenda. Please call the District to ask about available seats.***

GENERAL

Public Comment

Consent Agenda:

- June 12, 2026 Regular District Meeting Minutes
- June Treasurer's Report and authorize paying bills.

Correspondence – None

NRCS Report – Scott Scroggie

WSCC Report – Allisa Carlson

Grant Applications, Contracts and Budget Review and Approval

Other Business:

- Rates and Charges Renewal
- Executive Director's report

Board Member Comments & Open Discussion

Meeting Details:

Link: https://zoom.us/j/98769611557	**Dial:** +1 253 215 8782
One tap mobile: +12532158782,,98769611557#	**Meeting ID:** 987 6961 1557

Meeting Details:

Link: https://zoom.us/j/98769611557	**Dial:** +1 253 215 8782
One tap mobile: +12532158782,,98769611557#	**Meeting ID:** 987 6961 1557

CASCADIA CONSERVATION DISTRICT BOARD OF SUPERVISORS
REGULAR BOARD MEETING MINUTES
LOCATION: HYBRID: In-person AND Virtual on Zoom
PLANNED DATE AND TIME: 1:30pm on June 11, 2026
ACTUAL MEETING TIME: 1:36pm – 2:54pm

PRESENT AT BOARD MEETING:

Board Members	**Others**
Junell Wentz, Chair	Ryan Williams – CCD Executive Director
Dillon Miller, Vice-Chair	Cindy Goodell – CCD Staff
Amy Bridges, Member	Elizabeth Jackson – CCD Staff
Lance Brender, Associate Supervisor	Valerie Hampton – CCD Staff
	Ryan Baye – WACD Staff
	Lexi Gardner – NRCS Staff
	Brooke Tacia – FCS Group Staff
	Jack Hamilton FCS Group Staff

Summary of Motions Passed

Dillon Miller moved and Amy Bridges seconded to approve the Consent Agenda. The motion passed unanimously, (3-0).

Amy Bridges moved and Dillon Miller seconded to approve the Landowner Agreements and Cost Share projects in the grants and contracts list. The motion passed unanimously, (3-0).

Landowner Agreements/Cost Share					
Landowner Name	**Project Funding Source**	**Cost Share Rate**	**Amount**	**Activities**	**Action Needed**
Justin Donohue	CCNRD Leavenworth Landscapes	100%	N/A	Fuels Reduction on properties along Merry Canyon	Approve Landowner Agreement
Julie Girard	CCNRD Leavenworth Landscapes	100%	N/A	Fuels Reduction on properties along Merry Canyon	Approve Landowner Agreement
Kelly Carlton	CCNRD Leavenworth Landscapes	100%	N/A	Fuels Reduction on properties along Merry Canyon	Approve Landowner Agreement
Steve Raymond	CCNRD Leavenworth Landscapes	100%	N/A	Fuels Reduction on properties along Merry Canyon	Approve Landowner Agreement
Stephen Barnes	CCNRD Leavenworth Landscapes	100%	N/A	Fuels Reduction on properties along Merry Canyon	Approve Landowner Agreement
Teri Peterson	WSCC RCPP	80%	$3,840	Fuels Reduction	Approve Cost Share Agreement
Robert Haskey	CCNRD-LL	100%	N/A	Fuels Reduction on properties along Merry Canyon	Approve Landowner Agreement

DRAFT

Dillon Miller moved and Amy Bridges seconded to approve NRCS-Cascadia MOU. The motion passed unanimously, (3-0).

Amy Bridges moved and Dillon Miller seconded to approve Ryan appointing a staff committee to nominate and select an awardee, as well as to sponsor up to one table at the dinner at his discretion. The motion passed unanimously, (3-0).

Full Minutes

Junell Wentz, Chair, called the meeting to order at 1:36 P.M.

PUBLIC COMMENT – none

CONSENT AGENDA - The April Regular District Meeting minutes and authorization to pay the bills were presented.

M/S/C Dillon Miller moved and Amy Bridges seconded to approve the Consent Agenda. The motion passed unanimously.

CORRESPONDENCE: None requiring official action.

NATURAL RESOURCES CONSERVATION SERVICE (NRCS) REPORT –Lexi Gardner. NRCS staff are still working on contracting and there are quite a few to obligate in Chelan County. Nationally, NRCS has a new Chief and a new mission statement. They are still working out what changes that might bring to local offices. Signatures are due this month on the new Memorandums of Understanding with Districts. Cascadia's is on today's agenda. New District staff member Robin Buckingham is on track to start Aug 1 to work on NRCS tasks.

CONSERVATION COMMISSION REPORT – Allisa Carlson - not available

Washington Association of Conservation Districts (WACD) – Ryan Baye. To save funds through the end of the fiscal year, Ryan is attending meetings remotely. He will be back in person at a later date. Work is ongoing on a budget decision package. Agencies received a message from the governor to prepare to cut funds that were put in place after 2019. This means about ½ to ¾ of the Conservation Commission program funds are at risk.

STAFF REPORT – none this month

GRANT APPLICATIONS, CONTRACTS, AND BUDGET REVIEW AND APPROVAL (see next page)

DRAFT

Contracts and Grant Applications for Consideration at the June 12th, 2026 Board Meeting					
Grant Applications					
Granting Agency	Title	Amount		Activities	Action Needed
Grant Contracts					
Granting Agency	Contract Title	Duration	Amount	Activities	Action Needed
ILAs/MOUs/MOAs/Contracts					
Agreement Entity	Agreement Purpose	Duration	Financial Commitment	Activities	Action Needed
Landowner Agreements/Cost Share					
Landowner Name	Project Funding Source	Cost Share Rate	Amount	Activities	Action Needed
Justin Donohue	CCNRD-LL	100%	DIP	Fuels Reduction on properties along Merry Canyon	Approve and Sign LOA
Julie Girard	CCNRD-LL	100%	DIP	Fuels Reduction on properties along Merry Canyon	Approve and Sign LOA
Kelly Carlton	CCNRD-LL	100%	DIP	Fuels Reduction on properties along Merry Canyon	Approve and Sign LOA
Steve Raymond	CCNRD-LL	100%	DIP	Fuels Reduction on properties along Merry Canyon	Approve and Sign LOA
Stephen Barnes	CCNRD-LL	100%	DIP	Fuels Reduction on properties along Merry Canyon	Approve and Sign LOA
Teri Peterson	WSCC RCPP	80%	$3,840	Fuels Reduction	Approve and Sign Cost Share
Robert Haskey	CCNRD-LL	100%	DIP	Fuels Reduction on properties along Merry Canyon	Approve and Sign LOA
Landowner Cost Share/Contract Payments					
Landowner Name	Project Funding Source	Cost Share Rate	Amount	Activities Completed	Action Needed

M/S/C Amy Bridges moved and Dillon Miller seconded to approve the Landowner Agreements and Cost Share projects as presented. The motion passed unanimously.

OTHER BUSINESS -

NRCS MOU: The template was provided for review. After the discussion Ryan will edit the document to customize it for Cascadia. Previous agreements included a lot of specific requirements. Districts proposed changes to make them more general. Essentially, the District agrees to assist with and advocate for NRCS programs, chair the Local Working Group, keep NRCS informed of events that affect their work, and collaborate on programs and projects. In turn, NRCS agrees to keep the District informed, attend meetings, provide assistance and technical guidance, and supply annual reporting. Other elements include adherence to technical standards as well as data and privacy access and policies. There is a 30-day notice clause for either party to terminate the agreement. Ryan noted that there is nothing required that is outside what we normally do.

M/S/C Dillon Miller moved and Amy Bridges seconded to approve NRCS-Cascadia MOU. The motion passed unanimously.

Executive Director's Report:

Public Hearing: The date, time and location needs to be set for the public hearing regarding the Rates and Charges proposal. Location options include the rented space at Pybus Public Market by the hour or the meeting room at the fire station on Easy Street. The space is reserved by the date with no specific time limit for its use. Ryan is looking at evening times with a Zoom option for more access for the public during the week of July 20-24. The Pybus space is only available July 24, while the Easy Street space is open any day that week. The Senior Center may also be a possibility. Lexi suggested the Forest Service headquarters training room on Melody Lane as another option. Alternatively, the Board could hold multiple hearings in various locations and can also invite written comment for those who can't attend. The general plan is to hold the meeting, take public comment, discuss the options and select one to put forward to the County. The Board agreed to hold the hearing on Thursday July 23 at 6 pm and directed Ryan to select the location based on their discussion.

RATES AND CHARGES

DRAFT

At 2 pm FCS Group representatives Brooke Tacia and Jack Hamilton joined the meeting via Zoom to present the Rates & Charges rate model they have been preparing. The introduction included an overview of how Cascadia is currently funded, the affected parcels within the county, and an explanation of direct versus indirect benefit. In the modeling process, a budget is developed reflecting all of the District's planned and desired programs, which is then adjusted for expected grant revenue. The remaining overall Rates & Charges budget would be roughly 6 million. In order to recover the full amount, the collected rate would be over $100 per parcel. Since that is not feasible, the process is then to reduce the per parcel amount but maintain the proportional benefit by land use class. At a minimum the proposed rate needs to stay within the legal $25 rate cap.

Three options were presented for consideration, including phased-in rate adjustments such as Year 1 at $6.50/parcel plus $1/yr through year 10 when it would total $15.50/yr. This would supply roughly $50,000 per year growth for program planning. Option 2 was $10/parcel/yr 1 plus $1/yr increase. Option 3 was the full $25/yr to start, and would stay the same except for a potential inflation allowance. Ryan noted there will probably be an increase in the number of parcels over time as well due to development.

In response to a question about whether there would be a different rate for commercial parcels, Brooke indicated that the direct benefit perceived is greater to private landowners than commercial properties, and the direct benefit to agricultural land is more than to residential, but that all land uses get some indirect benefit from the District's programs.

Ryan noted that there would be variable increases in program offerings based on the different rate levels and resulting revenue – for example, more heritage and community garden support, more agricultural cost share, and more local programs like home hardening would be possible at higher rates. The Commissioners may prefer a single increase versus gradual escalation of the rate. The District needs to have a suite of options ready to respond to their input.

One variation that was suggested was starting at $6.50 and increasing by $2/year. This level could probably start with support for education programs, and add stable home hardening and ag cost share as funds became available.

Jack Hamilton left the meeting at 2:30 p.m.

Lance Brender joined the meeting online at 2:35 pm

After additional discussion it was decided that Ryan's assignment is to summarize the selected options and match up possible programs with them.

Community Award Night: A local recreational organization, Wenatchee TREAD, is having an award night in August to highlight outstanding community members. They put out a call to see if other entities want to add an award to the mix. Cascadia could join with them, and it would get some exposure for conservation work with less effort than putting on a separate event. The award could be Cooperator of the Year or a similar recognition. Ryan would gather a staff committee for nominations and selection to meet the July 7 submission deadline. The District could sponsor a table at the dinner for the awardees and District attendees. The cost would be per table, such as $500 for 10 place settings. They would provide all the organization as well as the award itself. The attendees would be in the room with other entities that are not typical to

DRAFT

District events, with the goal to expand Cascadia's recognition in the community. Ryan requested approval to participate in the event.

M/S/C Amy Bridges moved and Dillon Miller seconded to approve Ryan appointing a staff committee to nominate and select an awardee, as well as to sponsor up to one table at the dinner at his discretion. The motion passed unanimously.

Chelan City Council: Ryan indicated that he plans to attend a council meeting in July and give a presentation about the District, probably including information about the Rates & Charges proposal.

Washington Grown: District staff will be filming a new episode in June with a pear grower in Dryden who has received Salmon Safe certification and has a planting project upcoming with the District. It will air next winter.

Our Valley, Our Future: The organization is gearing up for the next five year plan. Ryan is participating on several committees for the effort.

Staff Changes: Valerie Hampton is retiring from the District. Her last meeting is today. Ryan and Cindy will be looking at how best to backfill the workload and support various office needs. The new employee for the NRCS staff position, Robin Buckingham, was able to attend the WADE conference, meet people and make some connections, and is preparing to start in August.

Next Meeting: The next Regular Meeting will be July 10, 2026 at 1:30 pm in the District conference room**.**

The Regular Meeting adjourned at 2:54 p.m.

CHAIR_____

RECORDER_____

DRAFT

Liaison Committee Report

Name of Meeting: *
Parks Board Meeting

Date of Meeting: *
2026-07-16

Key Meeting Notes: *

Meeting notes should consist of key agenda items that had significant discussion. Each item can be briefly summarized in 2 - 4 sentences.

Meeting called to order

public comments:

jet skies at lakeside park was commented on

dogs in park and signs

comment on garbage and bathrooms on 4th of July

parks board discussion agenda with more to decide next meeting

Tribes signs and locations talk about

Upload applicable meeting documents here if available:

Max upload is 25MB per file

image.jpg 3.06MB

Submitted By

Signature *

Brad Chitty

Signature Date *
2026-07-17

July 16, 2026
5:15 PM

CITY OF CHELAN
PARKS AND RECREATION ADVISORY BOARD AGENDA

Parks and Recreation
Administration Building
Meeting Room

1. CALL TO ORDER AND ROLL CALL
2. AGENDA CHANGES
3. CITIZEN COMMENTS
   Items not on the agenda. Time limited per the President.
4. OLD BUSINESS
   A. Athletic Facility Use & Fees Policy
   B. Chelan Gorge Park User Group Engagement Discussion
5. NEW BUSINESS
   A. Parks and Recreation Month Proclamation
6. PARKS AND RECREATION DIRECTOR AND CITY STAFF COMMENTS
7. BOARD COMMENTS
8. ADJOURNMENT

Liaison Committee Report

Name of Meeting: *
Manson Community Council

Date of Meeting: *
2026-07-21

Key Meeting Notes: *

Meeting notes should consist of key agenda items that had significant discussion. Each item can be briefly summarized in 2 - 4 sentences.

Council had guest Commissioner Vice Chair Fred Weiss as a speaker. Presented fire safety and preparedness with focus on community fire safety education. Cascadia Conservation District Conservatory also presented regarding land acquisition work.

Council exploring grant funding in consideration of developing a Master Plan for Manson. Council meeting with Port on July 24th to explore business development ideas and opportunities for Manson Community.

Council working on Incorporation feasibility study, more to come.

Dark skies party at Four Lakes Winery Aug 12 from 8 to 11. Open to anyone

further Manson Community Council information, meeting minutes etc may be found on their Manson Wa Community Council Facebook page.

Upload applicable meeting documents here if available:

Max upload is 25MB per file

Submitted By

Signature *
Agustin Benegas

Signature Date *
2026-07-23

Submission Date	City Point of Contact	Department	Company Name	Project Name, Project Number and Document Name if applicable	Term Start Date	Term End Date	Select a Contract Term:	This Contract Has Been Reviewed and Approved by the City Attorney.	Dollar Value
7/23/2026	Chad Coltman	Admin	Placer.ai	extension of software subscription agreement, will be sent to Mayor via docusign.	2026-09-24	2027-09-23	Extended End Date	No	$17,280.00
7/21/2026	Travis Denham	Public Works	WSDOT	Sanders Street Pedestrian Improvement Project, Change Order No. 1	2026-12-31	2027-01-02	Extended End Date	No	$0.00
7/15/2026	Jake Youngren	Public Works	Lyman Dust Control	Street Capital Annual Preservation	2026-07-01	2026-08-01	Original End Date	Yes	$35,000.00
7/14/2026	Steven Hildebrand	Finance	Paylocity	Signed contract	2026-06-26	2040-12-31	On-Going	Yes	$32,000.00

Lake Chelan Chamber of Commerce

Budget vs. Actual Report - FY2026

BARS	Description	2026 Budget	Reported totals thru June 1st council	June	YTD Total	Balance
				2nd Council		
104-000-000-557-35-41-10	Wages	$242,000	$95,879.41	$17,713.71	$113,593.12	$128,406.88
104-000-000-557-35-41-20	Benefits	$22,000	$10,554.93	$2,329.84	$12,884.77	$9,115.23
104-000-000-557-35-41-30	Supplies & Materials	$6,500	$2,566.70	$141.23	$2,707.93	$3,792.07
104-000-000-557-35-41-40	Advertisement (Marketing)	$398,000	$159,011.60	$14,735.30	$173,746.90	$224,253.10
104-000-000-557-35-41-41	Visitor Center (Building Rent)	$30,500	$8,152.00	$2,038.00	$10,190.00	$20,310.00
104-000-000-557-35-41-42	Legal and Professional Fees	$29,000	$15,659.00	$3,092.50	$18,751.50	$10,248.50
104-000-000-557-35-41-43	Permits	$1,000	$280.00	$102.95	$382.95	$617.05
104-000-000-557-35-41-44	Utilities	$12,000	$3,454.32	$757.15	$4,211.47	$7,788.53
104-000-000-557-35-41-45	Insurance	$9,000	$0.00	$0.00	$0.00	$0.00
		$750,000	**$295,557.96**	**$40,910.68**	**$336,468.64**	**$413,531.36**

2026
Chelan Airport Activity Report
Aviation Fuel Purchased for Resale Summary

Wholesale Fuel Purchased by City of Chelan

Months	100LL # of Gallons Purchased	Total Purchase Price	Jet A # of Gallons Purchased	Total Purchase Price
January	-	$ -	-	$ -
February	-	$ -	-	$ -
March	-	$ -	-	$ -
Qtr 1 Total	**-**	**$ -**	**-**	**$ -**
April	-	$ -	-	$ -
May	-	$ -	-	$ -
June	4,986.00	$ 5.89	-	$ 29,435.94
Qtr 2 Total	**4,986.00**	**$ 5.89**	**-**	**$ 29,435.94**
YTD Totals	**4,986.00**	**$ 5.89**	**-**	**$ 29,435.94**

Aviation Fuel Revenue Summary

Retail Fuel Sales by the City of Chelan

Months	100LL # of Gallons Sold	Total Sales - 100LL	Jet A # of Gallons Sold	Total Sales - Jet A
January	463.90	$ 2,713.55	91.00	$ 523.64
February	167.60	$ 1,006.58	15.00	$ 86.31
March	736.70	$ 4,629.21	377.30	$ 2,281.94
Qtr 1 Total	**1,368.20**	**$ 8,349.34**	**483.30**	**$ 2,891.89**
April	1,343.00	$ 8,518.41	54.40	$ 329.66
May	2,059.40	$ 13,056.58	271.60	$ 1,645.89
June	2,697.80	$ 18,363.45	1,097.90	$ 7,410.20
Qtr 2 Total	**6,100.20**	**$ 39,938.44**	**1,423.90**	**$ 9,385.75**
YTD Totals	**7,468.40**	**$ 48,287.78**	**1,907.20**	**$ 12,277.64**

2026
Chelan Airport Activity Report
Other Airport Fee Revenue Summary

Months	Lease Transfer Fees	Water Sales	Tie-Down Fees	Other
January	$ -	$ 1,080.00	$ 400.00	$ 18,857.97
February	$ -	$ 720.00	$ -	$ 25,497.22
March	$ -	$ 1,080.00	$ -	$ 6,646.33
Qtr 1 Total	**$ -**	**$ 2,880.00**	**$ 400.00**	**$ 51,001.52**
April	$ -	$ 900.00	$ 385.00	$ 35,180.15
May	$ -	$ -	$ 1,115.00	$ 43,896.26
June	$ -	$ -	$ 320.00	$ 29.85
Qtr 2 Total	**$ -**	**$ 900.00**	**$ 1,820.00**	**$ 79,106.26**
YTD Totals	**$ -**	**$ 3,780.00**	**$ 2,220.00**	**$ 130,107.78**

Lease Summary

***No lease changes to report in Q2**

Income & Expense Report (Excludes Capital Projects)

Months	Revenue	Expenses	Net Income	Number of NOTAMS Issued
January	$ 23,575.16	$ 30,397.10	$ (6,821.94)	-
February	$ 27,310.11	$ 18,913.56	$ 8,396.55	2
March	$ 20,856.79	$ 57,873.32	$ (37,016.53)	1
Qtr 1 Total	**$ 71,742.06**	**$ 107,183.98**	**$ (35,441.92)**	**3**
April	$ 45,313.22	$ 64,205.62	$ (18,892.40)	2
May	$ 59,713.73	$ 65,392.00	$ (5,678.27)	-
June	$ 26,123.50	$ 60,414.65	$ (34,291.15)	-
Qtr 2 Total	**$ 131,150.45**	**$ 190,012.27**	**$ (58,861.82)**	**2**
July				
August				
September				
Qtr 3 Total	**$ -**	**$ -**	**$ -**	**-**
October				
November				
December				
Qtr 4 Total	**$ -**	**$ -**	**$ -**	**-**
YTD Totals	**$ 202,892.51**	**$ 297,196.25**	**$ (94,303.74)**	**5**