CITY OF KITTITAS
KITTITAS COUNTY  WASHINGTON

CONTRACT PROVISIONS

for

MAIN STREET LIFT STATION

G&O #17022
JANUARY 2020

Gray & Osborne, Inc.
CONSULTING ENGINEERS
CITY OF KITTITAS
KITTITAS COUNTY
WASHINGTON

CONTRACT PROVISIONS

for

MAIN STREET LIFT STATION

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Gray & Osborne, Inc.
CONSULTING ENGINEERS
CALL FOR BIDS
CITY OF KITTITAS
MAIN STREET LIFT STATION

Sealed Proposals will be received by the undersigned at the City of Kittitas, 207 N. Main, Kittitas, Washington 98934, up to 10:00 a.m.; local time on Thursday, January 23, 2020, for furnishing the necessary labor, materials, equipment, tools, and guarantees thereof to construct Main Street Lift Station.

This Contract provides for the construction of approximately 870 lineal feet of 1.5-inch HDPE sanitary sewer force main, approximately 880 linear feet of 4-inch HPDE sanitary sewer force main, approximately 520 linear feet of 8-inch PVC gravity sanitary sewer main, approximately 130 linear feet of 6-inch PVC sanitary side sewer, and one packaged grinder pump station including electrical, controls, and ballast. The project also includes, but is not limited to, open cut sewer utility installation, manhole installation, connection to an existing manhole, surface restoration, and traffic control and all other work required to complete the project, all in accordance with the attached Contract Plans and Contract Provisions.

The Work shall be substantially complete within 40 working days after the commencement date stated in the Notice to Proceed. All bidding and construction is to be performed in compliance with the Contract Provisions and Contract Plans for this project and any addenda issued thereto that are on file at the office of the City Clerk, City Hall, Kittitas, Washington.

The Proposals will be publicly opened and read aloud shortly after the time and date stated above. Proposals are to be submitted only on the form provided with the Bid Documents. All Proposals must be accompanied by a certified check, postal money order, cashiers check, or Proposal bond payable to the “City of Kittitas” and in an amount of not less than five percent (5%) of the total Proposal amount.

Bid Documents may be examined at the office of the City of Kittitas or the office of the Project Engineer, Gray & Osborne, Inc. Bid Documents for this project are available free-of-charge at the following website: “http://gobids.grayandosborne.com”. Bidders are encouraged to “Register” as a planholder in order to receive automatic email notification of applicable addenda and to be placed on the “Planholder List”. For assistance, please call (509) 453-4833. Contract questions shall be directed only to the office of the Project Engineer.

Financing of the Project has been provided by the Kittitas County Council of Governments (COG). The City of Kittitas expressly reserves the right to reject any or all Proposals and to waive minor irregularities or informalities in any Proposal.

(Signed) DEBBIE LEE
CITY CLERK/TREASURER
CALL FOR BIDS

PART 1. BID DOCUMENTS

BIDDER’S CHECKLIST ................................................................. BC-1 TO BC-2
PROPOSAL .................................................................................. P-1 – P-7
PROPOSAL BOND .......................................................................... PB-1

PART 2. AGREEMENT AND BONDS

AGREEMENT .................................................................................... A-1 – A-11
WASHINGTON PERFORMANCE BOND .................................... PRB-1 – PRB-3
WASHINGTON PAYMENT BOND .................................................. PYB-1 – PYB-3

PART 3. GENERAL CONDITIONS

PART 4. TECHNICAL SPECIFICATIONS

PART 5. WAGE RATES

PART 6. APPENDIX

Appendix A – Supplemental Bidder Responsibility Criteria
Appendix B – Temporary Construction Permits
Appendix C – Boring Logs (For Information Only)
PART 1

BID DOCUMENTS
BIDDER’S CHECKLIST

1. REQUIRED FORMS

The Bidder shall submit the following forms, which must be executed in full and submitted with the Proposal.

a. Proposal (including Statement of Bidder’s Qualifications) (Pages P-1 – P-7)

b. Bid Deposit or Proposal Bond (B-1)

c. Total cost must be shown in both written words and figures.

2. SUPPLEMENTAL BIDDER CRITERIA

The Apparent two lowest bidders shall submit to the Contracting Agency the completed Supplemental Bidder Criteria forms in the Appendix by noon of the second business day following the bid submittal deadline.

3. AGREEMENT FORMS

The following forms (a., b., c. and e. through k.) are to be executed and the following Certificate of Insurance (d.) is to be provided after the Contract is awarded and prior to Notice to Proceed.

a. Agreement (Pages A-1 – A-11)

b. Washington Performance Bond (Pages PRB-1 – PRB-3)

c. Washington Payment Bond (Pages PYB-1 – PYB-3)

d. Certificate of Insurance

- Form to be furnished by Contractors insurance company. Forty-five (45) day cancellation notice by certified mail and hold harmless statement required. A copy of the endorsement naming the City, its officials, employees and Engineer as additional insureds must be attached to the Certificate of Insurance.

e. Indemnity Agreement

f. Declaration for Option for Management of Statutory Retained Percentage

g. Statement of Intent to pay Prevailing Wages

h. Evidence that a City Business License has been obtained (or applied for)

i. Progress Schedule

j. Itemized Schedule of Costs

k. List of Subcontractors
The following forms are to be executed in conjunction with the date of project acceptance:

l. Affidavit of Wages Paid

Submitted by prime Contractor and all subcontractors

m. Release of Liens

n. As-Built Drawings
MAIN STREET LIFT STATION

PROPOSAL

City of Kittitas
207 N. Main Street
Kittitas, Washington  98934

The undersigned has examined the Work site(s), local conditions, the Contract, and all applicable laws and regulations covering the Work. The following unit and lump sum prices are tendered as an offer to perform the Work in accordance with all of the requirements set forth in the Contract and all applicable laws and regulations.

As required by the Contract, a postal money order, certified check, cashier’s check or Proposal bond made payable to the Owner is attached hereto. If this Proposal is accepted and the undersigned fail(s) or refuse(s) to enter into a contract and furnish the required performance bond, labor and material payment bond, special guarantee bonds (if required), required insurance and all other required documentation, the undersigned will forfeit to the Owner an amount equal to five percent of the Proposal amount.

After the date and hour set for submitting the Proposals, no bidder may withdraw its Proposal, unless the Award of the contract is delayed for a period exceeding 60 consecutive calendar days.

The undersigned agrees that in the event it is Awarded the contract for the Work, it shall employ only Contractors and Subcontractors that are duly licensed by the State of Washington and remain so at all times they are in any way involved with the Work.

The undersigned agrees that the Owner reserves the right to reject any or all Proposals and to waive any minor irregularities and informalities in any Proposal.

The undersigned agrees that the Owner reserves the right to Award the Contract to the lowest responsible, responsive bidder whose Proposal is in the best interest of the Owner.
## PROPOSAL - Continued

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unexpected Site Changes</td>
<td>1 CALC</td>
<td>$5,000.00</td>
<td>$5,000.00</td>
</tr>
<tr>
<td>2</td>
<td>Mobilization and Demobilization Control</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>3</td>
<td>Project Temporary Traffic Control</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>4</td>
<td>Locate Existing Utilities</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>5</td>
<td>SPCC Plan</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>6</td>
<td>Dewatering</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>7</td>
<td>Trench Dam</td>
<td>2 EA</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>8</td>
<td>Trench Excavation Safety Systems</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>9</td>
<td>Manhole, 48 In. Diam.</td>
<td>3 EA</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>10</td>
<td>Connect to Existing Manhole</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>11</td>
<td>PVC Sanitary Sewer Pipe, 8 In. Diam.</td>
<td>520 LF</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>12</td>
<td>PVC Side Sewer Pipe, 6 In. Diam.</td>
<td>130 LF</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>13</td>
<td>HDPE Sewer Force Main, 1.5 In. Diam.</td>
<td>870 LF</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>14</td>
<td>HDPE Sewer Force Main, 4 In. Diam.</td>
<td>880 LF</td>
<td>$________</td>
<td>$________</td>
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<tr>
<td>15</td>
<td>Unsuitable Excavation</td>
<td>25 CY</td>
<td>$________</td>
<td>$________</td>
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<tr>
<td>16</td>
<td>Foundation Gravel</td>
<td>25 CY</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>17</td>
<td>Bank Run Gravel for Trench Backfill</td>
<td>2,000 TN</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>18</td>
<td>Crushed Surfacing Top Course</td>
<td>350 TN</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>19</td>
<td>Commercial HMA</td>
<td>200 TN</td>
<td>$________</td>
<td>$________</td>
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<td>20</td>
<td>Grinder Lift Station</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
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<tr>
<td>21</td>
<td>Cement Concrete Traffic Curb and Gutter</td>
<td>50 LF</td>
<td>$________</td>
<td>$________</td>
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<tr>
<td>22</td>
<td>Cement Concrete Sidewalk</td>
<td>15 SY</td>
<td>$________</td>
<td>$________</td>
</tr>
<tr>
<td>23</td>
<td>Electrical, Telemetry, and Instrumentation</td>
<td>1 LS</td>
<td>$________</td>
<td>$________</td>
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**Subtotal:** .................................................................$__________

**Washington State Sales Tax (8.0%):** ...........................................$________

**TOTAL CONSTRUCTION COST:** .........................................$________

(Write the total construction cost amount in words)

**Note:** A bid must be received on all items. If any unit prices or extensions are left blank, they will be entered as $0.00.
STATEMENT OF BIDDER'S QUALIFICATIONS

Name of Firm:  
Address:  
Telephone No.  Fax No.  
Contact Person for this Project:  
E-mail:  

Number of years the Contractor has been engaged in the construction business under the present firm name, as indicated above:

Gross dollar amount of work currently under contract:  
Gross dollar amount of contracts currently not completed:  
General character of work performed by firm:  

List of five major projects of a similar nature which have been completed by the Contractor within the last five years and the gross dollar amount of each project, together with the Owner's name and telephone number, and the Engineer’s name:

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Amount</th>
<th>Owner</th>
<th>Phone</th>
<th>Engineer’s Name</th>
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<tbody>
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</tbody>
</table>
List five major pieces of equipment which are anticipated to be used on this project by the Contractor and note which items are owned by the Contractor and which are to be leased or rented from others:

________________________________________________________________________

________________________________________________________________________

Bank Reference: __________________________________________________________

How many general superintendents or other responsible employees in a supervisory position do you have at this time, and how long have they been with the firm?

________________________________________________________________________

Identify who will be the general superintendent and/or project superintendent on this project. Also, list the number of years each person identified has been with firm.

________________________________________________________________________

Have you changed bonding companies within the last three years? ________________

If so, why? ________________________________________________________________

________________________________________________________________________

Have you ever been a party to a lawsuit or an arbitration proceeding in any way relating to a construction project? ______________________________________________________

Identify the proceeding and parties and describe the claims asserted by all parties. __________

________________________________________________________________________

What was the disposition of the case? __________________________________________

Do you have any outstanding payments due to the Department of Revenue? ____________

If yes, explain. _____________________________________________________________

Bidder agrees that the Owner shall have the right to obtain credit reports.

__________  __________
Yes  No
WORK TO BE COMPLETED BY BIDDER

List the Work and the dollar amount thereof that the Contractor will complete with its forces, if awarded the contract.

<table>
<thead>
<tr>
<th>Work to be Performed</th>
<th>Dollar Amount</th>
</tr>
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<tbody>
<tr>
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</tbody>
</table>

**PROPOSED SUBCONTRACTORS** (Per RCW 39.30.060)

For Proposals exceeding one million dollars, indicate who (either the Contractor submitting this bid or a subcontractor) will be completing the work for each of the three categories listed below. Information shall include their Washington State Department of Licensing Contractor's Registration No. This information shall be provided with the Proposal or within one hour after the published Proposal submittal time in accordance with RCW 39.30.060.

<table>
<thead>
<tr>
<th>Work to be Performed</th>
<th>Subcontractor or Prime (Name and Registration Number)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating, Ventilation and Air Conditioning</td>
<td></td>
</tr>
<tr>
<td>Plumbing</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
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</tbody>
</table>
ADDENDA RECEIVED

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Date Received</th>
<th>Name of Recipient</th>
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</thead>
<tbody>
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</table>

NOTE: Bidder shall acknowledge receipt of all addenda. Bidder is responsible for verifying the actual number of addenda issued prior to submitting a Proposal.

Subject to any extensions of the Contract time granted under the Contract, the undersigned agrees to substantially complete the Work required under this Contract within 40 working days (the Substantial Completion Date) and to physically complete the Work required under this contract within 45 working days (the Physical Completion Date) from when Contract Time begins.

The undersigned has reviewed and fully understands the provisions in the Contract regarding liquidated damages and agrees that liquidated damages shall be $1,000.00 per day for each and every working day beyond the Contract time allowed for substantial completion until the Substantial Completion Date is achieved and $500.00 for each and every working day required beyond the Contract Time for physical completion until the Physical Completion Date is achieved.

The undersigned is, and will remain in, full compliance with all Washington State administrative agency requirements including, but not limited to registration requirements of Washington State Department of Labor & Industries for contractors, including but not limited to requirements for bond, proof of insurance and annual registration fee. The undersigned's Washington State:

Dept. of Labor and Industries Workman's Compensation Account No. is _________________;
Dept. of Licensing Contractor's Registration No. is ________________________;
Unified Business Identifier Number is _________________________________;
Excise Tax Registration Number is ______________________________; and
Employment Security Account Number is _____________________________.

The undersigned has reviewed all insurance requirements contained in the Contract and has verified the availability of and the undersigned’s eligibility for all required insurance. The undersigned verifies that the cost for all required insurance, has been included in this Proposal.

In relation to claims related in whole or in part to workplace injuries to employees, the undersigned waives any immunity granted under the State Industrial Insurance Law, RCW Title 51. This waiver has been specially negotiated by the parties, which is acknowledged by the undersigned in signing this Proposal.

By signing the proposal, the undersigned declares, under penalty of perjury under the laws of the United States and the State of Washington, that the following statements are true and correct:
1. That the undersigned person(s) or entity(ies) has(not have) not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the project for which this Proposal is submitted.

2. The bidder hereby certifies that, within the three-year period immediately preceding the bid solicitation date (__________), that the bidder is not a “willful” violator, as defined in RCW 49.48.082, of any provision of chapters 49.46, 49.48, or 49.52 RCW, as determined by a final and binding citation and notice of assessment issued by the Department of Labor and Industries or through a civil judgment entered by a court of limited or general jurisdiction.

The undersigned agrees that the Owner is authorized to obtain information from all references included herein.

Sincerely,

__________________________
Sign Name

__________________________
Date

By: _________________________
Print Name, Title

__________________________
Location Executed (City, State)

__________________________
Print Company Name

Amount of Proposal deposit: $__________

Check No. __________

or Proposal bond in the amount of $__________

__________________________
Name of Bank/Bonding Company

located at _______________________

Mailing Address

__________________________
Telephone Number of Bank/Bonding Company
PROPOSAL BOND

KNOW ALL MEN BY THESE PRESENTS, That we ____________________________

of ____________________________ as principal, and the ____________________________

a corporation duly organized under the laws of the state of ____________________________,
and authorized to do business in the State of Washington, as surety, are held and firmly bound unto the CITY OF KITTITAS in the full and penal sum of five percent of the total amount of the bid proposal of said principal for the work hereinafter described, for the payment of which, well and truly to be made, we bind our heirs, executors, administrators and assigns, and successors and assigns, firmly by these presents.

The condition of this bond is such, that whereas the principal herein is herewith submitting his or its sealed proposal for the following construction project, to wit:

MAIN STREET LIFT STATION

said bid and proposal, by reference thereto, being made a part hereof.

NOW, THEREFORE, If the said proposal bid by said principal be accepted, and the contract be awarded to said principal, and if said principal shall duly make and enter into and execute said Contract and shall furnish bond as required by the CITY OF KITTITAS within a period of 10 days from and after said award, exclusive of the day of such award, then this obligation shall be null and void, otherwise it shall remain and be in full force and effect.

IN TESTIMONY WHEREOF, The principal and surety have caused these presents to be signed and sealed this ____________________________ day of ____________________________, ____________.

______________________________
(Principal)

______________________________
(Surety)

______________________________
(Attorney-in-fact)
PART 2

AGREEMENT AND BONDS
AGREEMENT

THIS AGREEMENT is entered into by and between the CITY OF KITTITAS (hereinafter called the Owner) and ____________________, (hereinafter called the Contractor) on ____________________ (date).

The Owner and the Contractor agree as follows:

ARTICLE 1. WORK.

This Contract provides for the construction of approximately 870 lineal feet of 1.5-inch HDPE sanitary sewer force main, approximately 880 linear feet of 4-inch HDPE sanitary sewer force main, approximately 520 linear feet of 8-inch PVC gravity sanitary sewer main, approximately 130 linear feet of 6-inch PVC sanitary side sewer, and one packaged grinder pump station including electrical, controls, and ballast. The project also includes, but is not limited to, open cut sewer utility installation, manhole installation, connection to an existing manhole, surface restoration, and traffic control and all other work required to complete the project, all in accordance with the attached Contract Plans and Contract Provisions.

ARTICLE 2. CONTRACT TIME.

2.1 The Contractor shall substantially complete the Work required by the Contract within ____ working days (the Substantial Completion Date), regardless of which schedule(s) are awarded, and physically complete the Work within ____ working days (the Physical Completion Date) after the date set forth in the Notice to Proceed, regardless of which schedule(s) are awarded.

2.2 Time is of the Essence of the Contract
Owner and Contractor recognize that time is of the essence of this Contract and the Owner will suffer significant loss if the Contract is not completed and the facilities are not fully usable for their intended purpose within the time specified in Paragraph 2.1 above. Therefore, Owner and Contractor acknowledge that Contractor’s failure to substantially complete the Work with the time specified in Paragraph 2.1 shall constitute a material breach under the Contract entitling Owner to terminate and reserving to Owner all rights to make any claim for actual damages as a result of such failure and termination. Owner and Contractor further acknowledge that Contractor’s failure to diligently prosecute the Work in accordance with the progress schedule approved by the Engineer, and/or Contractor’s refusal to prosecute the Work in a manner which, in the Engineer’s opinion, endangers timely project completion shall constitute a material breach under the Contract entitling Owner to terminate and reserving to Owner all rights to make any claim for actual damages as a result of such failure and/or refusal. Owner and Contractor recognize that even a minimal delay in project completion can result in significant liability to Owner and hence any unapproved delay shall constitute a material breach entitling Owner to its available remedies at law.
2.3 Owner’s Right to Complete Work
Upon termination, Owner is entitled to complete the Work by whatever reasonable method Owner may deem expedient. Upon a termination for delay, the Contractor is not entitled to further payment until the work is finished. If the unpaid balance of the Contract exceeds the cost of finishing the Work, including, but not limited to, compensation for the Engineer’s expenses and equipment rental and expenses made necessary thereby, such excess shall be paid to the Contractor. If the costs exceed the unpaid balance, the Contractor shall pay the difference to the Owner.

ARTICLE 3. LIQUIDATED DAMAGES.

The Owner and the Contractor recognize that time is of the essence and that the Owner will suffer financial loss if the Work is not completed within the time, plus any extensions thereof, allowed in accordance with the Contract. They also recognize the inconvenience, expense, and difficulties involved in a legal proceeding to prove the actual loss suffered by the Owner if the Work is not completed within the time allowed in the Contract. Accordingly, the Owner and the Contractor agree that as liquidated damages for delay, and not as a penalty, the Contractor shall pay the Owner $________ (US) per day for each working day beyond the Substantial Completion Date that the Contractor achieves substantial completion of the Work and $________ (US) for each working day beyond the Physical Completion Date that the Contractor achieves physical completion of the Work.

ARTICLE 4. CONTRACT PRICE.

The Owner shall pay the Contractor the amount(s) set forth in the Proposal (in United States dollars) for completion of the Work in accordance with the Contract.

ARTICLE 5. CONTRACT.

The Contract, which comprises the entire agreement between the Owner and the Contractor concerning the Work, consists of the following:

- This Agreement;
- The Call for Bids;
- Notice of Award
- The Contractor’s Proposal including the bid, bid schedule(s), information required of bidder, Proposal bond, and all required certificates and affidavits;
- Notice to Proceed
- Exhibit A
AGREEMENT – Continued

- The Performance Bond and the Payment Bond;
- The Contract Provisions, including 2016 WSDOT Standard Specification as referenced;
- Appendices
- Addenda and
- Change Orders issued after the effective date of this Agreement.

There are no Contract Documents other than those listed in this Article 5. The Contract may be amended only in writing by Change Order as provided in the Contract.

ARTICLE 6. MISCELLANEOUS.

6.1 Contractor shall comply with all requirements contained in the attached Exhibit A regarding insurance, indemnification, and payment of prevailing wages. The provisions of Exhibit A are incorporated herein as though fully set forth, and are by this reference made a part hereof.

6.2 No assignment by a party hereto of any rights under or interests in the Contract Documents will be binding on another party hereto without the written consent of the party sought to be bound; and specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge in the assignor from any duty or responsibility under the Contract Documents.

6.3 Owner and Contractor each binds himself, his partners, successors, assigns, and legal representatives to the other party hereto, its partners successors, assigns, and legal representatives in respect to all covenants, contracts, obligations contained in the Contract Documents.

6.4 The Contractor warrants that the Work furnished shall be free from defects resulting from faulty workmanship, and further warrants that the Work complies with all specified performance criteria. The Contractor agrees to remedy all defects appearing in the Work or developing in the materials supplied and the workmanship performed under this Contract during the warranty period, which shall be two years under the Base Bid after the Substantial Completion Date, and Contractor further agrees to indemnify and save the Owner harmless from any costs encountered in remediying such defects.
A new warranty period equal to that stated in above paragraph shall apply to parts supplied in replacement of defective parts or to parts renewed in pursuance of this warranty. The warranty period of the remaining parts shall be extended by a period equal to the period during which the Work is unfit for service as a result of a defect covered by this warranty.

If the Contractor refuses to fulfill Contractor’s obligation under this warranty, or fails to proceed with due diligence after being required to do so, the Owner may proceed to do the necessary work at the Contractor’s risk and expense.

6.5 It is further provided that no liability shall attach to the Owner by reason of entering into this contract except as expressly provided herein.

6.6 Before any work at the site is started, Contractor shall deliver to Owner with copies to the Engineer and each additional insured identified, certificates of insurance which Contractor is required to purchase and maintain in accordance with the Contract Documents.

6.7 The Contractor shall furnish payment and performance bonds in an amount equal to the contract price as security for the faithful performance and payment of all Contractors’ obligations under the Contract Documents. The bonds shall be in form prescribed herein and be executed such sureties as are licensed to conduct business in the State of Washington, and are named in the current list of “companies Holding Certificates of authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring companies” as published in circular 570 (amended) by the Audit Staff Bureau of Accounts, U.S. Treasury Department. All bonds signed by an agent must be accompanied by a certified copy of authority to act. The surety company executing bonds shall have a Best’s Guide rating A-VII or better. Date on the bonds must not be prior to the date of the Contract. If Contractor is Partnership, all partners shall execute the bonds. If Contractor is a Limited Liability Company, all members shall execute the bonds. ENCLOSED BOND FORMS MUST BE USED.

6.8 The Contract is made with reference to and shall be construed in accordance with the laws of the State of Washington. If a dispute arises under this Contract, resort shall be to litigation and jurisdiction and venue shall be in the Superior Court of Grant County, State of Washington.

ARTICLE 7. CONTRACTOR’S REPRESENTATIONS

In order to induce Owner to enter into this Contract, Contractor makes the following representations:

7.1 Contractor has familiarized himself with the nature and extent of the Contract Documents, Work, locality, and with all local conditions and federal, state, and local laws, ordinances, rules, and regulations that in any manner may affect cost, progress, or performance of the Work.
7.2 Contractor has studied carefully all reports of investigations and tests of subsurface and latent physical conditions at the site or otherwise affecting cost, progress, or performance of the Work which were relied upon by the Engineer in the preparation of the Contract Provisions.

7.3 Contractor has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, reports and studies (in addition to or to supplement those referred to in Paragraph 7.2 above) which pertain to the subsurface or physical conditions at or contiguous to the site or otherwise may affect the cost, progress, performance or furnishing of the Work as Contractor considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, exploration, tests, reports, studies or similar information or data are or will be required by Contractor for such purposes.

7.4 Contractor has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, studies or similar information or data in respect of said Underground Facilities are or will be required by Contractor in order to perform and furnish the Work at the Contract Price, within the Contract Time and in accordance with the other terms and conditions of the Contract Documents.

7.5 Contractor has correlated the results of all such observations, examinations, investigations, tests, reports, and data with the terms and conditions of the Contract Documents.

7.6 Contractor has given Owner written notice of all conflicts, errors, or discrepancies that he has discovered in the Contract Documents and the written resolution thereof by Owner acceptable to Contractor.
AGREEMENT – Continued

IN WITNESS WHEREOF, Owner and Contractor have caused this Agreement to be executed the day and year first above written.

<table>
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<tr>
<th>CITY OF KITTITAS</th>
<th>CONTRACTOR</th>
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Address for giving notices

____________________________

License No. __________________

Agent for service of process: _____________

____________________________
EXHIBIT A

Indemnification / Hold Harmless

The Contractor shall defend, indemnify and hold the Owner and Engineer, their officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the sole negligence of the Owner and/or Engineer.

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 Owner, 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.

A. 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.

B. 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 Owner’s recourse to any remedy available at law or in equity.

C. 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 substitute endorsement providing at least as broad coverage. There shall be no exclusion for liability arising from explosion, collapse or underground property damage. The Owner shall be named as additional insureds under the Contractor’s Commercial General Liability insurance policy with respect to the work performed for the Owner using ISO Additional Insured endorsement CG 20 10 01 and Additional Insured-Completed Operations endorsement CG 20 37 01 or substitute endorsements providing at least as broad coverage. The Engineer shall be named as additional insured under the Contractor’s Commercial General Liability insurance policy using ISO Additional Insured endorsement CG 20 32 07 04 Engineers, Architects or Surveyors Not Engaged by You, or substitute endorsement providing at least as broad coverage.

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

4. **Builders Risk** insurance covering interests of the Owner, the Contractor, Subcontractors, and Sub-subcontractors in the work. Builders Risk insurance shall be on a special perils policy form and shall insure against the perils of fire and extended coverage and physical loss or damage including flood, earthquake, theft, vandalism, malicious mischief, and collapse. The Builders Risk insurance shall include coverage for temporary buildings, debris removal, and damage to materials in transit or stored off-site. This Builders Risk insurance covering the work will have a deductible of $5,000 for each occurrence, which will be the responsibility of the Contractor. Higher deductibles for flood and earthquake perils may be accepted by the Owner upon written request by the Contractor and written acceptance by the Owner. Any increased deductibles accepted by the Owner will remain the responsibility of the Contractor. The Builders Risk insurance shall be maintained until the Owner has granted substantial completion of the project.

5. **Excess or Umbrella Liability** insurance shall be excess over and at least as broad in coverage as the Contractor’s Commercial General Liability and Automobile Liability insurance. The Owner shall be named as additional insureds on the Contractor’s Excess or Umbrella Liability insurance policy. The Excess or Umbrella insurance coverage will drop down when underlying policy aggregate limits are exhausted.
D. 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 $1,000,000 each occurrence, $2,000,000 general aggregate and a $2,000,000 products- completed operations aggregate limit.

3. Builders Risk insurance shall be written in the amount of the completed value of the project with no coinsurance provisions.

4. Excess or Umbrella Liability insurance shall be written with limits of not less than $2,000,000 or other per occurrence and annual aggregate. The Excess or Umbrella Liability requirement and limits may be satisfied instead through the Contractor’s Commercial General Liability and Automobile Liability insurance, or any combination thereof that achieves the overall required limits.

E. Owner Full Availability of Contractor Limits

If the Contractor maintains higher insurance limits than the minimums shown above, the Owner 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 Owner evidences limits of liability lower than those maintained by the Contractor.

F. 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 Owner. Any Insurance, self-insurance, or self-insured pool coverage maintained by the Owner shall be excess of the Contractor’s insurance and shall not contribute with it.

G. 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.
H. Waiver of Subrogation

The Contractor and the Owner 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.

I. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of not less than A: VII and licensed to do business in the state of Washington.

Verification of Coverage

Contractor shall furnish the Owner with original certificates and a copy of the amendatory endorsements, including but not necessarily limited to the additional insured endorsements, evidencing the Automobile Liability and Commercial General Liability insurance of the Contractor before commencement of the work. Before any exposure to loss may occur, the Contractor shall file with the Owner a copy of the Builders Risk insurance policy that includes all applicable conditions, exclusions, definitions, terms and endorsements related to this project. Upon request by the Owner, the Contractor shall furnish certified copies of all required insurance policies, including endorsements, required in this contract and evidence of all subcontractors’ coverage.

J. 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 Owner 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.

K. Notice of Cancellation

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

L. 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 Owner may, after giving five business days’ notice to the Contractor to correct the breach, immediately terminate the contract.
AGREEMENT – Continued

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 Owner on demand, or at the sole discretion of the Owner, offset against funds due the Contractor from the Owner.

The Contractor shall indicate any existing claims activity that would affect the aggregate limits. This shall include paid claims, reserve claims, and potential claims.

M. **Deductible**

Any insurance deductible shall be paid by the Contractor and shall not be greater than 10% of the total "Amount of Bid."

N. **Property Insurance**

Owner shall not be responsible for purchasing and maintaining any property insurance to protect the interests of Contractor, subcontractors or others in the Work.
Contract No. __________________

WASHINGTON PERFORMANCE BOND

Bond No. __________________
Bond Amount $____________________

KNOW ALL MEN BY THESE PRESENTS: that

__________________________________________________________________________
(Name of Contractor)
__________________________________________________________________________
(Address of Contractor)

a ___________________________________________________, hereinafter called Principal, and

__________________________________________________________________________
(Name of Surety)
__________________________________________________________________________
(Address of Surety)

a corporation duly authorized to do a general surety business in Washington, hereinafter called
Surety, are jointly and severally held and firmly bound unto the Owner, CITY OF KITTITAS,
and the State of Washington, the obligees herein, in the sum of

__________________________________________________________________________ (Dollars) ($____________________) in lawful
money of the United States, for the payment of which sum well and truly to be made, we bind
ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally,
firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a
certain Contract with the Owner in accordance with applicable industry standards, regulatory
requirements and Owner-supplied specifications, dated the _____ __ day of ___________
20___, a copy of which is attached and made a part hereof for the construction of:

MAIN STREET LIFT STATION

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the
undertakings, covenants, terms, conditions, and agreements of said Contract during the original
term thereof, and any extensions thereof which may be granted by the Owner, with or without
notice to the Surety and during the two-year guaranty period, and if Principal shall satisfy all
claims and demands incurred under such Contract, and shall fully defend and indemnify and save
harmless the Owner from all costs and damages which it may suffer by reason of failure to do so,
and shall reimburse and repay all outlay and expense which the Owner may incur in making
good any default, then this obligation shall be void; otherwise to remain in full force and effect.
PROVIDED, FURTHER that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder or the Contract Documents accompanying the same shall in any way affect its obligation on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Contract Documents.

PROVIDED, HOWEVER, that the conditions of this obligation shall not apply to any money loaned or advanced to the Principal or to any subcontractor or other person in the performance of any such work.

PROVIDED, FURTHER, that the said Surety hereby stipulates and agrees to be bound by the laws of the State of Washington and subject to the jurisdiction of the State of Washington.

PROVIDED, FURTHER, that no final settlement between the Owner and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

No right of action shall accrue upon, or by reason hereof to, or for the use or benefit of, anyone other than the Owner.

IN WITNESS WHEREOF, this instrument is executed pursuant to RCW Chapter 39.08 in _____ counterparts, each one of which shall be deemed an original, this the ________ day of ___________________, 20____.

PRINCIPAL:                     SURETY:
(Signature must be notarized)   (Signature must be notarized)

By: ___________________________  By: ___________________________
Print: _________________________  Print: _________________________
Title: _________________________

APPROVED AS TO FORM BY CITY ATTORNEY:

By: ___________________________
Date: _________________________

NOTE: Date of bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond. If Contractor is a Limited Liability Company, all members, or managers if manager-managed, should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department’s most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located. All bonds signed by an agent must be accompanied by a certified copy of the authority to act for the Surety at the time of the signing of this bond. The Surety agrees to be bound by the laws of the State of Washington and subject to the jurisdiction of the State of Washington. The Surety company executing this bond shall have a Best’s Guide rating A-VII or better. All signatures on bond must be original.
STATE OF WASHINGTON  )  ss.
COUNTY OF _______________  )

I certify that I know or have satisfactory evidence that______________________ is the person who appeared before me and said person acknowledged that s/he signed this instrument, on oath stated that s/he was authorized to execute the instrument and acknowledged it as __________________ of PRINCIPAL, and acknowledged it to be the free and voluntary act of such party for the uses and purposes mentioned in this instrument.

DATED:_____________________, 20____.

____________________________________
____________________________________
Notary Type or Print Name
NOTARY PUBLIC for State of Washington, residing at:___________________________
My commission expires:________________

STATE OF WASHINGTON  )  ss.
COUNTY OF _______________  )

I certify that I know or have satisfactory evidence that______________________ is the person who appeared before me and said person acknowledged that s/he signed this instrument, on oath stated that s/he was authorized to execute the instrument and acknowledged it as __________________ of SURETY, and acknowledged it to be the free and voluntary act of such party for the uses and purposes mentioned in this instrument.

DATED:_____________________, 20____.

____________________________________
____________________________________
Notary Type or Print Name
NOTARY PUBLIC for State of Washington, residing at:___________________________
My commission expires:________________
Contract No. __________________

WASHINGTON PAYMENT BOND

Bond No. __________________
Bond Amount $__________________

KNOW ALL MEN BY THESE PRESENTS: that

(Name of Contractor)

(Address of Contractor)

a ___________________________________________________, hereinafter called Principal, and

(a Corporation, Partnership or Individual)

(Name of Surety)

(Address of Surety)

a corporation duly authorized to do a general surety business in Washington, hereinafter called
Surety, are jointly and severally held and firmly bound unto the Owner, CITY OF KITTITAS, and
the State of Washington, the obligees herein, in the sum of __________________________ (Dollars) ($___________________) in lawful
money of the United States, for the payment of which sum well and truly to be made, we bind
ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severally,
firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a
certain Contract with the Owner in accordance with applicable industry standards, regulatory
requirements and Owner-supplied specifications dated the _______ day of _________________,
20____, a copy of which is attached and made a part hereof for the construction of:

MAIN STREET LIFT STATION

NOW, THEREFORE, if the Principal shall promptly make payment to all laborers, mechanics,
and subcontractors and materialmen and to all persons, firms, corporations, or other entities who
furnish equipment, materials, provisions and supplies for or perform labor or other services in
carrying on of such Work provided for in such Contract and any authorized extension or
modification thereof, including all amounts due for materials, lubricants, provisions, supplies,
gasoline, water, power, light, heat, telephone service, repairs on machinery, equipment and tools
consumed or used in connection with such Work, and all insurance premiums on said Work, and
for all labor performed in such Work whether by subcontractors or otherwise, then this
obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, HOWEVER, that the conditions of this obligation shall not apply to any money
loaned or advanced to the Principal or to any subcontractor or other person in the performance of
any such work.

PROVIDED FURTHER that the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the Work to be performed thereunder, or the Contract Documents accompanying the same, shall in any way affect its obligation on this bond, and it does hereby waive notice of such change, extension of time, alteration or addition to the terms of the Contract or to the Work or to the Contract Documents.

PROVIDED, FURTHER, that the said Surety hereby stipulates and agrees to be bound by the laws of the State of Washington and subject to the jurisdiction of the State of Washington.

PROVIDED, FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed pursuant to RCW Chapter 39.08 in ________ counterparts, each one of which shall be deemed an original, this the ________ (number) day of ___________________, 20____.

PRINCIPAL: (Signature must be notarized) SURETY: (Signature must be notarized)

By: _________________________________ By: _________________________________

Print: _________________________________ Print: _________________________________

Title: _________________________________

APPROVED AS TO FORM BY CITY ATTORNEY:

By: _________________________________

Date: _________________________________

NOTE: Date of bond must not be prior to date of Contract. If Contractor is Partnership, all partners should execute bond. If Contractor is a Limited Liability Company, all members, or managers if manager-managed, should execute bond.

IMPORTANT: Surety companies executing bonds must appear on the Treasury Department’s most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located. All bonds signed by an agent must be accompanied by a certified copy of the authority to act for the Surety at the time of the signing of this bond. The Surety agrees to be bound by the laws of the State of Washington and subject to the jurisdiction of the State of Washington. The Surety company executing this bond shall have a Best’s Guide rating A-VII or better. All signatures on bond must be original.
STATE OF WASHINGTON  
)  
COUNTY OF ____________  
) ss.

I certify that I know or have satisfactory evidence that_____________________ is the person who appeared before me and said person acknowledged that s/he signed this instrument, on oath stated that s/he was authorized to execute the instrument and acknowledged it as ________________ of PRINCIPAL, and acknowledged it to be the free and voluntary act of such party for the uses and purposes mentioned in this instrument.

DATED:_____________________, 20__.

____________________________________

____________________________________

Notary Type or Print Name
NOTARY PUBLIC for State of Washington, residing at:___________________________
My commission expires:________________

STATE OF WASHINGTON  
)  
COUNTY OF ____________  
) ss.

I certify that I know or have satisfactory evidence that_____________________ is the person who appeared before me and said person acknowledged that s/he signed this instrument, on oath stated that s/he was authorized to execute the instrument and acknowledged it as ________________ of SURETY, and acknowledged it to be the free and voluntary act of such party for the uses and purposes mentioned in this instrument.

DATED:_____________________, 20__.

____________________________________

____________________________________

Notary Type or Print Name
NOTARY PUBLIC for State of Washington, residing at:___________________________
My commission expires:________________
PART 3

GENERAL CONDITIONS
GENERAL CONDITIONS

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GENERAL CONDITIONS

SECTION 1 - GENERAL INFORMATION APPLICABLE TO PROPOSAL AND CONTRACT

1.01 DEFINITIONS AND TERMINOLOGY

The following terms are abbreviated and defined as they are used in the Contract. When used in the Proposal form to denote items of Work and units of measurements, abbreviations mean the full expression of the abbreviated term.

1.02 ABBREVIATIONS AND TERMINOLOGY

1.02.1 REFERENCED STANDARDS AND CODES

The following is a partial list of specifications and codes that may be referenced in sections of the Contract. The Contractor shall be responsible for conducting its Work and carrying out its operations and furnishing equipment in accordance with the latest edition or versions, in effect at the time of bid opening, of any applicable specified portions of the referenced standards and codes.

AASHTO American Association of State Highway and Transportation Officials
ACI American Concrete Institute
AFBMA Anti-friction Bearing Manufacturing Association
AGA American Gas Association
AGC Associated General Contractors of America
AI Asphalt Institute
AIA American Institute of Architects
AISC American Institute of Steel Construction
AISI American Iron and Steel Institute
AITC American Institute of Timber Construction
AMCA Air Moving and Conditioning Association
ANLA American Nursery and Landscape Association
ANSI American National Standards Institute, Inc.
APA American Plywood Association
API American Petroleum Institute
APWA American Public Works Association
ARA American Railway Association
AREMA American Railway Engineering and Maintenance-of-Way Association
ASA American Standards Association
ASCE American Society of Civil Engineers
ASLA American Society of Landscape Architects
ASME American Society Mechanical Engineers
ASNT American Society for Nondestructive Testing
ASTM American Society for Testing and Material
AWPA American Wood Preservers’ Association
AWS American Welding Society
1.02.2 TERMINOLOGY

The use of pronouns of any gender in these General Conditions shall include pronouns of all genders, as applicable.

The terms “provide,” “furnish” and “install” are used interchangeably in the Contract and mean that the Contractor shall provide, furnish, and install the item(s) described unless specifically noted otherwise.

The terms “Plans” and “Drawings” are used interchangeably in the Contract and shall mean the Contract Plans, which show location, character, and dimensions of prescribed Work, including layouts, profiles, cross-sections, and other details.

1.02.3 ITEMS OF WORK AND UNITS OF MEASUREMENT

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>AC</td>
<td>Asbestos Cement Pipe</td>
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<tr>
<td>Agg.</td>
<td>Aggregate</td>
</tr>
<tr>
<td>Al.</td>
<td>Aluminum</td>
</tr>
<tr>
<td>ATB</td>
<td>Asphalt Treated Base</td>
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<tr>
<td>BST</td>
<td>Bituminous Surface Treatment</td>
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<tr>
<td>CB</td>
<td>Catch Basin</td>
</tr>
<tr>
<td>Cfm</td>
<td>Cubic Feet per Minute</td>
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<tr>
<td>Cfs</td>
<td>Cubic Feet per Second</td>
</tr>
<tr>
<td>Cl.</td>
<td>Class</td>
</tr>
<tr>
<td>CMP</td>
<td>Corrugated Metal Pipe</td>
</tr>
<tr>
<td>Comb.</td>
<td>Combination</td>
</tr>
<tr>
<td>Conc.</td>
<td>Concrete</td>
</tr>
<tr>
<td>CPEP</td>
<td>Corrugated Polyethylene Pipe</td>
</tr>
<tr>
<td>Crib.</td>
<td>Cribbing</td>
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<tr>
<td>Culv.</td>
<td>Culvert</td>
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<tr>
<td>Cy or Cu. Yd.</td>
<td>Cubic Yard(s)</td>
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<tr>
<td>Dia.</td>
<td>Diameter</td>
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<tr>
<td>DI</td>
<td>Ductile Iron</td>
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<tr>
<td>DIM</td>
<td>Dimension</td>
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<tr>
<td>EA</td>
<td>Each</td>
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<tr>
<td>EL</td>
<td>Elevation</td>
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<tr>
<td>Est.</td>
<td>Estimate or Estimated</td>
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</tbody>
</table>
1.03 DEFINITIONS

ACCEPTANCE

The formal action by Owner or Owner’s governing body as provided in RCW 39.08 and RCW 60.28.
ADDENDUM

A written or graphic document issued to all Bidders prior to bid opening and identified as an addendum, which clarifies, modifies or supplements the bid documents and becomes part of the Contract.

ADDITIVE

A supplemental unit of work or group of bid items, identified separately in the Proposal, which may, at the discretion of the Owner, be awarded in addition to the base bid.

ALTERNATE

One of two or more units of work or groups of bid items, identified separately in the Proposal, from which the Owner may make a choice between different methods or material of construction for performing the same work.

AWARD

The formal decision of the Owner awarding the Contract to the lowest or most favorable responsible and responsive Bidder for the Work.

BID DOCUMENTS

The component parts of the proposed Contract which may include, but not limited to, the Proposal form, the proposed Contract Provisions, the proposed Contract Plans, Addenda, and Subsurface Boring Logs (if any).

BIDDER

A natural person or legal entity (e.g., partnership, corporation, limited liability company, firm, or joint venture) submitting a proposal or bid.

BUSINESS DAY

A business day is any day from Monday through Friday, except holidays, as listed in Section 3.04.14.

CLERK

The duly elected or appointed Clerk of the Commission, Council, or Board of Directors of the Owner.

COMMISSION, COUNCIL, OR BOARD OF DIRECTORS

The duly elected or appointed Council, Commission, or Board of Directors of the Owner.
CONTRACT

The written agreement between the Owner and the Contractor. It describes, among other things:

1. What work will be done, and by when;
2. Who will provide labor and materials; and
3. How Contractor will be paid.


CONTRACT BOND

The approved form of security furnished by the Contractor and the Contractor’s Surety as required by the Contract, that guarantees performance of all the Work required by the Contract and payment to anyone who provides supplies or labor for the performance of the Work.

CONTRACT DOCUMENTS

See definition for “Contract.”

CONTRACT PLANS (PLANS OR DRAWINGS)

The Contract Plans (or drawings) are those plans, drawings or other illustrations and all addenda and revisions, whether issued before or after the award of the contract to Contractor, which show location, character, and dimensions of the Work, including layouts, profiles, cross-sections and other details.

CONTRACT PROVISIONS

A publication addressing the work required for an individual project. At the time of the call for bids, the contract provisions may include, for a specific individual project, general conditions, supplemental general conditions, specifications, a listing of the applicable standard plans, the prevailing minimum hourly wage rates, and an informational proposal form with the listing of bid items. The proposed contract provisions may also include, for a specific individual project, various required certifications or declarations. At the time of the contract execution date, the contract provisions include the proposed contract provisions and include any addenda, a copy of the agreement form, and a copy of the proposal form with the contract prices and extensions.
CONTRACT TIME

The period of time established by the terms and conditions of the Contract within which the work shall be complete.

CONTRACTOR

The natural person(s) or legal entity (e.g., partnership, corporation, limited liability company, firm, joint venture) awarded the contract to perform the Work pursuant to the Contract Documents.

DATES

Substantial Completion Date is the day that the Engineer determines the Owner has full and unrestricted use and benefit of the Work, from both an operational and safety standpoint, any remaining traffic disruptions will be rare and brief, and only minor incidental work, replacement of temporary substitute facilities, plant establishment periods, or correction or repair remains for the physical completion of the total Work.

Physical Completion Date is the day that the Engineer determines that all of the Work required by the Contract is physically completed and the Owner has received from the Contractor all required record drawings, operation and maintenance manuals, manufacturers’ affidavits, and software and programming.

Contract Completion Date is the day when all the Work and all the obligations of the Contractor under the Contract are fulfilled by the Contractor. All documentation and other items required by the Contract and required by law shall be furnished by the Contractor before establishment of this date.

Final Acceptance Date is the date on which the Owner accepts the work as complete.

FIELD REPRESENTATIVE

The Owner’s representative who observes the Contractor’s performance of the Work. Such observation shall not be relied upon by the Contractor or others as approval or acceptance of the Work, nor shall it in any manner relieve the Contractor from its obligations and responsibilities under the Contract.

NOTICE TO PROCEED

The written notice from the Owner or Engineer to the Contractor authorizing and directing the Contractor to proceed with the Work and establishing the date on which the Contract Time begins.
OWNER

The government entity or agency that awards the contract to the Contractor and is responsible for the execution and administration of the Contract.

PROJECT ENGINEER/ENGINEER

The Owner’s representative who administers the construction program for the Owner.

PROPOSAL (or BID)

A Bidder’s offer, on a properly completed Proposal form, to perform the Work required by the Contract. The terms Proposal and Bid may be used interchangeably.

SPECIFICATIONS

Written provisions describing the Work and requirements thereof.

STANDARD PLANS

A manual of specific plans or drawings adopted by the Owner, which show frequently recurring components of work that, have been standardized for use.

SUBCONTRACTOR

A natural person, or entity (e.g., partnership, corporation, limited liability company, firm or joint venture) to which the Contractor sublets a portion of the Work.

SUBGRADE

The top surface of the roadbed on which subbase, base, surfacing, pavement, or layers of similar materials are placed.

SUPPLEMENTARY GENERAL CONDITIONS

That part of the Contract amends or supplements these General Conditions.

TRAVELED WAY

That part of the roadway made for vehicle travel, excluding shoulders and auxiliary lanes.

WORK

The provision of all labor, materials, tools, equipment, supervision and other things needed to complete the project in full accordance with the Contract Documents.
WORKING DRAWINGS

Shop drawings, shop plans, erection plans, falsework plans, framework plans, cofferdam, cribbing and shoring plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data, including a schedule of submittal dates for working drawings where specified, that the Contractor shall submit to the Engineer for approval.
SECTION 2 - INSTRUCTIONS FOR PREPARATION OF PROPOSAL (OR BID)

2.01 BID PROCEDURES AND CONDITIONS

2.01.1 QUALIFICATIONS OF BIDDERS

Where applicable and required, Bidders shall provide all requested information relating to experience, financing, equipment, and organization relating to their ability to properly perform the Work. The Owner reserves the right to take whatever action it deems necessary to ascertain the responsibility of the Bidder and the ability of the Bidder to perform the Work satisfactorily.

2.01.2 CONTRACT PROVISIONS AND CONTRACT PLANS

Contract Provisions and Contract Plans are on file in the offices of the Owner and the Engineer, Gray & Osborne, Inc. After award of the Contract, five sets of Contracts will be issued without charge to the Contractor. Additional sets of Contracts may be purchased from the Owner by the Contractor.

2.01.3 ESTIMATED QUANTITIES

The quantities shown in the Proposal form are estimates and are stated only for bid comparison purposes. The Owner does not warrant, expressly or by implication, that the actual quantities will correspond with those estimates. Payment will be made on the basis of the actual quantities of each item of Work satisfactorily completed in accordance with the requirements of the Contract.

2.01.4 EXAMINATION OF CONTRACT AND SITE

2.01.4(1) General

Bidders shall satisfy themselves by personal examination of Contract Provisions, Contract Plans, and site of the proposed improvements, and by any other examination and investigation which they may desire to make as to the accuracy of the estimate of quantities, the nature of the Work and the difficulties to be encountered. Bidders shall review the entire Contract to ensure that the completeness of their Proposal includes all items of Work regardless of where shown in the Contract. Bidders are cautioned that alternate sources of information (copies of the Contract obtained from third parties) are not necessarily an accurate or complete representation of the Contract. Bidders shall use such information at their own risk.

Bidders shall be familiar and comply with all applicable federal, state, and local laws, ordinances, and regulations in any way applicable to the performance of the Work. Bidders are responsible for familiarizing themselves with all current state and federal wage rates applicable to the Work and its duration before submitting a Proposal based on the Contract Provisions and Contract Plans. Any wage determination contained in the Contract is for the Bidder’s general information only and is not warranted to be complete or accurate. The Owner will not consider any plea of misunderstanding or ignorance of such requirements. Bid prices shall reflect what the Bidder has determined to be the total cost of completing the Work, including but not limited to: construction methods, materials, labor, administrative costs, any and all applicable taxes, and equipment.
Except as the Contract may provide, the Bidder to which the contract is awarded shall receive no payment for any costs that exceed those set forth in the Proposal.

2.01.4(2) **Interpretation of the Contract Provisions and Contract Plans**

If any Bidder desires interpretation or clarification of the Contract Provisions and Contract Plans, the Bidder shall make a written request to the Engineer for such clarification or interpretation prior to the submission of a Proposal. If the Engineer determines that the Contract Provisions and/or Contract Plans do not require interpretation or clarification, the Engineer will so notify the Bidder making the request. All interpretations and clarifications made by the Engineer and approved by the Owner will be by written addendum to all planholders of record, and a copy of the addendum will be filed in the office of the Owner. Neither the Owner nor the Engineer will be responsible for any interpretation, clarification or explanation of the Contract Provisions and Contract Plans that is not set forth in a written addendum to all planholders of record, and Biddes shall not under any circumstances rely on any other interpretation, clarification or explanation.

2.01.4(3) **Subsurface Information**

If the Owner has made a subsurface investigation of the site of the proposed Work, the boring log data and soil sample test data accumulated by the Owner will be made available for inspection by the Bidders. However, the Owner makes no representation or warranty, express or implied, that:

a. The Bidders’ interpretations from the boring logs may be correct;

b. Moisture conditions and indicated water tables will not vary from those found at the time the borings were made;

c. The ground at the location of the borings has not been physically disturbed or altered after the boring was made; and

d. Conditions below the surface of the ground are consistent throughout the site with the information made available hereunder, or that conditions to be encountered on the site are uniform or consistent with geological conditions usually encountered in the area.

The Owner makes no representations, guarantees, or warranties as to the condition, materials, or proportions of the materials between the specific borings, regardless of any subsurface information the Owner may make available to the prospective Bidders. Bidders are solely responsible for making the necessary investigations to support and/or verify any conclusions or assumptions used in preparation of their Proposals.

Any subsurface investigations and analysis were carried out for design purposes only. Contractor may not rely upon or make any claim against Owner, Engineer, or any of their subconsultants, with respect to:

1. The completeness of such reports 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 conclusions, interpretations, opinions, representations, and information contained in such reports; or

3. Any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, conclusions, interpretations, opinions or information.

2.01.4(4) Availability of Specified Items

Prior to submitting a Proposal, all Bidders shall verify that all items necessary to complete the Work will be available in time to allow the Work to be completed within the Contract Time. In the event that one or more items may not be available to allow the Work to be completed within the Contract Time, the Bidder shall notify the Engineer in writing prior to submitting a Proposal. Responsibility for delays and related costs because of non-availability of items necessary to complete the Work shall be borne by the Contractor.

2.01.5 PROPOSAL DEPOSIT

A deposit of at least 5 percent of the total Proposal amount shall accompany each Proposal. This deposit may be in the form of a Proposal bond (surety bond), certified check, cashier’s check, or postal money order made payable to the Owner. All Proposal bonds shall be on the form included within the Contract Provisions and shall be signed by the Bidder and the surety. The surety shall: (1) be registered with the Washington State Commissioner, and (2) appear on the current Authorized Insurance List in the State of Washington published by the Office of the Insurance Commissioner. The Proposal bond shall not be conditioned in any way to modify the minimum 5 percent required. The Proposal Deposit will be held as a guaranty that the successful Bidder will, within 10 days from the date of notification of Award, enter into a Contract and furnish approved Performance and Public Works Payment Bonds, on forms attached, in amounts equal to 100 percent of the amount of the Contract, including state sales tax.

2.01.6 PROPOSAL

(1) Proposals shall be submitted on the Proposal form included in the Contract Provisions. All Proposals shall be completed, signed by an authorized person and dated. To be considered by the Owner as a responsive Proposal, the Bidder shall bid on all Additive or Alternate items set forth in the Proposal form, unless otherwise specified in the Contract Documents.

(2) To be responsive, a Proposal shall state that it will remain valid for a period of 60 days following the date of Proposal opening. In the event that a conflict in this duration appears elsewhere in the Contract Provisions, the longest duration shall apply.

(3) All prices set forth on the Proposal form shall be legible and either be written in ink or typed. In the space provided on the Proposal form, Bidders shall identify all
Addenda that have been received. The Proposal, Bid bond, and all other certificates, forms or other documents required by the Contract Provisions to be executed and delivered with the Proposal shall be submitted in a sealed package, addressed to the Owner, and plainly marked “Proposal for _______________ (insert name of project as shown on the Proposal) to be opened on the ______ day of ____________, 20__, (insert the day, month and year shown in the published bid notice). The Owner will not consider any Proposal received after the time established for opening Proposals.

(4) Where noted in the Proposal, the Bidder to furnish information concerning its experience with work of a similar nature, equipment to be used on this project, and general background information. Information that is incomplete, evasive, or of a general nature only, may be considered as grounds for rejection of the Proposal.

(5) RCW 39.30.060 requires Bidders on public works projects expected to cost one million dollars or more to provide the names of the heating, ventilation and air conditioning, plumbing and electrical Subcontractors to whom the Bidder will directly subcontract those portions of the Work if awarded the contract. The Bidder may not list more than one Subcontractor for each category of Work identified, unless Subcontractors vary with bid alternates, in which case the Bidder shall indicate which Subcontractor will be used for which alternate. Failure of the Bidder to list the names of such Subcontractors or to name itself to perform such Work, or listing two or more Subcontractors to perform the same Work, shall render the Bidder’s Proposal unresponsive and void. Under RCW 39.30.060, the required names of such Subcontractors shall be provided with the Proposal or within one hour after the published Proposal submittal time. In addition to compliance with the requirements of RCW 39.30.060, the apparent successful Bidder may be required to submit to the Engineer as soon as possible after the Proposal opening, and not later than three calendar days thereafter, a written list of all proposed Subcontractors in addition to heating, ventilation, and air conditioning, plumbing and electrical contractors, that will perform subcontracting Work on the Project. If not previously provided, the following information shall be provided for each Subcontractor:

a. Name, address, email address, facsimile number, telephone number, contractor registration number and certification numbers;

b. The type of Work to be performed;

c. A list of at least three recently completed projects for Work similar to that to be performed by the proposed Subcontractor, with the following information for each project:

i. Name of project,

ii. Name, address, and telephone number of the project owner; and
d. Any additional pertinent information establishing the experience or qualifications of the proposed Subcontractor.

(6) After opening and reading Proposals, the Owner will check them for correctness of extensions of the prices per unit and the total price. If a discrepancy exists between the price per unit and the extended amount of any bid item, the price per unit, converted to the actual extension, will control. The total extensions, corrected where necessary, will be used by the Owner for comparison and award purposes and to establish the amount of the Contractor’s Performance and Public Works Payment Bonds.

2.01.7 WITHDRAWING OR REVISING PROPOSAL

After submitting a physical Proposal to the Owner, the Bidder may withdraw, or revise it if:

1. The Bidder submits a written request signed by an authorized person and physically delivers it to the place designated for receipt of Proposals, and
2. The Owner receives the request before the time set for receipt of Proposals, and
3. The revised or supplemented Proposal (if any) is received by the Owner before the time set for receipt of Proposals.

If the Bidder’s request to withdraw or revise its Proposal is received before the time set for receipt of Proposals, the Owner will return the unopened Proposal package to the Bidder. The Bidder must then submit the revised package in its entirety. If the Bidder does not submit a revised package, then its bid shall be considered withdrawn.

Late revised Proposals or late withdrawal requests will be date recorded by the Owner and returned unopened. Mailed, emailed, or faxed requests to withdraw or revise a Bid Proposal are not acceptable.

2.01.8 DISQUALIFICATION OF BIDDERS

1. A proposal will be considered irregular and will be rejected if:
   
a. The Bidder is not prequalified when so required;
b. The authorized proposal form furnished by the Owner is not used or is altered;
c. The completed proposal form contains any unauthorized additions, deletions, alternate Bids, or conditions;
d. The Bidder adds provisions reserving the right to reject or accept the award, or enter into the Contract;
e. A price per unit cannot be determined from the Bid Proposal;
f. The Proposal form is not properly executed;
g. The Bidder fails to submit or properly complete a Subcontractor list, if applicable;
h. The Bidder fails to submit or properly complete a Disadvantaged, Minority or Women’s Business Enterprise Certification, if applicable;

i. The Bid Proposal does not constitute a definite and unqualified offer to meet the material terms of the Bid invitation; or

j. More than one proposal is submitted for the same project from a Bidder under the same or different names.

2. A Proposal may be considered irregular and may be rejected if:

a. The Proposal does not include a unit price for every Bid item;

b. Any of the unit prices are excessively unbalanced (either above or below the amount of a reasonable Bid) to the potential detriment of the Contracting Agency;

c. Receipt of Addenda is not acknowledged;

d. A member of a joint venture or partnership and the joint venture or partnership submit Proposals for the same project (in such an instance, both Bids may be rejected); or

e. If Proposal form entries are not made in ink.

A Bidder will be deemed not responsible if:

1. The Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1); or

2. Evidence of collusion exists with any other Bidder or potential Bidder. Participants in collusion will be restricted from submitting further bids; or

3. The Bidder, in the opinion of the Owner, does not have the means or the qualifications to complete the Work; or

4. An unsatisfactory performance record exists based on past or current Owner work or for work done for others, as judged from the standpoint of conduct of the work; workmanship; or progress; affirmative action; equal employment opportunity practices; termination for cause; or Disadvantaged Business Enterprise, Minority Business Enterprise, or Women’s Business Enterprise utilization; or

5. There is uncompleted work (Owner or otherwise), which in the opinion of the Owner might hinder or prevent the prompt completion of the work bid upon; or

6. The Bidder failed to settle bills for labor or materials on past or current contracts, unless there are extenuating circumstances acceptable to the Owner; or

7. The Bidder has failed to complete a written public contract or has been convicted of a crime arising from a previous public contract, unless there are extenuating circumstances acceptable to the Owner; or

8. The Bidder is unable, financially or otherwise, to perform the work, in the opinion of the Owner; or

9. There are any other reasons deemed proper by the Owner.

The basis for evaluation of Bidder compliance with these mandatory and supplemental criteria shall be any documents or facts obtained by Owner (whether from the Bidder or third parties) which any reasonable owner would rely on for determining such compliance, including but not limited to: (1) financial, historical, or operational data from the Bidder; (2) information obtained
directly by the Owner from owners for whom the Bidder has worked, or other public agencies or private enterprises; and (3) any additional information obtained by the Owner which is believed to be relevant to the matter.

If the Owner determines the Bidder does not meet the bidder responsibility criteria above and is therefore not a responsible Bidder, the Owner shall notify the Bidder in writing, with the reasons for its determination. If the Bidder disagrees with this determination, it may appeal the determination within 48 hours of receipt of the Owner’s determination by presenting its appeal in writing to the Owner. The Owner will consider the appeal before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Owner will not execute a contract with any other Bidder until at least two business days after the Bidder determined to be not responsible has received the final determination.

2.01.9 PROPOSAL ERRORS

If a Bidder discovers an error in the Bidder’s Proposal after the Proposals have been opened and tabulated and desires to withdraw the erroneous Proposal, the Bidder shall submit a notarized affidavit signed by the Bidder, accompanied by original certified worksheets used in the preparation of the Proposal, requesting relief from the Award. The affidavit shall describe the specific error(s) and certify that the worksheets are the originals used in the preparation of the Proposal.

The affidavit and the certified worksheets shall be received by the Engineer before 5:00 p.m. local time on the next business day following the day of the Proposal opening or the claim of error will not be considered. The Engineer will review the certified worksheets to determine the validity of the claimed error, and make its recommendation to the Owner. If the Owner and Engineer concur that the claim of error is allowable under applicable law, the Bidder will be relieved of responsibility for the Proposal, and the Proposal Deposit will be returned to the Bidder. Thereafter, at the discretion of the Owner, all Proposals may be rejected or an Award made to the next lowest responsive, responsible Bidder.

2.02 AWARD AND EXECUTION OF CONTRACT

2.02.1 AWARD OF CONTRACT

A Contract will not be awarded until the Owner is satisfied that the successful Bidder is responsible, reasonably familiar with the Work to be performed and has the necessary capital, tools, personnel and equipment to satisfactorily perform the Work.

The Owner reserves the right to waive informalities in the bidding, accept a Proposal of the lowest responsive, responsible Bidder, reject any or all Proposals, republish the call for Proposals, or revise or cancel the project.

After the date and hour set for the opening of the Proposals, no Bidder may withdraw its Proposal unless the Award of the Contract is delayed for a period exceeding 60 calendar days following Proposal opening. In the event that a conflicting duration appears elsewhere in the Invitation for Proposals or Contract Provisions or advertisement, the longer period shall govern.
2.02.2 EXECUTION OF CONTRACT

Within 10 calendar days after notification by the Owner of the Award, the successful Bidder shall return to the Engineer the signed Owner-prepared Contract, all insurance certificates and endorsements required by the Contract Provisions, all other certificates, information, and forms required by the Contract Provisions, and Performance and Public Works Payment Bonds required by the Contract Provisions. If the Contract is signed by an officer, agent, or other authorized representative of the Contractor, the officer, agent, or other representative shall furnish satisfactory evidence of authority to sign as the legal representative of the Contractor, if required by the Owner. An authorized partner of a joint venture may sign the Contract, subject to the approval of the Owner, which may, at its discretion, require each and every member of the joint venture to sign the Contract.

Should the successful bidder fail to return to the Engineer the signed Owner-prepared Contract, all insurance certificates and endorsements required by the Contract Provisions, all other certifications, information, and forms required by the Contract Provisions, and Performance and Public Works Payment Bonds required by the Contract Provisions within 10 calendar days after notification by the Owner of the Award, the Owner reserves the right to and may elect to withdraw the award to the successful bidder and award the Contract to the next responsible, responsive bidder.

Until the Owner executes the Contract, no Proposal shall bind the Owner, and the Contractor shall not commence any Work. The Contractor shall bear all risks for any Work begun before the Contract is executed by the Owner.

2.02.3 FAILURE TO EXECUTE CONTRACT

If the Contractor fails to submit the insurance certificates, bonds, and all other certificates, forms, information and documents as required by the Contract Provisions, with the executed Contract within the time required by the Contract Provisions, the Owner may then award the Contract to the next lowest responsive, responsible Bidder or reject any or all Proposals.

2.02.4 RETURN OF BID DEPOSIT

When Proposals have been examined and corrected as necessary, proposal bonds and deposits accompanying Proposals ineligible for further consideration will be returned. All other Proposal bonds and deposits will be held until the Contract is awarded and fully executed, after which the Proposal bonds and deposits, except those subject to forfeiture, will be returned.

2.02.5 NOTICE TO PROCEED

A written Notice to Proceed will be issued to the Contractor by the Owner or Engineer after the Contract has been executed by the Contractor and the Owner, and the Performance and Public Works Payment Bonds and required insurance and other certificates and documents are approved by the Owner and, when applicable, by State or Federal agencies responsible for funding any
portion of the project. The Contractor shall not commence Work until the Notice to Proceed has been issued.
SECTION 3 - GENERAL REQUIREMENTS OF THE CONTRACT

3.01 SCOPE OF THE WORK

3.01.1 INTENT OF THE CONTRACT

The intent of the Contract is to describe a functionally complete project to be constructed in accordance with the Contract. The Contractor shall provide all labor, supervision, materials, tools, equipment, transportation, supplies, and other things required expressly by, or reasonably implied from, the Contract, to complete all Work. Omissions from the Contract of details of Work which are necessary to carry out the intent of the Contract, or which are customarily performed, shall not relieve the Contractor from performing the complete Work called for by the Contract; such Work shall be performed as if fully set forth and described in the Contract. The unit or other bid prices shall be full payment for everything required to complete the Work, including but not limited to labor, supervision, materials, equipment, jobsite and home office overhead and profit.

3.01.2 COORDINATION OF CONTRACT

The Contract Plans and the Contract Provisions for the Work shall be considered as a whole, and anything shown or called for in one and omitted in any other is as binding as if called for or shown on both. Figure dimensions shall, in all cases, be used in preference to scale dimensions. Any inconsistency in the Contract Documents shall be resolved by the following order of precedence (e.g., 1 presiding over 2 through 4, 2 presiding over 3 through 4, etc.):

1. Addenda;
2. The Agreement and Proposal Form;
3. Specifications;
3a. Supplementary General Conditions (including conditions supplied by federal or state agencies on projects funded, in whole or part, by such agencies. In the event of a conflict in various forms of General Conditions, those conditions affording the greatest benefit or protection to the Owner shall govern.);
3b. General Conditions;
3c. Technical Specifications;

3.01.3 ASSIGNMENT OF CONTRACT

The Contractor shall not assign the Contract or any part of the Contract or of the funds to be received under the Contract unless such assignment is approved by the Owner and the Contractor’s Performance and Public Works Payment Bonds surety prior to the execution or effectiveness of the assignment.

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3.02 CONTROL OF WORK

3.02.1 AUTHORITY AND ROLE OF THE ENGINEER

(1) The Engineer is the authorized representative of the Owner, and is employed to act as advisor and consultant to the Owner in engineering matters relating to the Contract. Among other things, the Engineer may determine the quantity of material installed or work completed, evaluate whether materials and equipment comply with the specifications, and assist the Owner with answering questions relating to the meaning and intent of the Contract. The Owner, with the advice of the Engineer, will make the final determination relating to quality, acceptability and conformity of labor and materials to the requirements of the Contract.

(2) The Engineer does not purport to be a safety expert, and is not engaged in that capacity under the Contract or the Engineer’s contract with the Owner. The Engineer does not have either the authority or the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of Work for claimed violations thereof. From time to time, the Engineer may inform the Contractor of conditions that may constitute safety issues or violations. Such information will be provided solely to cooperate with and assist the Contractor and shall not make the Field Representative or the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures. After receiving information relating to safety issues from the Engineer, the Contractor shall make its own examination and analysis of the situation reported and take such action, if any, that the Contractor determines to be appropriate. The Engineer’s performance of project representation and observation services shall not make the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures; nor shall it make the Engineer responsible for construction means, methods, techniques, sequences, or procedures, or for the Contractor’s failure to properly perform the Work, all of which are entirely the responsibility of the Contractor.

(3) The Engineer shall have no liability whatsoever to, or contractual relationship with, the Contractor in any way relating to the Contract. The Owner and the Contractor shall look solely to each other for the enforcement with respect to any rights, obligations, claims or liabilities arising under or in any way relating to the Contract. Neither the authority given to the Engineer herein, nor any action or service provided by the Engineer or its subconsultants with regard to the Project, shall create any duty owed by the Engineer or its subconsultants to the Contractor or a cause of action against the Engineer or its subconsultants by Contractor.

(4) Nothing in the Contract shall, in any way, be construed to place responsibility on the Field Representative, Engineer or the Owner for the method, manner, direction or superintendency of the performance of the Work by the Contractor. Such responsibility rests solely with the Contractor.
(5) Neither the Engineer nor any of its assistants or agents shall have any power to waive any obligation of the Contract. The Engineer’s failure to reject Work that is defective or otherwise does not comply with the requirements of the Contract shall not constitute approval or acceptance of the Work or relieve the Contractor of its obligations under the Contract, notwithstanding that such Work have been estimated for payment or that payments have been made for that Work. Neither shall such failure to reject Work, nor any acceptance by the Engineer or by the Owner of any part or of the whole of the Work bar a claim by the Owner at any subsequent time for recovery of damages for the cost of removal and replacement of any portions of the Work that do not comply with the Contract.

(6) No order, measurement, determination or certificate by the Engineer or Owner for payment of money or payment for or acceptance of the whole or of any part of the Work by the Engineer or the Owner or extension of time or possession taken by the Owner shall constitute a waiver of any portion of the Contract, nor shall any waiver of any breach of the Contract constitute a waiver of any other or subsequent breach thereof.

3.02.2 AUTHORITY OF FIELD REPRESENTATIVE

(1) Field Representatives are assigned to the project site to keep the Engineer and Owner generally informed as to the progress of the Work and the manner in which it is being done; to keep records; and to act as liaison between the Contractor, Owner and Engineer. When observed, the Field Representative shall call the attention of the Contractor to any deviations from the Contract. However, failure of the Field Representative to call the attention of the Contractor to faulty Work or deviations from the Contract shall not constitute either a waiver of any requirement in the Contract or acceptance of said Work.

(2) Since one of the Field Representative’s primary responsibilities is to observe that the Work progresses expeditiously and in a workmanlike manner, he or she may offer suggestions to the Contractor, which the Contractor, at its sole discretion, may or may not choose to follow. Such suggestions are not to be considered as anything but suggestions offered to cooperate with and assist the Contractor and shall not constitute an assumption of responsibility, financial or otherwise, by the Field Representative, the Engineer or the Owner.

(3) The presence or absence of the Field Representative on the job site will be at the sole discretion of the Owner, and the presence or absence of the Field Representative at any time will not relieve the Contractor of its responsibility to properly perform the Work as required by the Contract.

(4) The Field Representative will have the authority, but not the obligation, to reject defective materials and equipment if observed; however, the failure of the Field Representative to reject defective materials and equipment or any other Work involving deviations from the Contract will not constitute acceptance of such Work. The Field Representative is not authorized to approve or accept any portion of the
Work or to issue instructions contrary to the Contract; all such approvals, acceptances or instructions shall be in writing and signed by the Engineer, subject to the Owner’s approval.

(5) The Field Representative does not purport to be a safety expert, and is not engaged in that capacity under the Contract or the Engineer’s contract with the Owner. The Field Representative does not have either the authority or the responsibility to enforce construction safety laws, rules, regulations or procedures, or to order the stoppage of Work for claimed violations thereof. From time to time, the Field Representative may inform the Contractor of conditions that may constitute safety issues or violations. Such information will be provided solely to cooperate with and assist the Contractor and shall not make the Field Representative, the Owner or the Engineer responsible for the enforcement of safety laws, rules, regulations or procedures. After receiving information relating to safety issues from the Field Representative, the Contractor shall make its own examination and analysis of the situation reported and take such action, if any, that the Contractor determines to be appropriate. The Field Representative’s performance of observation services shall not make the Field Representative responsible for the enforcement of safety laws, rules, regulations or procedures; nor shall it make the Field Representative responsible for construction means, methods, techniques, sequences, or procedures, or for the Contractor’s failure to properly perform the Work, all of which are entirely the responsibility of the Contractor.

3.02.3 CONSTRUCTION OBSERVATION AND INSPECTIONS

(1) All Work required by the Contract, including all materials and equipment to be furnished and the manufacture and preparation thereof shall, at all times, be subject to observation by the Owner’s designated representatives, who may, at any time in the performance of their duties, enter upon the Work or the shops and factories where any part of the Work, materials or equipment are being prepared, fabricated or manufactured.

(2) Observation of Work by the Owner, the Engineer, or the Field Representative shall not relieve the Contractor of its obligation to furnish satisfactory materials and workmanship. Work or materials found unsatisfactory at any time during the life of the Contract, and the applicable warranty periods, guarantees or limitation periods shall be promptly corrected or replaced immediately by the Contractor at its own expense.

(3) Upon request by the Owner or Engineer, the Contractor shall furnish all tools, labor, equipment and materials necessary to examine any Work that may be completed or in progress, even to the extent of uncovering or taking down portions of completed or covered Work. Work shall be left exposed until examined by the Owner or Engineer, at no additional cost to the Owner. If the Owner or the Engineer determines that the uncovered Work does not comply with the requirements of the Contract, the cost of such examination and the cost of reconstruction and/or repair shall be borne by the Contractor.
The Contractor shall promptly comply with all directions of the Engineer with reference to correcting any Work or replacing any materials or equipment found to be not in accordance with the Contract. In the event of a dispute, the Contractor may appeal to the Engineer’s decision to the Owner in accordance with the Contract, and the Owner’s decision shall be final.

3.02.4 EMERGENCY CONTACT LIST

The Contractor shall submit an emergency contact list to the Engineer no later than five calendar days after the date the contract is executed. The list shall include, at a minimum, the Contractor’s project manager or equivalent, project superintendent, traffic control supervisor, and erosion and sediment control lead. The list shall identify a representative with delegated authority to act as the emergency contact on behalf of the Contractor and include one or more alternates. The emergency contact shall be available upon the Engineer’s request at other than normal working hours. The emergency contact list shall include 24-hour telephone numbers for all individuals identified as emergency contacts or alternates.

3.02.5 ORAL AGREEMENTS

No oral agreement or conversation with any officer, agent, or employee of the Owner, either before or after execution of the contract, shall affect or modify any of the terms or obligations contained in any of the documents comprising the contract. Such oral agreement or conversation shall be considered as unofficial information and in no way binding upon the Owner, unless subsequently put in writing and signed by the Owner.

3.03 LEGAL RELATIONS AND RESPONSIBILITIES

3.03.1 APPLICABLE LAWS AND REGULATIONS

3.03.1(1) General

The Contractor shall comply with all laws, ordinances, rules and regulations of any authority having jurisdiction in any way relating to the project, including, but not limited to, regulations governing site maintenance, clean-up, air pollution control, noise control, water quality control, surface water control and runoff, tree and vegetation protection, cultural resources and oil and hazardous substance control.

3.03.1(2) Utilities and Similar Facilities

The Contractor shall protect all private and public utilities from damage. Utilities include, among others: telephone lines; cable television and high-speed internet lines; gas; electric power lines; sanitary sewer; sewer; storm sewer and water lines; street lighting and traffic signal and signing systems; and railroad tracks and related equipment.

In accordance with Chapter 19.122 of the Revised Code of Washington, the Contractor shall call the One-Number Locator Service for the field location of underground utilities. If no locator
service is available for the area where the project is located, the Contractor shall provide written notice to all owners of utilities known to, or suspected of, having underground facilities within or near all areas of that will be excavated.

If the Work requires removing or relocating one or more utilities, the Contract will assign the task to the Contractor or utility owner. When this task is assigned to the utility owner and that work is not complete before the Contractor begins work, the Contractor shall immediately notify the Engineer in writing.

To expedite the removal or relocation work or to make that work more efficient, the Contractor may ask utility owners to move, remove, or alter their utilities or equipment in ways other than those specified in the Contract. If so, the Contractor shall make the arrangements with the utility owner and pay all costs associated therewith.

The Contractor shall be responsible for all costs required to protect public and private utilities from damage, including the costs of removal and replacement.

3.03.1(3) Site Maintenance

The Contractor shall keep the Work site, staging areas, and Contractor’s facilities clean and free from rubbish and debris. Materials and equipment shall be removed from the Work site when they are no longer necessary. Upon completion of the Work and before final acceptance, the Work site shall be cleared of equipment, unused materials, and rubbish and the Work site shall be left in clean and neat condition.

3.03.1(4) State Taxes

The Washington State Department of Revenue has issued special rules on the State sales tax. Section 3-03.1(4) a through Section 3-03.1(4) c are meant to clarify those rules. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The Owner will not adjust its payment if the Contractor bases a bid on a misunderstood tax liability.

The Contractor shall include all Contractor-paid taxes in the unit bid prices or other contract amounts. In some cases, however, state retail sales tax will not be included. Section 3-03.1(4) b describes this exception.

The Owner will pay the retained percentage only if the Contractor has obtained from the Washington State Department of Revenue a certificate showing that all contract-related taxes have been paid (RCW 60.28.051). The Owner may deduct from its payments to the Contractor any amount the Contractor may owe the Washington State Department of Revenue, whether the amount owed relates to the Contract or not. Any amount so deducted will be paid into the proper State fund.
a. State Sales Tax — Rule 171

WAC 458-20-171, and its related rules, apply to building, repairing, or improving streets, roads, etc., which are owned by a municipal corporation, or political subdivision of the state, or by the United States, and which are used primarily for foot or vehicular traffic. This includes storm or combined sewer systems within and included as a part of the street or road drainage system and power lines when such are part of the roadway lighting system. For work performed in such cases, the Contractor shall include Washington State Retail Sales Taxes in the various unit bid item prices, or other contract amounts, including those that the Contractor pays on the purchase of the materials, equipment, or supplies used or consumed in doing the work.

b. State Sales Tax — Rule 170

WAC 458-20-170, and its related rules, apply to the constructing and repairing of new or existing buildings, or other structures, upon real property. This includes, but is not limited to, the construction of streets, roads, highways, etc., owned by the state of Washington; water mains and their appurtenances; sanitary sewers and sewage disposal systems unless such sewers and disposal systems are within, and a part of, a street or road drainage system; telephone, telegraph, electrical power distribution lines, or other conduits or lines in or above streets or roads, unless such power lines become a part of a street or road lighting system; and installing or attaching of any article of tangible personal property in or to real property, whether or not such personal property becomes a part of the realty by virtue of installation.

For work performed in such cases, the Contractor shall collect from the Owner, retail sales tax on the full contract price. The Owner will automatically add this sales tax to each payment to the Contractor. For this reason, the Contractor shall not include the retail sales tax in the unit bid item prices, or in any other contract amount subject to Rule 170, with the following exception.

**EXCEPTION:** The Owner will not add in sales tax for a payment the Contractor or a subcontractor makes on the purchase or rental of tools, machinery, equipment, or consumable supplies not integrated into the project. Such sales taxes shall be included in the unit bid item prices or in any other contract amount.

c. Services

The Contractor shall not collect retail sales tax from the Owner on any contract wholly for professional or other services (as defined in Washington State Department of Revenue Rules 138 and 244).
3.03.1(5) **Equal Employment Responsibilities**

The Contractor shall, at its sole cost and expense, comply with all applicable laws, policies and regulations pertaining to nondiscrimination and equal employment opportunities. The absence of specific provisions or other requirements mandated by state, municipal or federal laws, policies or regulations from these General Conditions shall not excuse the Contractor from compliance with such laws, regulations or policies.

3.03.1(6) **Archaeological and Historical Objects**

Archaeological or historical objects, such as ruins, human skeletal remains, sites, buildings, artifacts, fossils, or other objects of antiquity that may have significance from a historical or scientific standpoint, which may be encountered by the Contractor, shall not be further disturbed. The Contractor shall immediately notify the Engineer of any such finds.

The Engineer will determine if the material is to be salvaged. The Contractor may be required to stop work in the vicinity of the discovery until such determination is made. The Engineer may require the Contractor to suspend Work in the vicinity of the discovery until salvage is accomplished.

If the Engineer finds that the suspension of Work in the vicinity of the discovery increases or decreases the cost or time required for performance of any part of the Work under the Contract, the Engineer will make an adjustment in payment or the time required for the performance of the work in accordance with Section 3.04.6.

3.03.2 **SAFETY MEASURES**

All Work under the Contract shall be performed in a safe manner. The Contractor and all subcontractors shall comply with all applicable rules, regulations, and safety standards of the Washington State Department of Labor and Industries and all other federal, state, local and other governmental entities having jurisdiction over the project. The Contractor shall be solely and completely responsible for the conditions of the job site, including the safety of all persons and property during the performance of the Work. This requirement shall apply continuously and not be limited to normal working hours.

The Engineer’s review of the Contractor’s work plan, safety plan, construction sequences, schedule or performance does not and is not intended to include review or approval of the adequacy of the Contractor’s safety measures in, on, or near the job site. The Engineer does not purport to be a safety expert, and is not engaged in that capacity under the Contract. The Engineer has neither the authority nor the responsibility to enforce construction safety laws, rules, regulations, or procedures, or to order the stoppage of Work for claimed violations thereof.

The Contractor shall exercise all required and appropriate precautions to protect all persons and property from injury and damage.
3.03.3 HAZARDOUS MATERIAL

Biological hazards and associated physical hazards may be present at the Work site. The Contractor shall take precautions and perform any necessary Work to provide and maintain a safe and healthful Work site in accordance with all applicable laws. The cost for all Work necessary to provide and maintain a safe Work site shall be included in the Contractor’s Proposal, unless the Contract includes provisions to the contrary.

3.03.4 PAYMENT OF WAGES AND RELATED REQUIREMENTS

3.03.4(1) Minimum Prevailing Wage Requirements

a. This Contract is subject to the minimum prevailing wage and hour requirements of RCW 39.12 and RCW 49.28 (as amended or supplemented). On projects having federal funding, federal wage laws and rules may also apply. The Contract may list minimum hourly rates for wages for trades or occupations in the locality within the state where such labor is performed as determined by the Industrial Statistician for the Department of Labor and Industries or under the federal Davis-Bacon Act. These rates are for general reference purposes only and may not be current or complete. The Contractor, any subcontractor, or other person doing any Work under the Contract shall not pay any worker less than the applicable current minimum hourly wage rates required by applicable law. Higher wages and benefits may be paid.

b. The Contractor, any Subcontractor, and all individuals or firms required by RCW 39.12, WAC 296-127, or the Federal Davis-Bacon and Related Acts (DBRA) to pay minimum prevailing wages, shall not pay any worker less than the minimum hourly wage rates and fringe benefits required by RCW 39.12 or the DBRA. Higher wages and benefits may be paid.

c. In accordance with WAC 296-127, the applicable prevailing wage rates that are in effect on the date when Proposals are due shall remain in effect for the duration of the Contract. By incorporating prevailing wage rates into the Contract, the Owner does not warrant or imply that the Contractor will find labor available at those rates. The Contractor shall calculate in its Proposal any amounts above the minimums that it will actually have to pay. Further, rates for wages and/or fringe benefits may change while the Contract is in force. If they do, the Contractor shall bear the cost of paying rates above those in effect at time of bid.

d. If employing labor in a class not listed in the Contract Provisions on State funded projects, the Contractor shall request the Industrial Statistician, Department of Labor and Industries to determine the correct wage and benefits rate.

e. If employing labor in a class not listed in the Contract Provisions on a federally funded project, the Contractor shall request the U.S. Secretary of Labor to determine the correct wage and benefits rate.
f. The Contractor shall ensure that any firm (Supplier, Manufacturer, or Fabricator) that falls under the provisions of RCW 39.12 because of the definition “Contractor” in WAC 296-127-010, complies with all the requirements of RCW 39.12.

g. The Contractor shall be responsible for compliance with the requirements of the DBRA and RCW 39.12 by all firms (Subcontractors, lower tier subcontractors, Suppliers, Manufacturers, or Fabricators) engaged in any part of the Work necessary to complete this Contract. Therefore, should a violation of this Subsection occur by any firm that is providing Work or materials for completion of this Contract whether directly or indirectly responsible to the Contractor, the Owner will take action against the Contractor, as provided by the provisions of the Contract, to achieve compliance, including, but not limited to, withholding payment on the Contract until compliance is achieved.

3.03.4(2) Posting Notice Requirements

Notice of intent to pay prevailing wages and prevailing wage rates for the project shall be posted for the benefit of workers. The Contractor shall post the following, together with anything else necessary to comply with all applicable laws and regulations:

a. One copy of the approved “Statement of Intent to Pay Prevailing Wages” for the Contractor, each subcontractor, and any other firm (Supplier, Manufacturer, or Fabricator) that falls under the provisions of RCW 39.12 because of the definition of “Contractor” in WAC 296-127-010;

b. One copy of the prevailing wage rates for the project;

c. The address and telephone number of the Industrial Statistician for the Department of Labor and Industries, along with a statement that complaints and questions about wage rates may be directed there; and

d. FHWA 1495/1495A “Wage Rate Information” poster if the project is funded with federal aid.

Notice shall be posted at a location readily visible to workers at the job site, or where no field office is established, at a local office. The Contractor shall supply a copy of the Notice to any employee upon request.

3.03.4(3) Apprentices

If employing apprentices, the Contractor shall submit to the Owner written evidence showing:

a. That each apprentice is enrolled in a program approved by the Washington State Apprenticeship and Training Council;

b. The progression schedule for each apprentice; and
c. The established apprentice-journeyman ratios and wage rates in the project locality upon which the Contractor shall base such ratios and rates under the contract. Any worker for whom an apprenticeship agreement has not been registered and approved by the Washington State Apprenticeship and Training Council shall be paid the prevailing hourly rate for journeymen provided in RCW 39.12.021.

3.03.4(4) Required Documents

On forms provided by the Industrial Statistician of Washington State Labor & Industries, the Contractor shall submit to the Owner the following for itself and for each subcontractor and firm covered under RCW 39.12 that provides work and materials for the Contract:

a. A copy of an approved “Statement of Intent to Pay Prevailing Wages.” The Owner will make no payment under the Contract until this statement has been completed and submitted to the Owner.

b. A copy of an approved “Affidavit of Wages Paid.” This affidavit certifies the Contractor has complied with all prevailing wage requirements. The Owner will not release to the Contractor any funds retained under RCW 60.28 until all of the “Affidavits of Wages Paid” have been completed and submitted to the Owner and approved by the Department of Labor and Industries.

c. At the end of each month a statement signed by the Contractor that prevailing wages have been paid in accordance with the Contractor’s Statement of Intent to Pay Prevailing Wages shall be on file with the Owner. If the Contractor fails to submit this statement, the progress payment will not be paid.

d. The Contractor shall submit certified payrolls to the Owner for the Contractor and all Subcontractors or lower tier subcontractors on federally funded projects and, when requested by the Owner, or agents on other projects. If certified payrolls are not supplied within 10 calendar days after the end of the preceding weekly payroll period for federal-aid projects or within 10 calendar days from the date of the written request on projects with Owner funds only, any or all payments may be withheld until compliance is achieved. All certified payrolls shall be complete and explicit. Employee Work classification codes used on certified payrolls shall coincide exactly with the occupation codes listed on the minimum wage schedule in the Contract Provisions, unless the Engineer specifically approves an alternate method to identify the occupation coding used by the Contractor to compare with the codes listed in the Contract Provisions. When an apprentice is shown on the certified payroll at a rate less than the minimum prevailing journey wage rate, the apprenticeship registration number for that employee from the State Apprenticeship and Training Council shall be shown along with the correct employee classification code.

e. Final Contract Voucher Certification.
3.03.5 BONDS, INSURANCE AND INDEMNITY OBLIGATIONS

3.03.5(1) Contract Bonds

See Agreement for requirements.

3.03.5(1.1) Two-Year Guarantee Period

See Agreement for requirements.

3.03.5(2) Worker’s Benefits

a. The Contractor shall make all payments required for unemployment compensation under RCW Title 50 and for industrial insurance and medical aid required under RCW Title 51. If any payment required by Title 50 or Title 51 is not made when due, the Contractor shall indemnify the Owner with respect to all costs and damages, including attorneys’ fees and expenses, associated with such nonpayment. The Owner may retain payments due under Title 50 or Title 51 from any money due to the Contractor and make payment to the appropriate fund.

b. The Contractor shall include in the various items in its bid Proposal all costs for payment of unemployment compensation and for providing the required insurance coverage(s). The Contractor will not be entitled to any additional payment for: (1) failure to include such costs in the Proposal, or (2) post-Award determinations made by the U.S. Department of Labor, the Washington State Department of Labor and Industries, or any other agency or entity regarding insurance coverage requirements.

3.03.5(4) Public Liability & Property Damage Insurance

See Agreement, Exhibit A for requirements.

3.03.5(5) Indemnity and Hold Harmless

See Agreement, Exhibit A.

3.03.5(6) Patent Royalties & Process Fees

The Contractor shall be responsible for all costs arising from the use of patented devices, materials, or processes used in or incorporated in the Work. The Contractor agrees to indemnify, defend, and save harmless the Owner from all claims and damages, in any way relating to the use of patented devices, materials, or processes used in or incorporated in the Work.

3.03.6 METHOD OF SERVING NOTICE

All correspondence from the Contractor constituting any notification, notice of protest, notice of dispute, or other correspondence constituting notification required to be furnished under the Contract, shall be in paper format, hand delivered or sent via mail delivery service to the Owner’s office with a copy to the Engineer’s office. Electronic formats such as emails or electronically
delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract.

3.04 PROSECUTION AND PROGRESS OF THE WORK

3.04.1 QUALITY OF WORK

3.04.1(1) Workmanship

a. The Contractor represents that it is fully experienced and possesses all the necessary capital, facilities and expertise to perform all of the Work, and hereby guarantees that all of the Work performed by it under the Contract will be of the highest quality and done in a workmanlike fashion in strict accordance with the requirements of the Contract.

b. The Contractor shall at all times employ skilled workmen and use skilled Subcontractors in the performance of the Work. When required in writing by the Owner or the Engineer, the Contractor or its Subcontractors shall remove from the Work site any person or Subcontractor who is, in the opinion of the Owner or the Engineer, not competent, not qualified, disorderly, or otherwise unsatisfactory and shall not again employ such discharged person or Subcontractor on the Work, except with the prior written consent of the Owner. Discharge of any person or Subcontractor shall not be the basis of any claim for compensation or damages against the Owner or the Engineer.

c. All Work performed under the Contract shall be of first quality workmanship throughout, with the Work complete and in full working order upon completion.

d. Except when otherwise expressly specified in the Contract, the Contractor shall design, survey, layout and be responsible for all methods, materials and equipment used in performing the Work.

e. If, at any time, the Contractor’s workforce (including Subcontractors), in the opinion of the Owner and/or the Engineer, shall be inadequate for maintaining the necessary progress required to complete the Work within the Contract Time, the Contractor shall, if so required by the Owner and/or the Engineer, increase the workforce or equipment to such an extent as to give reasonable assurance of compliance with the Work schedule. The failure of the Owner and/or the Engineer to make such demand shall not relieve the Contractor of its obligation to perform the Work in accordance with the requirements of the Contract. The Contractor alone shall be responsible for the safety, efficiency and adequacy of its activities, construction methods and the rate of progress required by the Contract.

3.04.1(2) Contractor’s Supervisory and Site Personnel

a. The Contractor shall assign sufficient supervisory personnel to ensure the faithful prosecution of the Work and shall have adequate supervisory personnel present at the work site.
the Work site who are either employees of the Contractor or duly authorized representatives designated in writing to the Owner and/or the Engineer. The Contractor shall at all times maintain at the Work site a complete copy of the Contract Provisions, Contract Plans, and record drawings of the Work that has been completed.

b. The Contractor shall at all times have at least one duly authorized supervisory representative at the Work site who shall be fully authorized to make binding decisions on behalf of the Contractor with respect to the Work. If the Contractor’s duly authorized supervisory representative at the Work site will be absent from the Work site for more than four hours, he/she shall designate an assistant who possesses the same authority and so inform the Owner and the Field Representative, if applicable.

3.04.2 MATERIALS AND EQUIPMENT

(1) Materials and equipment furnished and installed shall be manufactured, fabricated or constructed to meet all applicable safety requirements. All material and equipment supplied by the Contractor and incorporated in the Work shall be of new manufacture, free from defects and in strict compliance with the requirements of the Contract. When required by the Owner, a certificate from the manufacturer or other responsible supplier shall be supplied attesting to this fact.

(2) All tools and equipment used for construction operations shall be of the size and type suitable for the Work and shall be kept in safe and good working condition at all times.

(3) The Contractor shall, whenever required during the progress of the Work and after completion of the Work, furnish proof acceptable to the Owner that all items of equipment and all materials installed equal or exceed all requirements specified in the Contract.

(4) The Contractor shall use all means possible to protect materials and equipment from damage or degradation of any kind before, during and after installation.

(5) The Contractor shall replace any materials or equipment damaged during the performance of the Work to the approval of the Owner and the Engineer. The cost of replacing damaged materials and equipment shall be borne by the Contractor.

3.04.3 SPECIFICATION OF PARTICULAR MATERIALS AND EQUIPMENT

(1) Within the Contract, certain items are specified by brand, style, trade name, or manufacturer in order to set forth a standard of quality, and/or preference by the Owner. Unless specifically noted otherwise, it is not the intent of the Contract to exclude other processes or materials of a type and quality equal to those designated.
(2) The term “or equal” as used in the Contract does not mean that the Contractor’s substitution of material or equipment will necessarily be approved as equal by the Engineer. If the Contractor desires to substitute material or equipment on the basis that it is equal to that specified, the Contractor shall submit a written request to the Engineer to substitute the material or equipment. The Contractor shall not use or incorporate such material or equipment into the Work until the Contractor has received written approval from the Engineer and the Owner.

(3) If the Contractor proposes substitutions, the Engineer will record all time used to evaluate each proposed substitution. If an approved substitution requires revisions to the Contract Documents, the Engineer will record all time to accomplish the revisions. Whether or not the Engineer approves a proposed substitution all direct and indirect cost to evaluate the proposed substitution shall be deducted from amounts due or to become due to the Contractor.

(4) No additional compensation or extension of time will be allowed the Contractor for any changes required to incorporate substituted materials or equipment.

3.04.4 STORAGE

3.04.4(1) On-Site Storage

The Contractor shall store all equipment and materials in a safe and suitable place in accordance with the manufacturer’s recommendations. Materials and equipment shall be covered or wrapped to protect them from moisture, dust and deterioration, as required or necessary. All on-site storage areas shall be approved in advance by the Owner and the Engineer.

3.04.4(2) Off-Site Storage

The Contractor may be required to provide offsite storage of equipment and materials to enable construction to occur at the Work site. The Contractor has full responsibility to secure all offsite storage areas, if needed, and shall include the costs for providing such storage areas in the bid Proposal for the individual equipment and material items requiring off-site storage. All off-site storage areas shall be enclosed or fenced and be secure.

3.04.5 DEFECTIVE MATERIALS, EQUIPMENT AND WORKMANSHIP

(1) Materials, equipment, or workmanship which, in the opinion of the Owner or the Engineer, does not conform to the Contract or are in any other way unsatisfactory or unsuited to the purpose for which they are intended may be rejected. The Contractor shall remove from the Work site without delay, all rejected materials, equipment and work, and shall promptly replace the same in strict conformity with the requirements of the Contract. Unsatisfactory materials, equipment and workmanship may be rejected at any time, notwithstanding any previous testing, inspection or acceptance of such materials, equipment or workmanship, or inclusion thereof in any previously issued progress estimates.
(2) If the Contractor fails to correct defective Work, equipment or materials, the Owner shall have the right to exercise any of the following options or any combination thereof:

a. The Owner may replace the defective Work, materials or equipment by purchase from or contract with any other parties at the expense of the Contractor, and in this event, the Owner shall be entitled without compensation to the Contractor, to the use of the defective Work or equipment for such reasonable time as is necessary to enable Owner to replace such defective Work, materials or equipment.

b. The Owner may elect to accept the defective Work, materials or equipment and issue a Change Order reflecting a credit against the contract price, computed under the terms of the Contract in an amount to be determined by the Engineer, which amount shall reflect the actual value to the Owner of the accepted Work.

c. Upon receipt of notice from the Owner of any defects in material, equipment or workmanship which appear within a two-year period following the Substantial Completion Date, or within any other warranty or guarantee period required by the Contract or provided by a manufacturer or supplier, the Contractor shall promptly and with the least possible delay and inconvenience to the Owner, repair or replace such defective workmanship, material or equipment without expense to the Owner.

d. The Contractor shall be responsible for the full cost of correcting defective Work and complying with warranties and guarantees as required by the Contract. Direct or indirect costs, including administrative and engineering, incurred by the Owner attributable to correcting and remedying defective or unauthorized work, or Work the Contractor failed or refused to perform, shall be paid by the Contractor. Payment will be deducted by the Owner from monies due, or to become due, the Contractor. Such direct and indirect costs shall include in particular, but without limitation, compensation for additional professional services required, and costs for repair and replacement of work of others destroyed or damaged by correction, removal, or replacement of the Contractor’s unauthorized work.

e. All warranties, guarantees, and other obligations to correct work that does not comply with the Contract are material requirements of the Contract. The performance of all warranties, guarantees and other obligations shall be secured by the Performance Bond and the Public Works Payment Bond submitted by the Contractor at the time the Contract is signed.

3.04.6 CHANGES IN THE WORK

(1) The Owner, upon recommendation of the Engineer may, at any time, without notice to the Performance Bond or Public Works Payment Bond sureties, by written order
designated or indicated to be a Change Order or Change Directive, make any change, including modifications to, additions to or deletions from the Work including, but not limited to, changes:

a. To the Contract Provisions and Contract Plans;

b. To quantities or performance of the Work;

c. To Owner-furnished facilities, equipment, materials, services or the Work site; or

d. To the schedule for the Work or the Contract Time.

(2) A Change Order is an amendment to the Contract, which signifies changes in the scope of the Work, the Contract Time, and/or the Contract price. A Change Order shall be the complete expression of the agreement between the Owner and the Contractor. No claims or entitlement to and equitable adjustment or changes to the Contract Time and/or Contract Price will be allowed for alleged verbal or oral agreements or directives.

(3) The Engineer will issue a written change order for any change that has been approved in writing by the Owner. If the Engineer determines that the change increased or decreased the Contractor’s costs or time to do any of the Work, the Engineer shall present that determination to the Owner and the Owner may make an equitable adjustment to the Contract. The equitable adjustment will be by agreement with the Contractor. However, if the parties are unable to agree, the Engineer will determine the amount of the equitable adjustment in accordance with Section 3.04.6(7), present its determination to the Owner, and the Owner may adjust the cost and the time based upon the Engineer’s recommendation. Extensions of time will be evaluated in accordance with Section 3.04.15(1).

The Contractor shall proceed with the Work upon receiving:

1. A written change order approved by the Owner; or

2. A documented oral order from the Engineer before actually receiving the written change order.

Within 14 calendar days of delivery of the change order the Contractor shall endorse and return the change order, request an extension of time for endorsement or respond in accordance with Section 3.04.8. The Owner may unilaterally process the change order if the Contractor fails to comply with these requirements. Changes normally noted on field stakes or variation from estimated quantities, except as provided in Section 3.04.6(8), will not require a written change order. These changes shall be made at the unit prices that apply. The Contractor shall respond immediately to changes shown on field stakes without waiting for further notice.
The Contractor shall obtain written consent of the Surety or Sureties if the Engineer requests such consent.

(4) All Change Orders will be prepared and signed by the Owner and Engineer and executed in triplicate with one copy to the Owner, one to the Contractor, and one retained by the Engineer.

(5) If the Contractor encounters any circumstances during the performance of the Work that the Contractor contends creates any entitlement to a change in the Contract Time, the Contract Price, or both, the Contractor shall immediately provide written notice to the Engineer and the Owner. Within 10 calendar days after providing written notice, the Contractor shall provide a written request to the Engineer and the Owner for a change to the Contract Time and/or Contract Price and provide detailed information supporting the request, including cost and schedule information.

(6) No claim by the Contractor shall be allowed if the terms of this Section 3.04.6 are not strictly followed. In the event of any non-compliance, the Contractor shall be conclusively determined to have waived any claim or entitlement to an adjustment of the Contract Time or the Contract Price.

(7) The cost to be included in an adjustment for any changes to the Work, adjustment of the Contract Time or Contract Price and any equitable adjustment or entitlement related to the Work or the Contract shall meet the claim notice provisions of Section 3.04.6, and will be determined strictly by one or a combination of the following methods:

a. Contract unit bid prices previously agreed upon; or

b. If there are no unit bid prices, an agreed lump sum; or

c. If the amount of the adjustment cannot be agreed upon in advance or in the manner provided in subparagraph a or b above, the cost will be determined by the actual cost of:

1. Labor including working foremen. Labor rates will only include the basic wage and fringe benefits, the current rated for Federal Insurance Compensation Act (FICA), Federal Unemployment Tax Act (FUTA) and State Unemployment Tax Act (SUTA), and the company’s present rates for medical aid and industrial insurance premiums;

2. Materials incorporated permanently into the Work;

3. The ownership or rental cost of equipment during the time of use on the extra work. Equipment rates shall be as set forth in the then current AGC/WSDOT Equipment Rental Agreement. These rates
shall be full compensation for all costs incidental to furnishing and operating the equipment. The Contractor shall submit copies of the applicable portions of the AGC/WSDOT Equipment Rental Agreement to the Engineer; plus

4. Overhead and Profit as follows:

For Work performed by the Contractor, an amount to be agreed upon but not to exceed 15 percent of the labor, material, and equipment cost agreed to by the Engineer as compensation for supervision, small tools, provisions for safety, home office and field overhead, profit and other general conditions expenses, including, but not limited to, insurance, bond and business and occupation taxes.

For Subcontractor Work, the Subcontractor will be allowed an amount to be agreed upon but not to exceed 15 percent of the labor, material, and equipment cost agreed to by the Engineer as compensation for supervision, small tools, provisions for safety, home office and field overhead, profit and other general conditions expenses, including, but not limited to, insurance, bond and business and occupation taxes. The Contractor will be allowed an additional markup of 10 percent to compensate the Contractor for all administrative costs, including home office and field overhead, profit, bonding, insurance, business and occupation taxes and any other costs incurred.

In no case will the total fixed fee for the Contractor and all Subcontractors of all tiers exceed 30 percent.

Payment to the Contractor will be made only for the actual quantities of Work performed and accepted in conformance with the Contract. When the accepted quantity of Work performed under a unit item varies from the original bid quantity, payment will be at the unit Contract price for all Work unless the total accepted quantity of any Contract item, adjusted to exclude added or deleted amounts included in change orders accepted by both parties, increases or decreases by more than 25 percent from the original bid quantity, and that bid item represents 10 percent or more of the total original contract price. In that case, payment for Contract Work may be adjusted as described herein.

The adjusted final quantity shall be determined by starting with the final accepted quantity measured after all Work under an item has been completed. From this amount, subtract any quantities included in additive change orders accepted by both parties. Then, to the resulting amount, add any quantities included in deductive change orders accepted by both parties. The final result of this calculation shall become the adjusted final quantity and the basis for comparison to the original Proposal quantity.
a. **Increased Quantities.** Either party to the Contract will be entitled to renegotiate the price for that portion of the adjusted final quantity in excess of 1.25 times the original Proposal quantity, if 10 percent or more of the original contract price. The price for excessive increased quantities will be determined by agreement of the parties, or, where the parties cannot agree, the price will be determined by the Engineer based upon the actual costs to perform the Work, including reasonable markup for overhead and profit. The final price will be determined by the Engineer subject to the Owner’s approval.

b. **Decreased Quantities.** Either party to the Contract will be entitled to an equitable adjustment if the adjusted final quantity of Work performed is less than 75 percent of the original Bid quantity, if 10 percent or more of the original contract price. The Contractor shall submit the documentation to support the equitable adjustment to the Engineer. The equitable adjustment shall be based upon and limited to three factors:

1. Any increase or decrease in unit costs of labor, materials or equipment, utilized for Work actually performed, resulting solely from the reduction in quantity;

2. Changes in production rates or methods of performing Work actually done to the extent that the nature of the Work actually performed differs from the nature of the Work included in the original plan; and

3. An adjustment for the anticipated contribution to unavoidable fixed cost and overhead from the units representing the difference between the adjusted final quantity and 75 percent of the original Plan quantity.

The following limitations shall apply to renegotiated prices for increases and/or equitable adjustments for decreases:

1. The equipment rates shall be actual cost but shall not exceed the rates set forth in the AGC/WSDOT Equipment Rental Agreement.

2. No payment will be made for extended or unabsorbed home office overhead and field overhead expenses to the extent that there is an unbalanced allocation of such expenses among the Contract Bid items.

3. No payment for consequential damages or loss of anticipated profits will be allowed because of any variance in quantities from those originally shown in the Proposal form, Contract Provisions, and Contract Plans.
4. The total payment (including the adjustment amount and unit prices for Work performed) for any item that experiences an equitable adjustment for decreased quantity shall not exceed 75 percent of the amount originally Bid for the item.

If the adjusted final quantity of any item does not vary from the quantity shown in the Proposal by more than 25 percent, then the Contractor and the Owner agree that all Work under that item will be performed at the original Contract unit price.

When ordered by the Engineer and Owner, the Contractor shall proceed with the Work pending determination of the cost or time adjustment for the variation in quantities.

The Contractor and the Owner agree that there will be no cost adjustment for decreases if the Owner has entered the amount for the item in the Proposal form only to provide a common Proposal for Bidders.

3.04.7 DIFFERING SITE CONDITIONS

The Contractor shall promptly, and before such conditions are disturbed, notify the Engineer and Owner in writing of: (1) pre-existing subsurface or latent physical conditions at the Work site that differ materially from those indicated in the Contract Documents, or (2) pre-existing unknown physical conditions at the Work site, of an unusual nature, that differ materially from those ordinarily encountered and generally recognized as inherent in the Work of the character required by the Contract. The Engineer and Owner shall be given an opportunity to examine such conditions in order to evaluate possible modifications to the Work to mitigate such conditions. If the Engineer and Owner determine that conditions are materially different and cause a material increase or decrease in the Contractor’s cost of, or time required for, performance of any part of the Work, an equitable adjustment may be made in the Contract Time and/or Contract price in accordance with other applicable provisions of the Contract relating to changes in the Work. Failure of the Contractor to give notice of such conditions at the time of discovery shall constitute a waiver of any claim for an equitable adjustment. Any such adjustments to the Contract Price shall be computed strictly limited to amounts provided under paragraph 3.04.6.

3.04.8 PROTEST BY THE CONTRACTOR

If the Contractor disagrees with anything in a Change Order or a written directive, or with any interpretation or determination by the Engineer and Owner, the Contractor shall:

a. Immediately submit a signed written notice of protest to the Engineer and Owner before doing the Work;

b. Supplement the written protest within 14 calendar days with a written statement and supporting documents providing the following:
1. The date and nature of the protested order, direction, instruction, interpretation or determination;

2. A full discussion of the circumstances which caused the protest, including names of persons involved, time, duration, and nature of the Work involved and a review of the Plans and Contract Provisions referenced to support the protest;

3. The estimated dollar cost, if any, of the protested Work and a detailed breakdown showing how that estimate was determined; and

4. An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption; and

5. If the protest is continuing, the information required above shall be supplemented upon request by the Engineer until the protest is resolved.

The Contractor shall keep detailed and complete records of extra costs and schedule impacts to Contract Time that in any way relate to a protest. The Contractor shall allow the Engineer and Owner to have access to all documents and records needed for evaluating the protest.

The Engineer and Owner will evaluate all protests that comply with this Section. If the Engineer and Owner determine that a protest is valid, the Engineer and Owner may adjust the Contract Price and/or the Contract Time by an adjustment in accordance with Section 3.04.6 and 3.04.15(2).

During the time when any protest is pending, the Contractor shall proceed promptly with the Work, as the Engineer and Owner order in writing.

The Contractor’s failure to submit a protest in strict accordance with the requirements of this Section shall constitute a waiver of any claim for an adjustment to the Contract Time, the Contract Price, or other relief.

3.04.9 SUBCONTRACTORS AND SUBCONTRACTS

3.04.9(1) Contractor Responsibility

Nothing contained in the Contract shall create any contractual or other relationship between the Owner and/or the Engineer and any Subcontractor or sub-subcontractor, and no performance undertaken by any such Subcontractor or sub-subcontractor shall, under any circumstances, relieve the Contractor of its obligations and responsibilities under the Contract.

Prior to subcontracting any Work, the Contractor shall verify that every first tier Subcontractor meets the responsibility criteria stated below at the time of subcontract execution. The Contractor shall include these responsibility criteria in every subcontract, and require every Subcontractor to:
1. Possess any electrical contractor license required by 19.28 RCW or elevator contractor license required by 70.87 RCW, if applicable;

2. Have a certificate of registration in compliance with Chapter 18.27 RCW;

3. Have a current State unified business identifier number;

4. If applicable, have:
   a. Industrial insurance coverage for the bidder’s employees working in Washington (Title 51 RCW);
   b. An employment security department number (Title 50 RCW);
   c. A state excise tax registration number (Title 82 RCW).

5. Not be disqualified from bidding on any public works contract under RCW 39.06.010 or RCW 39.12.065(3);

6. Verify these responsibility criteria for every lower tier subcontractor at the time of subcontract execution; and

7. Include these responsibility criteria in every lower tier subcontract.

3.04.9(2) Contractor Work Performance Requirement

Work done by the Contractor’s own organization shall account for at least 30 percent of the awarded Contract price.

3.04.9(3) Approval of Subcontractors

The Contractor shall not subcontract Work unless the Engineer approves in writing. Each request to subcontract shall be on the form the Engineer provides. If the Engineer requests, the Contractor shall provide proof that the subcontractor has the experience, ability, and equipment the work requires. The Contractor shall require each subcontractor to comply with Section 3.03.4 and to furnish all certificates and statements required by the contract. Approval of a Subcontractor by the Owner shall not relieve the Contractor or Subcontractor of any obligations or responsibilities under the Contract. Any delays or other impacts caused by the failure of the Contractor to provide required information and obtain approval of any Subcontractor in a timely manner will not be considered as justification for additional compensation or an extension of the Contract Time.

3.04.9(4) Subcontracts

Upon approval of Subcontractors by the Owner, the Contractor shall, if requested, provide the Owner with complete copies of all subcontracts entered into between the Contractor and any Subcontractor. Providing requested subcontracts to the Owner shall be a condition precedent to the Owner’s obligation to make any progress payment to the Contractor.

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3.04.9(5) **Incorporation of Contract**

Every subcontract entered into by the Contractor shall expressly bind each Subcontractor to all of the terms and conditions of the Contract, which the Contractor shall incorporate into each subcontract by reference.

3.04.9(6) **Replacement of Subcontractors**

Subject to the requirements of state and/or federal agencies having jurisdiction over MBE/WBE/DBE requirements applicable to the Work, should it become impossible for a Subcontractor to perform the Subcontractor’s intended work, the Contractor shall submit the information required above for an alternate Subcontractor at least 10 days prior to the time that the Subcontractor is scheduled to begin work. The failure of any Subcontractor to perform its portion of the Work in a timely or workmanlike fashion is the sole responsibility of the Contractor.

3.04.10 **MUTUAL RESPONSIBILITY OF CONTRACTORS**

The Owner reserves the right to perform other work on or near the Work site using its own forces and/or other contractors. The Contractor shall take all reasonable steps to coordinate its performance of the Work with the Owner and/or such other contractors and subcontractors. If, through acts of commission or omission on the part of the Contractor, any other contractor or any subcontractor shall suffer loss or damage with respect to the other work being performed by the Owner, the Contractor agrees to promptly settle with such other contractor or subcontractor by agreement or other dispute resolution process. The Contractor agrees to indemnify and hold harmless the Owner and the Engineer from all claims asserted against and liability incurred by the Owner or the Engineer resulting from disputes between the Contractor and any other contractor or any subcontractor or material supplier. The indemnification rights of the Owner and the Engineer include expenses such as, but not limited to, salaries/wages of employees and all other expenses relating to any mediation, litigation, or arbitration, including costs, consulting fees and attorneys’ fees. If such other contractor or subcontractor shall assert any claim against the Owner on account of any damage alleged to have been sustained by an act or omission of the Contractor or anyone for whose acts it may be liable, the Owner or the Engineer shall notify the Contractor, which shall defend, indemnify and save harmless the Owner and the Engineer against such claim.

The coordination of the Work with other work by the Owner shall be taken into account by the Contractor as part of its site investigation obligations under Section 2.01.4, and all costs thereof shall be borne by the Contractor as part of the contract price for the Work.

3.04.11 **RISK OF LOSS**

The Contractor shall have all risk of loss for all Work in progress, all materials, all equipment and all other items in any way relating to the Work through theft, fire, other casualty, act of God, or any other cause until the Contract Completion Date.
3.04.12 MEASUREMENT AND PAYMENT

3.04.12(1) General

The Contract price for the Work, whether lump sum or unit prices, shall constitute full compensation for furnishing all facilities, labor, materials, appurtenances, and incidentals and performing all operations necessary to construct and complete all items of the Work in accordance with the Contract, notwithstanding that minor or incidental features of the Work may not be shown on the Contract Plans or Contract Provisions.

3.04.12(2) Measurement

Measurement for all items shall be as specified in the Contract for unit price and lump sum price items.

3.04.12(3) Payment

Payment for all of the Work will be made at the lump sum or unit contract price as set forth in the Contract. Payment of the contract price shall constitute full compensation for the complete performance of all of the Work.

3.04.12(4) Access to Books and Records

The Contractor shall, whenever so requested, give the Owner and/or the Engineer access to all invoices, bills of lading and other documents relating to the Work. The Contractor shall, without charge, provide personnel and measures and scales with adequate capacity for measuring or weighing any materials or other items paid for on a unit price basis.

3.04.12(5) Progress Payment Estimates

Progress payment estimates shall be prepared by the Engineer and reviewed by the Contractor and will be submitted with the Engineer’s recommendation to the Owner for its approval on the first day of the month for all Work completed through the 26th day of the preceding month, unless otherwise agreed upon by the Owner, the Engineer and the Contractor. The Engineer will prepare progress payment estimates as accurately as available information permits. The Owner will make no payment under the Contract for the Work performed until the “Statement of Intent to Pay Prevailing Wages,” in accordance with RCW 39.12.040, is submitted to the Engineer, including Subcontractor wage rates. In general, each progress payment will be based upon the payment schedule and the value of Work performed during the preceding pay period. Before the final progress payment estimate is prepared, all quantities will be reviewed by the Engineer.

3.04.12(6) Payment for Materials on Hand

The Owner may reimburse the Contractor for 90 percent of the invoice amount of materials and equipment purchased before their incorporation into the work if properly stored on or near the Work site. Invoices for equipment and materials will be verified and approved by the Engineer. Each invoice shall be sufficiently detailed to enable the Engineer to determine actual costs.
Payment for materials on hand shall not exceed the total contract cost of the contract item. Payment will not be made for granular materials, forming materials, consumables, nails, tie wire, etc. Payment will not be made for materials for any invoice that is less than $2,000.00 or for freight bills and similar items. Payment for equipment or materials on hand shall not constitute acceptance of the equipment or materials. Equipment and materials will be rejected if found to be faulty, even if payment for it has been made.

3.04.12(7) Payments Withheld

The Engineer may decide not to recommend approval of all or a portion of a progress estimate, and/or the Owner may decide to withhold from a progress estimate an amount sufficient to protect the Owner from loss because of:

a. Defective Work not remedied;

b. Third-party claims or reasonable evidence indicating the probability that a third-party claim will be asserted;

c. Failure of the Contractor to make timely and proper payments to Subcontractors or for labor, materials or equipment;

d. Reasonable evidence that the Work cannot be completed for the unpaid balance of the contract price;

e. Damage to the Owner or another contractor;

f. Reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance of the contract price will not be adequate to cover actual or liquidated damages for the anticipated delay;

g. Repeated failure by the Contractor to comply with the directions of the Owner or the Engineer or to carry out the Work in accordance with the Contract;

h. Other appropriate reasons necessary to protect the Owner.

3.04.12(8) Payment Upon Correction of Deficiencies

When the reason or reasons for withholding payment are resolved, payment will be made for amounts previously withheld.

3.04.12(9) Final Payment

After final inspection (Section 3.04.16(2)) of the Work and a determination by the Engineer and Owner that the Physical Completion Date has been achieved, the balance of the Contract price due to the Contractor will be paid based upon the final estimate by the Engineer and presentation of a Final Contract Voucher Certification signed by the Contractor. The Final Contract Voucher Certification shall be deemed to be a release of all claims of the Contractor unless a claim is filed.
in accordance with the requirements of Section 3.05 and is expressly excepted from release in the Contractor’s Final Contract Voucher Certification. The date the Owner signs the Final Contract Voucher Certification constitutes the Contract Completion Date in accordance with Section 3.04.16(3).

If the Contractor fails, refuses, or is unable to sign and return the Final Contract Voucher Certification or any other documentation required in order to achieve the Contract Completion Date, the Owner reserves the right to establish a completion date (for the purpose of meeting the requirements of RCW 39.08 and RCW 60.28) and unilaterally accept the Work. Unilateral final acceptance will occur only after the Contractor has been provided the opportunity, by written request from the Engineer, to voluntarily submit such documents. If voluntary compliance is not achieved, formal notification of the impending establishment of a completion date and unilateral final acceptance will be provided by certified letter from the Owner to the Contractor, which will provide 30 calendar days for the Contractor to submit the necessary documents. The 30 calendar day period will begin on the date the certified letter is received by the Contractor. The date on which the Owner unilaterally signs the Final Contract Voucher Certification shall constitute the Contract Completion Date under Section 3.04.16(3). The Owner shall have the right to unilaterally establish a Contract Completion Date when either (1) the Physical Completion Date for the Work has been achieved in accordance with Section 3.04.16(2), or (2) the Owner terminates the contract in accordance with Section 3.07. Unilateral establishment of the Contract Completion Date by the Owner shall not in any way relieve the Contractor of any liability for failing to comply with the Contract or from responsibility for compliance with all federal, state, tribal, or local laws, ordinances, and regulations that affect the Work.

Payment to the Contractor of partial or final payment estimates and retained percentages shall be subject to applicable laws.

3.04.13 WORK HOURS

Except in the case of emergency or unless otherwise approved by the Owner, the normal straight time working hours for the contract shall be any consecutive 8-hour period between 7:00 a.m. and 6:00 p.m. of a working day with a maximum 1-hour lunch break and a 5-day work week. The normal straight time 8-hour working period for the contract shall be established at the preconstruction conference or prior to the Contractor commencing the Work.

Written permission from the Engineer is required, if a Contractor desires to perform Work on holidays, Saturdays, or Sundays; before 7:00 a.m. or after 6:00 p.m. on any day; or longer than an 8-hour period on any day. The Contractor shall apply in writing to the Engineer for such permission, no later than noon on the working day prior to the day for which the Contractor is requesting permission to work.

Permission to work between the hours of 10:00 p.m. and 7:00 a.m. during weekdays and between the hours of 10:00 p.m. and 9:00 a.m. on weekends or holidays may also be subject to noise control requirements. Approval to continue work during these hours may be revoked at any time the Contractor exceeds the Owner’s noise control regulations or complaints are received from the public or adjoining property owners regarding the noise from the Contractor’s operations. The
Contractor shall have no claim for damages or delays should such permission be revoked for these reasons.

Permission to work Saturdays, Sundays, holidays, or other than the agreed upon normal straight time working hours Monday through Friday may be given subject to certain other conditions set forth by the Owner or Engineer. These conditions may include but are not limited to:

- The Engineer may require designated representatives to be present during the work. Representatives who may be deemed necessary by the Engineer include, but are not limited to: survey crews; personnel from the Owner’s material testing lab; inspectors; and other Owner employees when in the opinion of the Engineer, such Work necessitates their presence.

- Requiring the Contractor to reimburse the Owner all the costs in excess of straight time costs for the Owner’s representatives who work during such times. These costs shall be deducted from amounts due or to become due to the Contractor.

- Considering the Work performed on Saturdays, Sundays, and holidays as working days with regard to the contract time.

- Considering multiple work shifts as multiple working days with respect to contract time, even though the multiple shifts occur in a single 24-hour period.

### 3.04.14 CONTRACT TIME

The Contract Time shall begin on the first working day following the 10th calendar day after the issuance of the written Notice to Proceed or the first day on which the Contractor begins to perform Work on the site, whichever occurs first. Time is of the essence of the Contract. All of the Work shall be completed within the time limits set forth in the Contract, and the Contractor’s unexcused failure to do so shall result in the assessment of liquidated damages as provided in the Contract.

The Contractor shall complete all of the physical Work within the number of working days that are specified as the Contract Time. Every day will be counted as a working day unless it is a non-working day or the Engineer determines the day to be an unworkable day. A non-working day is a Saturday, a Sunday, a day on which the Contract suspends work, or one of the following holidays: January 1st; the third Monday of January; the third Monday of February; Memorial Day; July 4th; Labor Day; November 11th; Thanksgiving Day; the day after Thanksgiving; and Christmas. Whenever any of these holidays falls on a Sunday, the following Monday shall be counted a non-working day. When the holiday falls on a Saturday, the preceding Friday shall be counted a non-working day.

The days between December 25th and January 1st will be classified as non-working days, provided that the Contractor actually suspends performance of the Work.

An unworkable day is defined as a partial or whole day that the Engineer determines to be unworkable because of weather, conditions caused by the weather, or such other conditions beyond the control of the Contractor that prevent the satisfactory and timely performance of the Work, and
such performance, if not hindered, would have otherwise progressed toward physical completion of the Work.

Each working day shall be charged to the Contract Time as it occurs until the Work is physically complete. If requested by the Contractor in writing, the Engineer will provide the Contractor with a weekly statement that shows the number of working days: (1) charged to the Contract Time the week before; (2) specified for the substantial and physical completion of the Contract Time; and (3) remaining to achieve the substantial and physical completion of the Contract. The statement will also show the nonworking days and any partial or whole days that the Engineer declares to be unworkable. If the Contractor disagrees with any statement issued by the Engineer, the Contractor shall submit a written protest within 10 calendar days after the date of the statement. The protest shall be sufficiently detailed to enable the Engineer to ascertain the basis for the dispute and amount of time disputed. Any statement that is not protested by the Contractor as required in this Section shall be deemed as having been accepted as correct. If the Contractor elects to work 10 hours a day 4 days a week (a 4-10 schedule), the fifth day of that week will be charged as a working day if that day would be chargeable as a working day if the Contractor had not elected to utilize a 4-10 schedule.

3.04.15 CONSTRUCTION SCHEDULE

3.04.15(1) Progress Schedule

a. Within 5 days after the date the Contract is executed, the Contractor shall submit to the Engineer four copies of a preliminary progress schedule covering the first 90 days of the Work. Within 30 days after the Contract is executed, the Contractor shall submit to the Engineer four copies of a comprehensive critical path method progress schedule and analysis for the entire Work. The preliminary progress schedule may consist of a bar graph or arrow diagram and shall show the time the Contractor intends to start and complete various Work activities. No progress payments will be made until the required progress schedules have been submitted in a form acceptable to the Engineer.

b. Each week the Work is performed, the Contractor shall submit a Weekly Look-Ahead Schedule showing the Contractor’s and all the Subcontractors’ proposed Work activities for the next two weeks. The Weekly Look-Ahead Schedule shall include the description, duration and sequence of Work, along with the planned hours of Work. This schedule may be network schedule, bar chart, or other standard schedule format. The Weekly Look-Ahead Schedule shall be submitted to the Engineer by the mid-point of the week preceding the scheduled Work or some other mutually agreed upon submittal time.

c. The comprehensive progress schedule shall include a brief explanation of the schedule submitted, together with an analysis showing the following:

i. The percentage of each Work activity completed;
ii. The anticipated Substantial Completion Date, Physical Completion, and Contract Completion Date;

iii. A description of anticipated problem areas that may impact the schedule;

iv. A description of any current factors that are impacting the schedule and the affect of each;

v. An explanation of corrective actions taken or proposed.

d. The Contractor shall promptly, and in no event more than 7 days following the occurrence of any of the events described below, submit to the Engineer a revised schedule:

i. A Change Order affects the Contract Time or the sequence of Work activities;

ii. The progress of any activity on the critical path falls behind schedule or progresses significantly ahead of schedule;

iii. A delay in the progress of a non-critical activity results in a change to the critical path for the Work;

iv. The Contractor elects to change the sequence of any activities affecting the critical path.

e. The original and all supplemental progress schedules shall not conflict with any time and order-of-work requirement in the Contract.

f. If the Engineer deems that the original or any necessary supplemental progress schedule does not provide the information required in this section, the Owner may withhold progress payments until a schedule containing the required information has been submitted by the Contractor and accepted by the Engineer.

g. The Contractor shall comply with other progress schedule requirements that are further defined in the Specifications.

h. The Engineer’s approval of any schedule shall not transfer any of the Contractor’s responsibilities to the Owner. The Contractor alone shall remain responsible for adjusting forces, equipment, and work schedules to ensure completion of the work within the time(s) specified in the Contract.

3.04.15(2) Extensions of the Contract Time

a. The Contractor specifically waives claims for damages for any hindrance or delay, excepting unreasonable delays caused by the Owner. In lieu thereof, the Contractor will be granted equitable extensions of the Contract Time for which liquidated
damages will not otherwise be claimed by the Owner under the following circumstances:

i. A delay caused by any suit or other legal action against the Owner will entitle the Contractor to an equivalent extension of time, unless the period of such delay exceeds 90 calendar days. When such period is exceeded, the Owner will, upon written request of the Contractor, either negotiate a termination of the Contract or grant a further extension of the Contract Time, whichever is in the best interests of the Owner.

ii. If the volume of specified unit price work is increased over the estimated volume utilized in the Proposal at the time of the Award for reasons beyond the control of the Contractor, and the increased volume delays the Contractor’s performance of the Work, the Contractor will be granted an equivalent extension of the Contract Time as determined by the Engineer and Owner. As a condition precedent to entitlement to an adjustment of the Contract Time, Contractor must meet the claim notice provisions of Paragraph 3.04.6 herein. Failure to provide timely notice of claim shall be deemed a complete waiver of entitlement to an extension of time.

iii. Should any other unforeseen condition occur that is beyond the reasonable control of Contractor, requires more time for the Contractor to complete the performance of the Work by the Substantial Completion Date, the Contractor shall notify the Owner and the Engineer in writing prior to the performance of such Work, and in any event within 10 calendar days after the occurrence of the unforeseen condition. The notice shall set forth in detail the Contractor’s estimate of the required time extension. The Owner may allow such equitable extension of the Contract Time that the Engineer determines to be appropriate. Failure to complete with the claim notice provisions required by the Contract shall be deemed a complete waiver of any entitlement to adjustment of the Contract Time.

3.04.15(3) Liquidated Damages

a. The Contractor acknowledges that the Owner will suffer monetary damages in the event of an unexcused delay in the Substantial Completion Date and the Physical Completion Date of the Work. If the Contractor fails, without excuse under the Contract, to complete the Work within the Contract Time, or any proper extension thereof granted by the Owner, the Contractor agrees to pay to the Owner the amount specified in the Proposal form, not as a penalty, but as liquidated damages for such breach of the Contract, for each day that the Contractor shall be in default after the time stipulated for the Substantial Completion Date and the Physical Completion Date of the Work.

b. The amount of liquidated damages is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain,
and said amount is specifically agreed to be a reasonable approximation of damages that the Owner would sustain as a result of an unexcused delay in the Substantial Completion Date and the Physical Completion Date; said amount may be retained from time to time by the Owner from current progress payments.

3.04.16 COMPLETION AND ACCEPTANCE OF THE WORK

3.04.16(1) Substantial Completion Date

a. When the Contractor considers the Work to be substantially complete and ready for its intended purpose, the Contractor shall notify the Engineer in writing and include an itemized list of remaining Work to be completed. On the Substantial Completion Date, the Owner shall have full and unrestricted use and benefit of all of the facilities that comprise the Work, both from an operational and safety standpoint, with only minor incidental work, replacement of temporary substitute facilities, or correction or repair of work remaining for the physical completion of the total Work.

b. If the Engineer determines that the Work is not substantially complete, it will so notify the Contractor in writing identifying those items of the Work that shall be completed by the Contractor in order to achieve the Substantial Completion Date.

c. If the Engineer believes that the Work is substantially complete, the Engineer will meet with the Contractor to: (1) prepare a list of incomplete or unsatisfactory items of the Work that shall be completed or corrected; (2) define the division of responsibility between Owner and Contractor with respect to security, operation, maintenance, heat, utilities, insurance, etc., for the facilities; and (3) describe any other issues related to approval of the substantially completed Work. Upon reaching agreement with the Contractor, the Engineer will notify the Owner that, in its opinion and based on the information supplied by the Contractor, the Work is substantially complete, listing the items of incomplete Work, defining the division of responsibilities for the facilities, and setting forth any other terms related to final completion and acceptance.

d. The Owner, who has sole authority to make the determination of the Substantial Completion Date, will review the Engineer’s recommendation that the Work is substantially complete and, if it concurs, will instruct the Engineer to notify the Contractor that the Work is accepted as being substantially complete. Except for any portion(s) of Work specified for early completion or required by the Owner for early possession, substantial completion will not occur for any portion of the Work until the entire Work is ready for possession and use. The approval notice will include a list of incomplete Work items, establish the Substantial Completion Date, and describe any other terms relating to such approval. The Contractor shall acknowledge receipt of the approval notice in writing, indicating acceptance of all of its terms and provisions.
e. The date of Substantial Completion, as determined by the Engineer and agreed to by the Owner, shall be the date for the beginning of the warranty period.

f. Subsequent to the Substantial Completion date, the Owner may exclude the Contractor from the Work during such periods when construction activities might interfere with the operation of the Project. The Owner, however, shall allow the Contractor reasonable access for completion of incomplete punch list items.

3.04.16(2) Physical Completion Date

a. The Contractor shall complete all physical Work within the Contract Time.

b. Upon physical completion of the Work, including completion of all corrective Work described in Section 3.04.16(1) above and the submission of all required record drawings, operation and maintenance manuals, manufacturers’ affidavits, software and programming, and other items required by the Contract, the Contractor shall notify the Engineer in writing that the Work is physically complete. Upon receipt of the notification, the Engineer will determine if the Work is physically complete in accordance with the Contract. If the Engineer determines that any materials, equipment, or workmanship do not meet the requirements of the Contract, the Engineer will prepare a list of such items and submit it to the Contractor. Following the satisfactory completion of the corrective Work by the Contractor, the Engineer will notify the Owner that the Work is physically complete in accordance with the requirements of the Contract.

c. The Engineer, with the written concurrence of the Owner, will give the Contractor written notice of the Physical Completion Date for all of the Work. The Physical Completion Date shall not constitute the Owner’s acceptance of the Work.

3.04.16(3) Contract Completion Date (Acceptance of the Project)

a. When all of the Contractor’s obligations under the Contract have been performed satisfactorily, the Owner will provide the Contractor with written notice of the Contract Completion Date. The following events shall occur in order for the Contractor to achieve the Contract Completion Date:

1. The Contractor shall have achieved the Substantial Completion Date and the Physical Completion Date for the Work; and

2. The Contractor shall furnish all documentation required by the Contract and required by law. The documents shall include, but are not limited to, the following:

   i. Complete and legally effective releases and/or waivers of liens or bond or retainerage claims in a form acceptable to the Owner. Subject to prior approval of the Owner, the Contractor may, if approved by the Owner, submit in lieu of the lien or claims releases and waivers:
(1) receipts showing payment of all accounts in full; (2) an affidavit that the release and receipts cover all labor, services, materials, and equipment for which a lien or other claim could be filed and that all payrolls, material, and equipment bills and other indebtedness connected with the Work for which the Owner or the Owner’s property might in any way be responsible, have been paid; and (3) the consent of the surety, if any, to final payment. If any Subcontractor or supplier fails to furnish a release waiver or receipt in a form satisfactory to the Owner, the Contractor may be permitted by the Owner to furnish a bond or other collateral satisfactory to the Owner to indemnify the Owner against any lien or similar claim;

ii. Certified Payrolls (Federal Aid projects or if requested);

iii. Final Contract Voucher Certification.

iv. Affidavits of Wages Paid for the Contractor and all subcontractors must be submitted to the Owner.

b. The Contractor agrees that neither completion nor final acceptance shall relieve the Contractor of the responsibility to indemnify, defend, and protect the Owner against any claim or loss resulting from the failure of the Contractor (or the subcontractors or lower tier subcontractors) to pay all laborers, mechanics, subcontractors, materialpersons, or any other person who provides labor, supplies, or provisions for carrying out the work or for any payments required for unemployment compensation under Title 50 RCW or for industrial insurance and medical aid required under Title 51 RCW.

Final acceptance shall not constitute acceptance of any unauthorized or defective work or material. The Owner shall not be barred from requiring the Contractor to remove, replace, repair, or dispose of any unauthorized or defective work or material or from recovering damages for any such work or material.

3.04.16(4) Use of Completed Portions of the Work

The Owner reserves the right to use and occupy any portion of the Work which has been completed sufficiently to permit partial use and occupancy, and such partial use and occupancy shall not be construed as an acceptance of the Work as a whole or any part thereof. Any claims that the Owner may have against the Contractor shall not be deemed to have been waived by such partial use and occupancy.

3.04.16(5) Waiver of Claims by Contractor

The Contractor’s acceptance of the final payment from the Owner constitutes an irrevocable and complete waiver of any and all claims against the Owner under the Contract or otherwise arising from the Work, except for those claims that have been properly identified in writing in advance of
final payment, and for which timely and sufficient prior written notice has been given, all in accordance with the Contract.

**3.04.17 CORRECTION OF FAULTY WORK AFTER FINAL PAYMENT**

The Owner’s final payment to the Contractor shall not relieve the Contractor of responsibility for faulty materials, equipment or workmanship. The Contractor shall promptly repair or replace any such defects discovered within the warranty or other applicable limitations period.

**3.04.18 RETAINAGE**

1. Pursuant to RCW 60.28, there will be retained from monies earned by the Contractor on progress estimates a sum not to exceed 5 percent of the monies earned by the Contractor. Such retainage shall be used as a trust fund for the protection and payment (1) to the State with respect to taxes imposed pursuant to RCW Title 82, which may be due from such Contractor, and (2) the claims of any other person or entity arising under the Contract or RCW 60.28.

2. Monies retained pursuant to RCW 60.28 shall, at the option of the Contractor, be:
   a. Retained in a fund by the Owner;
   b. Deposited by the Owner in an interest-bearing account in a bank, mutual savings bank, or savings and loan association (interest on monies so retained may be paid to the Contractor);
   c. Deposited by the Owner in an escrow (interest-bearing) account in a bank, mutual saving bank, or savings and loan association (interest on monies so retained shall be paid to the Contractor). Deposits are to be in the name of the Owner and are not to be allowed to be withdrawn without the Owner’s written authorization. The Owner will issue a check representing the sum of the monies reserved, payable to the bank or trust company;
   d. In choosing option (b) or (c), the Contractor agrees to assume full responsibility to pay all costs which may accrue from escrow services, brokerage charges or both, and further agrees to assume all risks in connection with the investment of the retainage in securities.

At the time the Contract is executed the Contractor shall designate the option desired.

3. Release of retainage will be made within the statutory period following the last date for filing of claims pursuant to RCW Chapter 60.28, provided that the following conditions are met:
   a. A release has been obtained from the Washington State Department of Revenue;
b. A “Certificate of Payment of Contributions Penalties and Interest on Public Works Contract” is received from the Washington State Employment Security Department;

c. The Washington State Department of Labor and Industries indicates the Contractor is current on the payment of industrial insurance and medical aid premiums;

d. All claims by the Owner against the Contractor have been resolved;

e. No claims have been filed against the retained percentage;

f. All required “Affidavits of Wages Paid” are on file with the Owner for the Contractor and all Subcontractors, regardless of tier;

4. In the event that claims are filed against the retainage, the Contractor will be paid the retained percentage less an amount sufficient to pay all such claims, together with a sum determined by the Owner to be sufficient to pay the costs of foreclosing on claims and to attorneys’ fees, all in accordance with applicable law.

3.05 DISPUTES AND CLAIMS

3.05.1 DISPUTES

When disputes occur, the Contractor shall pursue resolution through the Engineer. The Contractor shall follow the notice and protest procedures outlined in Section 3.04. If negotiation using the procedures outlined in Section 3.04 fails to provide satisfactory resolution, the Contractor shall pursue the more formalized method set forth in Section 3.05.2 for submitting claims.

3.05.2 CLAIMS

If the Contractor contends that additional payment is due, has provided timely notices and protests as required by Section 3.04, and the Contractor has pursued and exhausted all of the means provided in that section to resolve the dispute, the Contractor may submit a claim as provided in this Section. Any claim for an increase in the Contract Price or for an extension of the Contract Time by the Contractor is waived if the written notifications and protests required in Section 3.04 have been not provided, or if the Engineer and Owner are not afforded reasonable access to the Contractor’s complete records relating to the claim, as required by Section 3.04.8, or if a claim is not submitted in accordance with the requirements of this Section. The fact that the Contractor has provided proper notification, properly submitted a claim, or provided the Engineer and Owner with access to records, shall not in any way be construed as proving or substantiating the validity of the claim. If, after consideration by the Owner, the claim is found to have merit, the Owner may make an equitable adjustment to either the Contract Price, the Contract Time, or both. If the Owner finds the claim to be without merit, no adjustment will be made.
All claims submitted by the Contractor shall be in writing and in sufficient detail to enable the Engineer and Owner to ascertain the basis for and amount of the claim. All claims shall be submitted to the Engineer and Owner in the manner in Section 3.03.6. The following information shall accompany each claim submitted:

1. A detailed factual statement of the basis for the claim for additional compensation and/or extension of time, including all relevant dates, locations, and items of work relating to the claim.

2. The date on which the events occurred that give rise to the claim.

3. The name of each person involved in or having knowledge about the claim.

4. The specific provisions of the Contract which support the claim and a statement of the reasons why such provisions support the claim.

5. If the claim relates to a decision of the Engineer that the Contract leaves to the Engineer’s discretion or as to which the Contract provides that the Engineer’s decision is final, the Contractor shall set out in detail all facts supporting its position relating to the decision of the Engineer.

6. The identification of any documents and the substance of any oral communications that support the claim.

7. Copies of any identified documents, other than Owner documents and documents previously furnished to the Owner by the Contractor, that support the claim (manuals which are standard to the industry may be included by reference).

8. If an extension of the Contract Time is sought:
   a. The specific days and dates for which the extension is sought;
   b. The specific reasons why the Contractor believes a time extension should be granted;
   c. The specific provisions of Section 3-04.15(2) under which the time extension is sought; and
   d. An analysis of the Contractor’s progress schedule, demonstrating the reasons why a time extension should be granted.

9. If additional compensation is sought, the exact amount sought and a breakdown of that amount into the following categories:
   a. Labor;
   b. Materials;
   c. Direct equipment. The actual cost for each piece of equipment for which a claim is made, or, in the absence of actual cost, the rates established by the AGC/WSDOT Equipment Rental Agreement which was in effect when the Work was performed. The amounts claimed for any piece of equipment
shall not exceed the rates established by the Equipment Rental Agreement, even if the actual cost for such equipment is higher. The Owner may audit the Contractor’s cost records, as provided in Section 3.06, to determine actual equipment costs. The following information shall be provided for each piece of equipment:

i. Detailed description (e.g., make, model, year, diesel or gas, size of bucket);

ii. The hours of use or standby; and

iii. The specific day and dates of use or standby.

d. Subcontractor claims (in the same level of detail as specified herein); and
e. Other information as requested by the Engineer or the Owner.

10. A notarized statement containing the following language:

Under the penalty of law for perjury or falsification, the undersigned,

____________________________, ______________________________
(name) (title)
of _________________________________________________________
(company)

hereby certifies that the claim for extra compensation and time, if any, made herein for work on this Contract is a true statement of the actual costs incurred and time sought, and is fully documented and supported under the contract between the parties.

Dated __________________________/s/__________________________

Subscribed and sworn before me this ___________ day of ____________

___________________________________________________________
Notary Public

My Commission Expires:______________________________________

It will be the responsibility of the Contractor to keep full and complete records of the costs and additional time incurred with respect to any claim. The Contractor shall permit the Engineer and Owner to have access to those records and any other records and documents as may be required by the Engineer and Owner to determine the facts or contentions involved in the claim. The Contractor shall retain all records and documents in any way relating to the Work for a period of not less than three years after the Contract Completion Date.

The Contractor shall in good faith attempt to reach a negotiated resolution of all claims with the Engineer or its designee and the Owner.
The Contractor’s failure to submit with the Final Contract Voucher Certification a list of all claims, together with the information and details required by this Section shall operate as a waiver of the complete claims by the Contractor, as provided in Section 3.04.12(9).

If the Contractor submits a claim in full compliance with all the requirements of this Section, the Owner will respond in writing to the claim as follows:

1. Within 45 calendar days from the date the claim is received by the Owner, if the claim amount is less than $100,000;
2. Within 90 calendar days from the date the claim is received by the Owner, if the claim amount is equal to or greater than $100,000; or
3. If these time periods are unreasonable due to the complexity of the claim, the Contractor will be notified within 15 calendar days from the date the claim is received by the Owner of the amount of time which will be necessary for the Owner to evaluate the claim and issue a response.

Full compliance by the Contractor with the provisions of this Section is a condition precedent to the Contractor’s right to seek commence a lawsuit or pursue other legal remedies.

3.05.3 TIMELINE AND JURISDICTION

For the convenience of the parties to the Contract it is mutually agreed by the parties that any claims or causes of action which the Contractor has against the Owner arising from the Contract shall be brought within 180 calendar days from the date of Physical Completion (Section 3.04.16(2)) of the Contract by the Owner; and it is further agreed that any such claims or causes of action shall be brought only in the Superior Court of the county where the Owner headquarters is located, provided that where an action is asserted against a county, RCW 36.01.05 shall control venue and jurisdiction. The parties understand and agree that the Contractor’s failure to bring suit within the time period provided, shall be a complete bar to any such claims or causes of action. It is further mutually agreed by the parties that when any claims or causes of action which the Contractor asserts against the Owner arising from the Contract are filed with the Owner or initiated in court, the Contractor shall permit the Owner to have timely access to any records deemed necessary by the Owner to assist in evaluating the claims or action.

3.05.4 CONTINUATION OF WORK PENDING RESOLUTION OF DISPUTES

The Contractor shall expeditiously carry on the Work, adhere to the progress schedule, and comply with all written directives of the Owner or the Engineer regardless of any dispute or claim that may exist between the Owner and the Contractor. No Work shall be delayed or postponed pending resolution of any dispute or claim. Failure or refusal of the Contractor to comply with the written directives of the Owner or the Engineer shall constitute a material breach of the Contract and immediately constitute grounds for the Owner to withhold payments to the Contractor, suspend the Work or terminate the Contract. Notice under this Section shall be in accordance with other provisions of the Contract.
3.06 AUDITS

If the Contractor requests an equitable adjustment to either the Contract price or the Contract Time, the Owner shall have the right to audit the Contractor’s books, records, other documents, and accounting practices and procedures, and to inspect the Contractor’s plant, equipment and facilities to examine all facts and verify all direct and indirect costs of whatever nature claimed to have been incurred or are anticipated to be incurred. The right to audit encompasses all subcontracts and is binding upon Subcontractors. All subcontracts that the Contractor enters into shall contain a clause allowing the Owner to audit all Subcontractor books, records, other documents, and accounting practices and procedures, and to inspect the Subcontractor’s plant, equipment and facilities. All audits shall be performed by auditors of the Owner during normal working hours at the Contractor’s or Subcontractor’s office or any other location mutually agreed upon. The Contractor shall cooperate fully with the auditor and shall make available all required information. Failure to cooperate or provide requested information shall be grounds for denial of the claim.

3.07 SUSPENSION OF WORK AND TERMINATION OF CONTRACT

3.07.1 SUSPENSION OF WORK

1. The Owner or the Engineer may order suspension of all or any part of the Work if:
   
   a. Unsuitable or other conditions that are beyond the reasonable control of the Contractor exist or arise that prevent satisfactory and timely performance of the Work; or
   
   b. The Contractor fails to comply with written directives by the Owner or the Engineer to correct deficiencies in its performance of the Work; or
   
   c. It is in the public interest.

2. If the Contractor believes that suspension of performance of all or any part of the Work is occasioned by any wrongful act or omission of the Owner, the Contractor shall notify the Owner and Engineer in writing within 10 calendar days following the beginning of the suspension of the Contractor’s intent to seek an equitable adjustment in the Contract Time or the Contract price.

3. If the Contractor believes that the suspension of performance of all or part of the Work has continued for an unreasonable period of time, the Contractor shall give written notice to the Owner and Engineer of its intention to seek an equitable adjustment in the Contract Time or the Contract price. In the event that an equitable adjustment is allowed, no adjustment shall be allowed for any time lost or costs incurred more than 10 calendar days before delivery of the written notice to the Owner and Engineer.

4. If the Owner and Engineer determine that the suspension is for reasons set forth in Subsection a. above, an equitable adjustment may be made in the Contract Time.
but not the Contract price. If the Owner and Engineer determines that the suspension is for reasons set forth in Subsection b. above, no adjustment shall be made in the Contract Time or the Contract Price.

3.07.2 TERMINATION FOR DEFAULT

1. The Owner may terminate the Contract for default, effective seven days following delivery of written notice of default to the Contractor, if the Contractor:
   
   a. Refuses or fails to supply enough properly skilled laborers or conforming materials to complete the Work in a timely manner;
   
   b. Refuses or fails to prosecute the Work with such diligence as will ensure its physical completion by the Physical Completion Date;
   
   c. Performs work which deviates from the requirements of the Contract and refuses or fails to correct the non-conforming work;
   
   d. Fails to make prompt payment to Subcontractors and/or suppliers for labor or materials;
   
   e. Fails to comply with laws, ordinances, rules, regulations or orders of a public authority having jurisdiction; or
   
   f. Otherwise fails to follow written directives of the Owner or the Engineer or is in default of a material provision of the Contract.

2. If the Contractor abandons the Work for any cause other than failure of the Owner to make monthly progress payments for Work properly performed, or if the Contractor refuses to comply with requirements of the Contract, the Owner has the additional right to notify the Contractor’s performance bond surety and require the surety to complete the Work in accordance with the Contract.

3.07.3 TERMINATION FOR CONVENIENCE OF THE OWNER

The Owner may by written notice terminate the Contract at any time in whole or in part, without cause, and except where termination is due to the Contractor’s default, the Owner shall pay the Contractor that portion of the Contract price corresponding to the acceptable Work completed to the Owner’s satisfaction, together with reasonable costs, as determined in the sole discretion of the Owner, necessarily incurred by the Contractor in terminating the remaining portion of Work, less any payments made before termination. In no event shall the Owner be required to pay the Contractor any amount in excess of the completed portion Contract price. The Owner shall not be required to pay the Contractor any amount for consequential damages including but not by means of limitation lost or anticipated profits on Work that is not performed as a result of termination.
3.07.4 RESPONSIBILITY OF THE CONTRACTOR AND SURETY

Termination of the Contract shall not relieve the Contractor of any responsibilities under the Contract for Work performed. Nor shall termination of the Contract relieve the sureties of their obligations under the bonds required or permitted by the Contract or applicable law.
PART 4

TECHNICAL SPECIFICATIONS
# TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL TECHNICAL REQUIREMENTS
SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 SCOPE OF WORK

The work specified in this Section consists of furnishing all labor, materials, and equipment necessary for construction of the Main Street Lift Station, as shown on the Plans, and hereinafter specified. Work shall include, but not be limited to, the following:

A. Locate and identify existing utilities.

B. Provide traffic control.

C. Construct new gravity sewer in Main Street consisting of 8-inch pipe and manholes.

D. Construct new side sewers and cleanouts.

E. Install new packaged grinder lift station.

F. Install new 1-1/2” force main in Main Street from the grinder lift station to an existing manhole at the intersection with Railroad Avenue. Connect new force main to existing manhole.

G. Install new 4-inch force main in Main Street from the south end of the project to an existing manhole at the intersection with Railroad Avenue. This force main is for future use, and will not be connected to a lift station with this project.

H. Complete curb, gutter, and sidewalk repair where indicated on the Plans.

I. Provide restoration for the Grinder Pump Installation site and at other areas where indicated on the Plans.

J. Furnish and install all required electrical, instrumentation and telemetry work.

K. Provide testing, commissioning, and training as specified herein.

L. Provide all associated work as shown on the Plans and specified herein, for a complete and workable system.
1.2 PROJECT INFORMATION

The Contract Documents show the location, arrangement, and type of work to be performed under the proposed project.

The Contractor shall be responsible for proper notification to and coordination with all utility districts, service districts, and all other persons and services that will be affected by this project at least one week in advance of beginning any construction that affects them.

It is the intent and purpose of these Contract Documents to have constructed complete facilities in good working order for the least practical cost to the Owner. Suggestions, recommendations, as well as inquiries from the Contractor that will serve this purpose are welcome and will be given consideration by the Owner and the Engineer.

1.3 CONTRACTOR USE OF SITE AND PREMISES

Construction operations shall be limited to the areas noted on Sheet 1 of the Plans and subject to the approval of the Engineer. The Owner has obtained a temporary construction easement where shown in the Appendix. The condition of this easement is shown in the Appendix. The Contractor shall meet all these conditions while performing his work.

The Contractor shall submit a traffic control plan for all site access and egress routes for construction vehicle traffic per Section 01950.

The Contractor shall allow representatives of the funding and regulatory agencies access to the project site at all times.

1.4 ORDER OF WORK

The order of work will be at the option of the Contractor, except as noted below, in keeping with good construction practice, time restrictions, requirements of the permits applicable to this project, and the order of work as outlined herein, all costs of which shall be included in the various bid amounts. The Contractor shall conduct the order of work to allow the existing facilities to remain operational during the construction of the Project and shall coordinate all of his activities through the Engineer with the Owner’s operations and maintenance staff. The Contractor shall provide a written plan of activities to the Engineer and Owner each Thursday for the following week, for review and coordination with existing facility operations.

The implementation of any measure required to protect the environment shall supersede any order of work designated within these Specifications. The
Contractor shall meet the conditions as outlined in any and all permits and requirements of the Federal, State, County, and City regulatory agencies.

The Contractor shall keep the disruption of the existing facility operations to a minimum. The Contractor shall be responsible for all temporary pumping to include all connections, piping, pumping equipment, temporary electrical service and controls, and appurtenances.

Access to the existing operations areas shall be maintained. Disruption of this access shall be kept to a minimum and must be prearranged and scheduled through the Engineer with the Owner’s operations and maintenance staff.

The following summary shall be used as a general guideline of the construction tasks to be performed. The tasks are generally listed in the order of completion. The tasks, however, can be completed in a different order than listed herein, including performance of two or more tasks concurrently. The Contractor shall prepare a complete project schedule, which shall be provided in accordance with the limitations specified herein.

A. PLAN AND SCHEDULE SUBMITTALS

Prior to starting construction, the Contractor shall furnish the Contracting Agency with a Spill Prevention Control and Countermeasures Plan (SPCC Plan), Progress Schedule, Dewatering Plan, and a Traffic Control Plan. The progress schedule and all plans shall be approved by the Contracting Agency prior to commencing any construction operations.

B. PRE-CONSTRUCTION MEETING

The Contractor shall attend a mandatory pre-construction meeting.

C. PUBLIC NOTICE

The Contractor shall provide Public Notice to property owners abutting the project limits.

D. MATERIAL SUBMITTALS

The Contractor shall provide material submittals. The Contractor shall also provide a schedule of value for all lump sum bid items.

E. UTILITY LOCATES

The Contractor shall call 1-CALL and have utilities marked in the field by the various utility owners.
F. PHOTOGRAPHS

After the utilities have been marked, the Contractor shall provide for the photographing of the entire project site. This activity must be completed and the photographs and digital files delivered to the Contracting Agency as required and further specified in Section 01385 prior to any excavation, asphalt cutting, mobilization, staging, or any other work items being performed.

G. TRAFFIC CONTROL

The Contractor shall furnish and install all traffic control facilities including signs/barricades for detour routes, unless indicated on the Plans.

H. POTHOLE EXISTING UTILITIES

The Contractor shall pothole existing utilities as specifically noted on the Plans, as well as in other areas the Contractor deems necessary.

I. INSTALL UTILITIES AND LIFT STATION

The Contractor shall install all underground utilities and lift station.

J. SITE RESTORATION

The Contractor shall complete HMA pavement repair, curb and sidewalk restoration, gravel surfacing restoration, and roadway striping where indicated on the Plans.

The remaining order of work shall be at the Contractor’s option, in keeping with generally accepted, good construction practice. However, the Contractor shall coordinate work by others which will affect his production, schedule, mobilization and demobilization efforts.

K. PROPERTY RELEASE FORMS AND RECORD DRAWINGS

The Contractor shall submit Property Release Forms and Record Drawings. After all preliminary and final “punch list” items have been satisfactorily completed, then, as a last order of work, the Contractor shall provide post-construction photographs.

*** END OF SECTION ***
SECTION 01150
SURVEYS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes all survey for the project. The Contractor shall provide all construction survey for the Work. The Engineer will provide primary horizontal and vertical control data and monuments, as shown on the Plans.

At the Contractor’s request, the Engineer will provide the Plans in electronic format. Electronic files are provided for the Contractor’s convenience and are not part of the Contract. Calculations shall be made from the Plans.

During the prosecution of the work, the Contractor shall make all necessary measurements to prevent misfitting, and shall be responsible for the accurate construction of the work.

1.2 DEFINITIONS

The meaning of words and terms used in this provision shall be as listed in “Definitions of Surveying and Associated Terms” current edition, published by the American Congress on Surveying and Mapping, and the American Society of Civil Engineers.

1.3 RELATED WORK SPECIFIED ELSEWHERE

<table>
<thead>
<tr>
<th>Section</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>01200</td>
<td>Measurement and Payment</td>
</tr>
<tr>
<td>01720</td>
<td>Record Drawings</td>
</tr>
</tbody>
</table>

1.4 QUALIFICATIONS

The Contractor shall employ a Professional Land Surveyor (PLS) registered in the State of Washington and acceptable to the Owner. All surveying shall be completed by or under the direct supervision of the PLS.

1.5 SUBMITTALS

The Contractor shall submit the name, address, and license number of the Professional Land Surveyor before starting construction.
### 1.6 QUALITY ASSURANCE

The Contractor shall ensure a surveying accuracy within the following tolerances:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Vertical</th>
<th>Horizontal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slope Stakes</td>
<td>±0.1 feet</td>
<td>±0.10 feet</td>
</tr>
<tr>
<td>Subgrade Grade Stakes Set 0.04 foot Below Grade</td>
<td>±0.01 feet</td>
<td>±0.5 feet (parallel to alignment) ±0.1 feet (normal to alignment)</td>
</tr>
<tr>
<td>Stationing on Roadway</td>
<td>N/A</td>
<td>±0.1 feet</td>
</tr>
<tr>
<td>Alignment on Roadway</td>
<td>N/A</td>
<td>±0.04 feet</td>
</tr>
<tr>
<td>Surfacing Grade Stakes</td>
<td>±0.01 feet</td>
<td>±0.1 foot (parallel to alignment) ±0.1 feet (normal to alignment)</td>
</tr>
<tr>
<td>Roadway Paving Pins for Surfacing or Paving</td>
<td>±0.01 feet</td>
<td>±0.1 feet (parallel to alignment) ±0.05 feet (normal to alignment)</td>
</tr>
<tr>
<td>Alignment of sewer and storm manholes and catch basins</td>
<td>±.01 feet</td>
<td>±0.1 feet</td>
</tr>
<tr>
<td>Stationing on Structures</td>
<td></td>
<td>±.02 feet</td>
</tr>
<tr>
<td>Alignment on Structures</td>
<td></td>
<td>±.02 feet</td>
</tr>
<tr>
<td>Superstructure elevations</td>
<td>±.01 feet variation from Plan elevation</td>
<td></td>
</tr>
<tr>
<td>Substructure</td>
<td></td>
<td>±.02 feet variation from Plan grades</td>
</tr>
</tbody>
</table>
When the following items are included in the project, the Contractor shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances:

- Piles
- Shafts
- Footings
- Columns

The Owner may spot-check the Contractor’s surveying. These spot-checks will not change the requirements for accuracy by the Contractor.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

The Contractor’s PLS shall establish all secondary survey controls, horizontal and vertical, as necessary to assure proper placement of all Work based upon the primary control points provided by the Owner. The Contractor shall be responsible for setting, maintaining, and resetting all alignment stakes, clearing limit stakes, slope stakes, and grades for the Work. Except for the survey control data to be furnished by the Owner, calculations, surveying, and measuring required for setting and maintaining the lines and grades shall be the Contractor’s responsibility.

Survey records shall be maintained by the Contractor’s PLS, including a description of the work performed on each shift, the methods utilized, and the control points used. The record shall be adequate to allow the survey to be reproduced. A copy of each day’s record shall be provided to the Engineer within three working days of Engineer’s request.

All surveyed points shall be established by placing hubs and tacks with marked stakes in unpaved areas or P.K. nails with painted markings in paved areas. All surveying stakes shall be marked in accordance with WSDOT Standard Plan A-10.10-00. When stakes are needed that are not described in the Standard Plans, then those stakes shall be marked as ordered by the Engineer. The Contractor’s surveyor shall maintain and replace survey hubs, stakes, nails and markings immediately if destroyed, removed, or the Engineer determines the stake or pavement markings are illegible.

For monuments to be removed or destroyed as shown on the Plans, the Contractor’s PLS shall file all required permit forms with the Department of Natural Resources (DNR), as required by RCW 58.09.130 and WAC 332-120.
The form “Application for Permit to Remove or Destroy a Survey Monument” shall be signed by the PLS, and submitted directly to DNR and the Owner. No work affecting monumentation shall commence until DNR has approved the permit. The form “Completion Report for Monument Removal or Destruction” shall be signed by the PLS and submitted to DNR and the Owner upon completion of work affecting monumentation.

The Contractor shall be responsible for locating and preserving existing monuments within the right-of-way, which shall include existing property corners on the right-of-way lines. In the event the Contractor disturbs or destroys any survey marker, monument, or property corner during the course of construction, not indicated to be removed on the Plans, the Contractor shall bear all costs or survey, resetting, legal claims and filing state forms as required by RCW 58.09.130 and WAC 332-120.

*** END OF SECTION ***
SECTION 01160
REGULATORY REQUIREMENTS

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section contains information pertaining to permits and licenses, and use of private property.

1.2  PERMITS AND LICENSES

Except as noted below, the Contractor shall be responsible for obtaining and paying all fees associated with all the necessary permits, licenses, approvals, and construction permits necessary for the execution of this Contract, whether they be City, County, State, or federal permits.

1.3  OTHER PERMIT REQUIREMENTS

The Washington State Department of Ecology has prohibited bypassing of sewage to state waters. The Contractor shall maintain the conveyance facilities in continuous operation during the entire construction period and until the project has been accepted by the Owner. The Contractor shall pay all costs of any damages and/or Regulatory Agency penalties resulting from plant bypassing or overflows caused by their actions or inactions.

1.4  USE OF PRIVATE PROPERTY

The Contractor shall be responsible for all conditions of any arrangements the Contractor makes for the use of any privately-owned property.

In the event any dispute occurs and claims for damages are filed by the property owners, the Owner will request that the Contractor give evidence that they have requested their insurance company to make personal contact with the claimants. Any settlement for insurance claims shall be strictly an act restricted to the claimant, the Contractor, and their insurance company.

The Contractor is advised that in the event of any property damage, the Owner reserves the right to withhold monies to protect the property owner.

1.5  PROPERTY RELEASE FORM

The Contractor shall be held responsible for acquiring signed property release forms, in the format provided on the following page, for all properties that have...
been disturbed or damaged by the Contractor’s operations, or utilized by the Contractor for staging, storing, or stock piling of materials or equipment.

This work shall include submitting the form(s), as further shown herein, by certified mail to each property owner effected and further including therein a self addressed stamped envelope for the property owner’s use. The enclosed self addressed envelope shall be addressed to: City of Kittitas, PO Box 719, Kittitas, WA 98934. Contractor shall provide evidence of all certified mailings.

*** END OF SECTION ***
PROPERTY RELEASE

________________________________________________
(Property Address)

________________________________________________

DATE:_____________________________________

I, __________________________________, owner of ________________, hereby release
(Property Owner’s Name) ________________ (Property Description or
Address)

____________________________________________, hereby release
(Contractor’s Name)

damage or personal injury resulting from construction adjacent
to or on my property located at ____________________________,
(Property Address)
during construction of the Main Street Lift Station project.

My signature below is my acknowledgment and acceptance that my property, as
identified above, was returned to a satisfactory condition.

Name: ______________________________________

Signed: ____________________________________

Address: _________________________________

Phone: _________________________________

City of Kittitas
Main Street Lift Station
G&O #17022 01160-3
SEASON 01200
MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 SCOPE

This Section further defines Measurement and Payment for this project.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<table>
<thead>
<tr>
<th>Section</th>
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</thead>
<tbody>
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<td>Measurement and Payment</td>
</tr>
<tr>
<td>01300</td>
<td>Submittals</td>
</tr>
</tbody>
</table>

1.3 MEASUREMENT

Measurement for all items shall be as indicated in these Specifications for unit price and lump sum price bid items. Bid items are outlined in detail in this Specification Section and listed in the Proposal.

Measurement shall be in accordance with Section 1-09.1 of the WSDOT Standard Specifications. Volumes of gravel materials and concrete volumes shall be measured by the Engineer in the field and quantities will be limited to the relative neat line dimensions shown on the Plans or as approved by the Engineer in the field.

Weighing equipment, scale verification checks, load tickets for quarry spalls, rock riprap, cobbles, gravel materials, hot mix asphalt, bituminous construction materials, etc., shall conform to Section 1-09.2 of the WSDOT Standard Specifications. Load tickets shall include all gravel materials, cast-in-place concrete, cement grout, CDF, hot mix asphalt, ATB, and reinforcing steel. The Owner will pay for no material received by weight unless they have been weighed as required in this Section or as required by another method the Engineer has approved in writing. All costs incidental to weighing shall be merged into the various unit prices bid.

1.4 INDIVIDUAL BID ITEMS

The following is a list of bid items for the project. The contract price for each item constitutes full compensation for furnishing all equipment, labor, materials, appurtenances, and inadvertent and performing all operations necessary to construct and complete the various bid items in accordance with the Contract Documents. Payment for each item shall be considered as full compensation,
notwithstanding that minor features may not be mentioned herein. Work paid for under one item will not be paid for under any other item. If a particular item of work shown on the Plans or described in Specifications is not described in a specific bid item, this item of work shall be considered as incidental to the work and the costs for this work shall be merged into the various respective unit price and lump sum bid items.

A. BASE BID

1. Unexpected Site Changes

   a. Measurement: Will be negotiated prior to commencing any such work under this pay item and shall be for work to remedy unforeseen conditions, utility conflicts, minor landscaping, minor drainage improvements, or special surface restoration.

   b. Payment: Payment or credits for changes amounting to $15,000 or less may be made under the Bid Item UNEXPECTED SITE CHANGES. At the discretion of the Owner, this procedure for Unexpected Site Changes may be used in lieu of the more formal procedure as outlined in General Conditions Section 3.04.6. The Contractor will be provided a copy of the completed order for Unexpected Site Changes. The agreement for the Unexpected Site Changes will be documented by signature of the Contractor or notation of the verbal agreement. If the Contractor is in disagreement with anything required by the order for Unexpected Site Changes, the Contractor may protest the order as provided in General Conditions Section 3.04.8.

   Payments or credits will be determined in accordance with General Conditions Section 3.04.6. For the purpose of providing a common Proposal for all Bidders, the Owner has entered an amount for UNEXPECTED SITE CHANGES in the Proposal to become part of the total Bid by the Contractor.

2. Mobilization and Demobilization

   a. Measurement: Will be measured by lump sum.

   b. Payment: The lump sum contract price for MOBILIZATION AND DEMOBILIZATION shall include all costs for the labor, materials, and equipment required.
for mobilization and demobilization on the project as described in Section 01505.

Payment for MOBILIZATION AND DEMOBILIZATION shall be as follows:

35% Payment: When Contractor has mobilized on-site and temporary facilities are in place.

50% Payment: When 5 percent of the total pay items are completed (not including payment for materials on hand).

75% Payment: When 50 percent of the total pay items are completed (not including payment for materials on hand).

100% Payment: When Project is completed and recommended for acceptance.

3. Project Temporary Traffic Control
   a. Measurement: Will be measured by lump sum.
   b. Payment: The lump sum contract price for PROJECT TEMPORARY TRAFFIC CONTROL shall include costs for all labor, material, and equipment to provide temporary traffic control for the project as shown on the Plans and as specified in Section 01950.

4. Locate Existing Utilities
   a. Measurement: Will be measured by lump sum.
   b. Payment: The lump sum contract price for LOCATE EXISTING UTILITIES shall include all costs for labor, material, and equipment required to locate all existing utilities as shown on the Plans as specified in Section 02050.

5. SPCC Plan
   a. Measurement: Will be measured by lump sum.
b. Payment: The lump sum contract price for SPCC PLAN shall include all costs for the preparation of the SPCC plan as specified in Section 02220.

6. Dewatering
   a. Measurement: Will be measured per lump sum.
   b. Payment: The lump sum contract price for DEWATERING shall include all costs of furnishing, installing, maintaining, and removing those items necessary to provide adequate dewatering for the installation of the sanitary sewer system for the project to include, but not limited to, materials, power, groundwater control systems, design calculations, installation, permitting and flow monitoring as shown on the Plans and as specified in Section 02240.

7. Trench Dam
   a. Measurement: Will be measured per each.
   b. Payment: The unit price bid per each for TRENCH DAM shall include all costs of furnishing and installing the trench dam within the pipe trench as specified herein and indicated on the Plans or as otherwise required and directed in the field by the Contracting Agency.

8. Trench Dam
   a. Measurement: Will be measured per each.
   b. Payment: The unit price bid per each for TRENCH DAM shall include all costs of furnishing and installing the trench dam within the pipe trench as specified herein and indicated on the Plans or as otherwise required and directed in the field by the Contracting Agency.

9. Trench Excavation Safety Systems
   a. Measurement: Will be measured by lump sum.
   b. Payment: The lump sum contract price for TRENCH EXCAVATION SAFETY SYSTEMS shall include all costs for labor, materials, and equipment required to provide sheeting, shoring, and bracing of trenches and open
excavations as required to meet the Washington Industrial Safety and Health Act, Chapter 49.17 RCW and Section 02250. These costs shall not be considered incidental to any other bid item.

10. **Manhole, 48 In. Diam.**
   a. **Measurement:** Shall be measured per each. The cost shall include full height of manholes as shown.
   b. **Payment:** The unit price bid per each for MANHOLE, 48 IN. DIAM. shall include all costs for labor, material, and equipment for the installation of manholes including, excavation, backfill, compaction, gaskets, ladder steps, frames, covers, connections, and testing the manhole as shown on the Plans and as specified in Section 02530.

11. **Connect to Existing Manhole**
   a. **Measurement:** Shall be measured by lump sum.
   b. **Payment:** The unit price bid for CONNECT TO EXISTING MANHOLE shall include all costs for labor, material, and equipment for the connection to the existing manhole. The unit price shall include all costs for excavation, maintaining operation of the existing manhole, preventing debris and other materials from entering the sewer, core drill of the structure, cleaning, grouting, rechanneling of the existing manhole, bedding, backfill, compaction, pipe, fittings, gaskets, and pipe straps as shown on the Plans and as specified in Section 02535.

12. **PVC Sanitary Sewer Pipe, 8 In. Diam.**
   a. **Measurement:** Shall be measured per lineal foot.
   b. **Payment:** The unit price bid for PVC SANITARY SEWER PIPE, 8 IN. DIAM. shall include all costs for labor, material, and equipment for the installation of sanitary sewer. The unit price shall include all costs for excavation, bedding, backfill, compaction, pipe, fittings, gaskets, locating tape, video inspections, and testing as shown on the Plans and as specified in Section 02535.
13. PVC Side Sewer Pipe, 6 In. Diam.
   a. Measurement: Shall be measured per lineal foot.
   b. Payment: The unit price bid for PVC SIDE SEWER PIPE, 6 IN. DIAM. shall include all costs for labor, material, and equipment for the installation of side sewer. The unit price shall include all costs for excavation, bedding, backfill, compaction, pipe, fittings, gaskets, locating tape and wire, cleanouts, flushing and cleaning, and testing as shown on the Plans and as specified in Section 02535.

14. HDPE Sewer Force Main, 4 In. Diam.
   a. Measurement: Shall be measured per lineal foot.
   b. Payment: The unit price bid for HDPE SEWER FORCE MAIN, 4 IN. DIAM. shall include all costs for labor, material, and equipment for the installation of HDPE force main. The unit price shall include all costs for excavation, bedding, backfill, compaction, pipe, fittings, and testing as shown on the Plans and as specified in Section 02536.

15. HDPE Sewer Force Main, 1.5-In. Diam.
   a. Measurement: Shall be measured per lineal foot.
   b. Payment: The unit price bid for HDPE SEWER FORCE MAIN, 1.5-IN. DIAM. shall include all costs for labor, material, and equipment for the installation of HDPE force main. The unit price shall include all costs for excavation, bedding, backfill, compaction, pipe, fittings, and testing as shown on the Plans and as specified in Section 02536.

16. Unsuitable Excavation
   a. Measurement: Will be measured by the cubic yard, in-place and shall be to the limits as designated by the Engineer. There shall be no payment if the Engineer believes removal of materials is needed because of damage caused by the Contractor’s operations.

   All quantities will be measured and recorded by the Engineer in his Daily Report and the Contractor shall be
responsible for reconciling his quantities with the Engineer on a daily basis.

b. Payment: The unit price per cubic yard for UNSUITABLE EXCAVATION shall include all cost for labor, material, and equipment to excavate and wastehaul unsuitable native subgrade materials, including backfilling the resulting excavations with compacted foundation gravel materials.

The Contractor is advised that the excavation of any and all unsuitable material must be authorized by the Engineer in writing prior to the commencement of said excavation by the Contractor.

17. Foundation Gravel

a. Measurement: Shall be measured per cubic yard and shall be to the limits shown on the Plans or as required by encountered subgrade conditions as approved by the Engineer.

b. Payment: The unit price bid per cubic yard for FOUNDATION GRAVEL shall include all costs for the labor, material, and equipment for furnishing and installing foundation gravel in trenches and below structures as shown on the Plans and as described Section 02700. The quantity of material for payment shall be based volume of material placed within the neat line limits as shown on the Plans and as approved by the Engineer.

In the event the Contractor overexcavates the trench depth, or if the trench width becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor’s sole expense.

18. Bank Run Gravel for Trench Backfill

a. Measurement: Shall be measured per ton, in-place, based on truck tickets and shall be to the limits designated and approved by the Engineer.

All quantities will be measured and recorded by the Inspector in his Daily Report and the Contractor shall be responsible for reconciling his quantities with the Engineer on a daily basis.
b. Payment: The unit price per ton for BANK RUN GRAVEL FOR TRENCH BACKFILL shall include all costs for labor, material, equipment to furnish and install bank run gravel including backfilling, compaction, as shown on the Plans and as specified in Sections 02300 and 02700.

19. Crushed Surfacing Top Course

a. Measurement: Shall be measured per ton, in-place, based on truck tickets and shall be to the limits designated and approved by the Engineer.

b. Payment: The unit price bid per ton for CRUSHED SURFACING TOP COURSE shall include all costs for the labor, material, and equipment associated with furnishing, installing, and testing crushed surfacing top course as shown on the Plans and as described in Section 02710.

20. Commercial HMA

a. Measurement: Shall be measured per ton, in-place, based on truck tickets and shall be to the limits designated and approved by the Engineer.

b. Payment: The unit price bid per ton for COMMERCIAL HMA shall include all costs for the labor, material, and equipment to furnish, install, and test hot mix asphalt as shown on the Plans and as described in Section 02740.

21. Grinder Lift Station

a. Measurement: Will be measured per lump sum.

b. Payment: The lump sum contract price for GRINDER LIFT STATION shall include all costs for labor, materials, and equipment to furnish and install the package lift station, including but not limited to, excavation, backfill, compaction, bedding, concrete anchor, connection to new gravity sewer, connection to new force main, control panel, power and control cabling conduit, any necessary dewatering and temporary shoring, and testing on the Plan and as specified herein.
22. Cement Concrete Traffic Curb and Gutter
   a. Measurement: Shall be measured per lineal foot.
   b. Payment: The unit contract price per linear foot for CEMENT CONCRETE TRAFFIC Curb AND Gutter shall include all costs associated with furnishing labor, material, tools, and equipment for the complete installation of these items including, but not limited to, sawcutting, removal and wastehaul of existing curb and gutter, furnishing and placing crushed surfacing top course, forming, placing, block-outs, joint filler, curing, temporary barricades, end-sections, painting, material testing and any other items as shown on the Plans and as described in Section 03300. It shall also include protecting all curbs from damage until accepted by the Contracting Agency.

23. Cement Concrete Sidewalk
   a. Measurement: Shall be measured per square yard.
   b. Payment: The unit contract price for CEMENT CONCRETE SIDEWALK shall include all costs of furnishing all materials, labor, tools, and equipment necessary for a complete installation including sawcutting, removal and wastehaul of existing sidewalk, forming, furnishing and placing crushed surfacing top course and concrete, jointing and joint filler, curing, temporary barricades, and any other items required for a complete installation in good working order and in accordance with the Plans and Section 03300. It shall also include protecting all sidewalks from damage until accepted by the Contracting Agency.

24. Electrical, Telemetry, and Instrumentation
   a. Measurement: Shall be measured by lump sum.
   b. Payment: The lump sum contract price for ELECTRICAL, TELEMETRY, AND INSTRUMENTATION shall include all labor, materials and equipment to furnish electrical, telemetry, and instrumentation components of this Project including conduit, wiring, motor control centers, panel boards, receptacles, fixtures, instrumentation, and telemetry as shown on the Plans and as described in Divisions 11 and
16 of these Specifications. Costs shall also include all costs for demolition or abandonment of electrical components.

1.5 PAYMENT

Payment for all work will be made at the contract unit price or lump sum price as indicated in the Proposal, payment of which shall constitute full compensation, for a complete installation.

For items of equipment, acceptable operating and maintenance information shall be delivered to the Engineer before the Contractor will be paid for more than 90 percent of the purchase value of that equipment. Purchase value shall be the net price for the equipment as given on the invoice.

Final operating and maintenance manuals per Section 01300 must be delivered to the Engineer prior to the Project being 90 percent complete. Progress payments for work in excess of 90 percent completion will not be made until the specified acceptable operating and maintenance information has been delivered to the Engineer.

*** END OF SECTION ***
SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes requirements that apply to all equipment and materials supplied on the Project.

The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment or method of work shall be as described in the submittal. The Contractor shall verify that all features of all products conform to the requirements of the Contract Documents. Submittal documents shall be clearly edited to indicate only those items, models, or series of equipment that are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated. The Contractor shall ensure that there is no conflict with other submittals and notify the Engineer in each case where his submittal may affect the work of another contractor or the Owner. The Contractor shall ensure coordination of submittals among the related crafts and subcontractors and shall verify such coordination on all submittals.

Where noted in the Contract Documents, the structural, mechanical, and electrical designs associated with the indicated equipment items are specific to the manufacturer and model number specified. Any structural, mechanical, or electrical modifications required to utilize an approved substitution to the specified equipment shall be made by the Contractor at no additional cost to the Owner. Where approved substitutions of specified equipment affect other materials or equipment, mechanical, structural, or electrical work, the Contractor shall note in the equipment submittal any necessary changes to accommodate the substituted equipment. It shall also be the responsibility of the Contractor to coordinate other mechanical, structural, or electrical equipment submittals to make sure that all changes necessary to accommodate the substituted equipment are addressed in these submittals as well. See General Condition 3.04.3.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<table>
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<td>Division 3</td>
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<td>Electrical</td>
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City of Kittitas
Main Street Lift Station
G&O #17022  01300-1
1.3 WORK INCLUDED

Submittals required for this work shall include any or all of the following as required by the particular specification section and the submittal schedule:

A. Schedules and Plans

B. PRODUCT SUBMITTALS

1. Manufacturer’s Literature
2. Shop Drawings
3. Color and Material Samples
4. Design Calculations
5. Test Reports

C. Equipment Operation and Maintenance Manuals

D. Post-Construction (Record) Drawings (see Section 01720)

1.4 SUBMITTAL INFORMATION

Shop, catalog, and other appropriate drawings and information shall be submitted to the Engineer for review prior to fabrication or ordering of all equipment and materials specified. The number of copies of submittal information to be submitted shall be as indicated below.

All submittal information shall be sent to the Engineer through the Contractor. The Contractor shall assign a separate submittal number to each item or group of items that relate to each specification section. Submittal numbers shall be assigned in consecutive ascending order, with the first project submittal assigned the number “1.” Resubmittals shall be numbered using the same number followed by an alphabetical suffix. All submittals shall bear the Contractor’s certification that he has reviewed, checked, and approved the submittal information prior to transmitting to the Engineer. The submittal number and related specification section shall be marked on each submittal.
PART 2 PRODUCTS

2.1 GENERAL

When the Contract Documents require a submittal the contractor shall submit the following number of documents.

<table>
<thead>
<tr>
<th>Type of Submittal</th>
<th>Number of Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schedules or Plans</td>
<td>1</td>
</tr>
<tr>
<td>Product Submittal</td>
<td>1</td>
</tr>
<tr>
<td>Design Calculations</td>
<td>1</td>
</tr>
<tr>
<td>Test Reports</td>
<td>1</td>
</tr>
<tr>
<td>Preliminary Equipment Manuals</td>
<td>1</td>
</tr>
<tr>
<td>Final Equipment Manuals</td>
<td>1</td>
</tr>
</tbody>
</table>

If requested by the Contractor and approved by the Engineer and Owner, the Contractor may submit one copy of submittals electronically in lieu of submitting hard copies for all submittals except Equipment Manuals. Hard copies of Equipment Manuals must be submitted. If submittals are provided electronically, only one reviewed copy will be returned to the Contractor.

2.2 PRODUCT SUBMITTALS

A. GENERAL

When indicated in the Contract Documents the contractor shall submit product data for review by the Engineer. Unless otherwise specified, within 14 calendar days after receipt of the submittal, the Engineer shall review the submittal and return three copies of the marked-up submittal. The reproducible original will be retained by the Engineer. The returned submittal shall indicate one of the following actions:

1. If the review indicates that the material, equipment, or work method complies with the project Specifications, submittal copies will be marked “NO EXCEPTIONS TAKEN.” In this event, the Contractor may begin to implement the work method or incorporate the material or equipment covered by the submittal.

2. If the review indicates limited corrections are required, copies will be marked “MAKE CORRECTIONS NOTED.” The Contractor may begin implementing the work method or incorporating the material and equipment covered by the submittal in accordance with the noted corrections. Where submittal information will be incorporated in operation and maintenance data, a corrected copy shall be provided.
3. If the review reveals that the submittal is insufficient or contains incorrect data, copies will be marked “AMEND AND RESUBMIT.” Except at their own risk, the Contractor shall not undertake work covered by this submittal until it has been revised, resubmitted, and returned marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”

4. If the review indicates that the material, equipment, or work method does not comply with the project Specifications, copies of the submittal will be marked “REJECTED - SEE REMARKS.” Submittals with deviations that have not been identified clearly may be rejected. Except at their own risk, the Contractor shall not undertake the work covered by such submittals until a new submittal is made and returned marked either “NO EXCEPTIONS TAKEN” or “MAKE CORRECTIONS NOTED.”

B. MANUFACTURER’S LITERATURE

Where the contents of submitted literature include data not pertinent to the submittal, the portion(s) of the contents being submitted for the Engineer’s review shall be clearly indicated.

C. SHOP DRAWINGS

Shop drawings shall be submitted in the form of blue-line or black-line prints of each sheet. Blueprint submittals will not be acceptable.

All shop drawings shall be accurately drawn to a scale sufficiently large enough to show pertinent features and method of connection or joining. On all shop drawings, figure dimensions shall be used as opposed to scaled dimensions.

D. COLOR AND MATERIAL SAMPLES

All material samples shall be of the exact article proposed to be furnished for the work and shall be submitted in the quantity required. Samples shall be returned to the Contractor, with one retained by the Engineer.

Unless the precise color is specifically described in the Contract Documents, or whenever a choice of color or pattern is available in a specified product, accurate color charts shall be submitted to the Engineer for their review and selection.
E. DESIGN CALCULATIONS

Where required in the Specifications, design calculations shall be submitted to the Engineer. Design calculations shall be complete, concise, and in an easy-to-read format. All design calculations shall be stamped by a Professional Engineer licensed in the State of Washington.

F. TEST REPORTS

Copies of all test reports shall be submitted to the Engineer.

2.3 EQUIPMENT MANUALS

A. GENERAL

For all items of equipment, preliminary manufacturer’s equipment operation and maintenance manuals shall be submitted to the Engineer for review. One copy will be returned to the Contractor with comments.

The following information shall be furnished for all items of equipment installed on the project requiring operational and/or maintenance procedures, and for any additional items indicated by the Engineer.

1. Lubrication Information

This shall consist of the manufacturer’s recommendations regarding the lubricants to be used and the lubrication schedule to be followed.

2. Electrical and Control Diagrams

Diagrams shall show internal and connection wiring.

3. Startup Procedures

These instructions consist of equipment manufacturer’s recommendations for installation, adjustment, calibration, and troubleshooting.

4. Operating Procedures

These instructions consist of the equipment manufacturer’s recommended step-by-step procedures for starting, operating, and stopping the equipment under specified modes of operation.
5. Preventive Maintenance Procedures

These instructions consist of the equipment manufacturer’s recommended steps and schedules for maintaining the equipment.

6. Overhaul Instructions

These instructions consist of the manufacturer’s directions for the disassembly, repair, and reassembly of the equipment and any safety precautions that must be observed while performing the work.

7. Parts List

This list consists of the generic title and identification number of each component part of the equipment.

8. Spare Parts List

This list consists of the manufacturer’s recommendations of number of parts, which should be stored by the Owner and any special storage precautions, which may be required.

9. Exploded View

Exploded or cut views of equipment shall be provided if available as a standard item of the manufacturer’s information. When exploded or cut views are not available, plan and section views shall be provided with detailed callouts.

10. Test Documentation

Reports, records, data and forms documenting the results of equipment factory tests, including pump and blower performance curves, shall be provided, with the operating points for the specific equipment designated. When a special factory test of the supplied equipment is not performed, the manufacturer’s standard performance reports and curves, with specified operating points, shall be provided for the supplied equipment.

11. Specific Information

Where items of information not included in the above list are required, they will be provided as described in the specifications for the equipment.
12. Warranty Information.

13. Maintenance Information Summaries (see below for requirements).

In addition, the following items of equipment shall be provided with Maintenance Information Summaries in each appropriate section of the equipment manuals, prepared according to the format specified herein:

- Grinder Pumps
- Electrical Equipment

Maintenance information summaries shall be prepared on 8-1/2-inch x 11-inch paper only and shall contain the following information compiled from manufacturer’s recommendations in the order shown.

1. Description or name of item of equipment.

2. Manufacturer.

3. Name, address, and telephone number of local manufacturer’s representative.

4. Serial number (where applicable). The Contractor shall verify that it matches the equipment installed on the project.

5. Equipment nameplate data including model number.

6. Recommended maintenance procedures:
   a. Description of procedures.
   b. Maintenance frequency required.
   c. Lubricant(s) or other materials required (where applicable), including type of lubricant, lubricant manufacturer, and specific compound.
   d. Additional information as required for proper maintenance.

7. Recommended spare parts (where applicable).

The maintenance information summary shall be placed at the beginning of the manual.
All operation and maintenance information shall be comprehensive and detailed, and shall contain information adequately covering all normal operation and maintenance procedures.

For ease of identification, each manufacturer’s brochure and manual shall be appropriately labeled with the equipment name and equipment specification number as it appears in the project Specifications. The information shall be organized in binders. The binders shall be provided with a table of contents and tab sheets to permit easy location of desired information.

Lubricants shall be described in detail, including type, recommended manufacturer, and manufacturer’s specific compound to be used.

It shall be the responsibility of the Contractor to ensure that all operation and maintenance materials are obtained. Material submitted must meet the approval of the Engineer prior to project acceptance.

B. EXTRANEOUS DATA

Where the contents of the manuals include manufacturers’ standard brochures or catalog pages, the exact item(s) used in this installation shall be clearly indicated and all manufacturers’ data which is extraneous shall be clearly deleted.

C. FINAL EQUIPMENT MANUALS

The Contractor shall be responsible for tracking and coordinating each separate manufacturer’s equipment operation and maintenance manual submittal and shall resubmit, as necessary, until the Engineer’s review indicates that the submittal is acceptable. The Contractor shall maintain equipment manual files until final approval copies are delivered to the Engineer. The Contractor shall be responsible for collating the approved operation and maintenance submittal sections into complete final manufacturers’ equipment operation and maintenance manuals bound in post binders which are indexed to the Specifications. The Contractor shall deliver the complete final operation and maintenance manuals to the Engineer prior to project completion. All copies final manufacturers’ equipment manuals submitted will be retained by the Engineer or Owner.

The Contractor shall also supply three CD-Rom copies of the final equipment manuals in a tabbed, searchable, .pdf format, with a table of contents bookmarked to provide a navigation link to each section of the manual.
PART 3 EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

A. GENERAL

Each submittal shall be accompanied by a letter of transmittal showing the date of transmittal, specification section, or drawing number to which the submittal pertains, submittal number, and a brief description of the material submitted.

B. RESUBMITTALS

When material is resubmitted for any reason, it shall be submitted under a new letter of transmittal and referenced to the previous submittal.

3.2 REVIEW OF SUBMITTALS

The Engineer will review all submittals for general conformance with the design and other requirements of the Contract Documents. Markings or comments shall not be construed as relieving the Contractor from compliance with the Contract Documents. Submittals may be rejected based on inadequate information and/or not meeting the requirements of the Contract Documents. Rejection of submittals requires action on the part of the Contractor to correct the reason for the rejection. The Contractor remains responsible for details and accuracy, for confirming and correlating all quantities and dimensions, for selecting fabrication processes, and for techniques of assembly and installation.

3.3 COORDINATION OF PRODUCT SUBMITTALS

A. GENERAL

Prior to submittal for review by the Engineer, all data shall be fully coordinated, including the following:

1. All field dimensions and conditions.

2. All trades and public agencies involved, including necessary approvals.

3. All deviations from the Contract Documents.
B. GROUPING OF SUBMITTALS

1. All submittals shall be grouped with associated items, unless otherwise specifically permitted by the Engineer.

2. The Engineer may reject the submittals in their entirety or any part thereof, if not in accordance with the Contract Documents.

C. CERTIFICATION

Submittals shall bear the Contractor’s certification that he has reviewed, checked, and approved the shop drawings prior to forwarding them to the Engineer.

3.4 TIMING OF PRODUCT SUBMITTALS

A. GENERAL

1. All submittals shall be made far enough in advance of installation to provide all required time for reviews and securing necessary approvals.

2. In scheduling, the Contractor shall allow for the time indicated in Part 2.2A for the Engineer’s review following his receipt of the submittal.

B. DELAYS

No additional or separate payment will be made for costs of delays occasioned by tardiness of submittals on the part of the Contractor.

3.5 EQUIPMENT MANUALS

The preliminary copies of the manufacturer’s equipment manuals shall be delivered to the Engineer for review not later than the time of equipment delivery to the project site. The Contractor will not be paid for more than 90 percent of the purchase value of an item of equipment until the Engineer has received the preliminary equipment manual for that item of equipment.

Final copies of the manufacturer’s equipment manuals shall be delivered to the Engineer at least 10 days prior to requesting payment in excess of 90 percent completion for the project. Progress payments for work in excess of 90 percent completion will not be made until the final equipment manuals have been received and accepted by the Engineer. Prior to submittal of the final equipment
manuals, the Contractor shall check the manuals for accuracy and completeness and shall verify that prior review comments have been addressed.

*** END OF SECTION ***
SECTION 01310

PROJECT MEETINGS

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes information pertaining to the various meetings that will be held during the course of constructing this project.

1.2  PRECONSTRUCTION CONFERENCE

As soon as possible following the award of the Contract, a preconstruction conference shall be scheduled for representatives of the Owner, the Contractor, the Engineer, funding agencies, regulatory agencies, and affected utilities.

1.3  PROJECT PROGRESS MEETINGS

The Owner and the Engineer will schedule and attend regular weekly meetings with the Contractor for coordination, administrative, and procedural requirements of the project.

1.4  CONSTRUCTION MEETINGS

The Contractor shall schedule and hold regular meetings during the project:

A.  Safety Meetings (Contractor’s subcontractors shall attend if they are working onsite.)

B.  Project Progress Meetings

C.  Equipment Installation Meetings

D.  Coordination Meetings

E.  Startup and Testing Meetings

The Contractor shall notify the Owner and Engineer in advance of all meetings. The meetings may or may not be attended by the Owner and Engineer.

*** END OF SECTION ***
SECTION 01385

PHOTOGRAPHS

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes all photography requirements for the project.

The Contractor shall provide comprehensive preconstruction photographs of the entire construction area and adjacent properties. The photographs shall provide complete coverage of all features in the project area, and in no event shall photographs be more than 50 feet apart.

Prior to construction, photographs shall be taken in the project area where work is to be done. Special attention shall be given to depict existing roadway and property conditions, fences, buildings, trees, ditches, culverts, meter boxes, etc. The photographs shall be of commercial quality and must be submitted to the Engineer prior to the initiation of construction.

Photographs may be submitted to the Engineer in electronic format:

A.  ELECTRONIC FORMAT

The Contractor shall submit digital photographs on either CD-rom or electronic storage device (flash/thumb drive). Three copies of each storage device or CD-rom shall be submitted to the Engineer. Each photograph shall be of good quality, sufficiently large to distinguish unique features captured in the photograph, and should be at least 4 MB in size. Each electronic storage device or CD-rom shall be labeled, and shall, at a minimum include the name of the Owner, name of the Contractor, Date, Project Name, and the title, “Pre-Construction Photographs” in sufficiently legible text.

The photographs shall be arranged in a continuous fashion indicating topographical features from one end of the project to the other. The Contractor shall invite the Engineer to the site while collecting these photographs.

Photographs shall be taken during a period of good visibility. Unless otherwise directed by the Engineer, photographs will not be allowed during times of precipitation or poor visibility.
Following construction, the Contractor shall provide post-construction photographs of the entire construction area and adjacent properties in a similar format to the preconstruction photographs.

*** END OF SECTION ***
SECTION 01400

QUALITY CONTROL

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the control tests, test sample collection, required field-testing, and special inspections as specified herein, and indicated on the Plans.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<table>
<thead>
<tr>
<th>Section</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>02700</td>
<td>Gravel Materials</td>
</tr>
<tr>
<td>02710</td>
<td>Gravel Surfacing</td>
</tr>
<tr>
<td>02740</td>
<td>Hot Mix Asphalt</td>
</tr>
<tr>
<td>03300</td>
<td>Reinforced Concrete</td>
</tr>
</tbody>
</table>

1.3 PAYMENT

All testing as required by this Section shall be paid for by the Contractor. All costs to prepare and implement the sample and testing program shall be included in the bid prices for the various items associated with the sampling and testing program.

Retesting and reinspection required because of defective work and testing performed for the convenience of the Contractor shall also be paid for by the Contractor.

Testing requirements shall not be cause for claims of delay by the Contractor and all expenses accruing therefrom shall be deemed incidental to the performance of the Contract.

PART 2 PRODUCTS

2.1 GENERAL

The Contractor shall be responsible for all material testing specified in the Contract Documents and any applicable permits and codes. The materials testing laboratory shall be accredited for performing the various testing methods either by AASHTO R18, AASHTO 150/IEC 17025 or the American Association for Laboratory Accreditation and further approved by the Owner. The materials testing laboratory shall send test results directly to the Engineer.
2.2 EARTHWORK AND GRANULAR MATERIALS

A. COMPACTION CONTROL

Optimum moisture content and maximum density tests shall be determined by the following method:

ASTM D1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort

B. IN-PLACE TESTS

In-place density and moisture content tests shall be made by an independent testing laboratory according to the following methods:

ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

2.3 AGGREGATES

All aggregates shall be tested in accordance with applicable WSDOT test methods:

<table>
<thead>
<tr>
<th>Title</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling</td>
<td>AASHTO T2</td>
</tr>
<tr>
<td>Sieve Analysis of Fine and Coarse Aggregates</td>
<td>104A</td>
</tr>
<tr>
<td>Material Finer than No. 200 Sieve in Aggregates</td>
<td>102A</td>
</tr>
<tr>
<td>Percentage of Particles Smaller than 0.025 mm and 0.005 mm</td>
<td>603</td>
</tr>
<tr>
<td>Organic Impurities</td>
<td>111A</td>
</tr>
<tr>
<td>Abrasion of Coarse Aggregates by Use of the Los Angeles Machine</td>
<td>101A</td>
</tr>
<tr>
<td>Sand Equivalent</td>
<td>109A</td>
</tr>
</tbody>
</table>

2.4 CAST-IN-PLACE CONCRETE

Cast-in-place concrete shall be tested in accordance with applicable parts of Chapter 16 of ACI 301. Concrete reinforcement and concrete special inspections
shall be performed in accordance with local Building Official and WABO requirements.

2.5 HOT MIX ASPHALT

Paving asphalt shall be tested in accordance with the following WSDOT test methods:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Test Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tests on Residue from RTFC Procedure</td>
<td>208</td>
</tr>
<tr>
<td>Absolute Viscosity at 140 degrees F, poise</td>
<td>203</td>
</tr>
<tr>
<td>Kinematic Viscosity at 275 degrees F., cSt, min.</td>
<td>202</td>
</tr>
<tr>
<td>Penetration at 77 degrees F., 100 g/5 sec., min.(1)</td>
<td>201</td>
</tr>
<tr>
<td>Percent of Original Penetration at 77 degrees F., min.</td>
<td>2</td>
</tr>
<tr>
<td>Ductibility at 45 degrees F., cm, min.</td>
<td></td>
</tr>
<tr>
<td>Flashpoint, (Cleveland Open Cup), degrees F min. (test on original asphalt)</td>
<td>206</td>
</tr>
<tr>
<td>Solubility in Trichloroethylene percent, min. (test on original asphalt)</td>
<td>214</td>
</tr>
</tbody>
</table>

(1) Original penetration, as well as penetration after RTFC loss shall be determined by AASHTO Test Method T 49.

A. COMPLETE EXTRACTIVE OF UNCOMPACTED MIX

Test methods shall be in accordance with the following:

1. AASHTO T68
2. ASTM D2172
3. AASHTO T30

B. DENSITY OF COMPACTED MIX

Test method shall be in accordance with AASHTO T166.

1. The Contractor shall employ an independent testing laboratory approved by the Owner to conduct complete extraction tests on the uncompacted asphalt concrete pavement mix.
2. The Contractor shall provide the Engineer with an affidavit from the asphalt supplier of the characteristics of the paving asphalt. The paving asphalt shall be tested in accordance with WSDOT Construction Manual and Standard Specifications, latest editions.
PART 3 EXECUTION

3.1 SAMPLING AND TESTING FREQUENCY

A. GENERAL

The Contractor shall provide the following quality control tests at the number and frequency described herein. On-site testing technicians and testing laboratories shall be WABO-certified. The precise location of the tests shall be designated by the Engineer. The Contractor shall cooperate with laboratory personnel employed to conduct the density testing, sampling of material(s), and special inspections. The Contractor shall provide safe access within the work site for laboratory personnel such that density testing and visual inspection can be performed. The Contractor shall provide samples of materials to be tested in the quantities required and herein specified to the appropriate laboratory personnel. The Contractor shall furnish all labor, equipment, tools, and materials necessary to obtain and deliver samples as herein designated. He shall also provide and repair any test holes required in order to facilitate the testing and sampling and to provide for the testing laboratory’s exclusive use for storage and curing of test samples until removed to the laboratory.

Any areas tested and further failing compliance with the Specifications shall be recompacted and retested at the Contractor’s expense, until a successful density test indicating compliance with these Specifications has been achieved.

B. SOIL TESTING

The following soil quality control tests shall be completed at the given frequency:

<table>
<thead>
<tr>
<th>Material</th>
<th>Test</th>
<th>Minimum Sampling &amp; Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backfill for foundations, walls, trenches and roads</td>
<td>Gradation(^1)</td>
<td>One every 500 cy or one per day for quantities exceeding 25 cy. For trenches, one every 750 feet of trench.</td>
</tr>
<tr>
<td></td>
<td>In-Place Density(^2,3,4)</td>
<td>One every 500 cy or one per day for each type of soil or fill material with quantities exceeding 25 cy. For trenches, one per day and one every 250 feet of trench.</td>
</tr>
</tbody>
</table>
### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Test</th>
<th>Minimum Sampling &amp; Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Bedding</td>
<td>Gradation$^1$</td>
<td>One every 750 feet of trench.</td>
</tr>
<tr>
<td>Subgrade and Fills</td>
<td>In-Place Density$^{2,3}$</td>
<td>One every 500 cy of each type material.</td>
</tr>
<tr>
<td></td>
<td>Moisture-Density Relationship$^3$</td>
<td>One for every 20 densities for each material.</td>
</tr>
<tr>
<td></td>
<td>Gradation</td>
<td>One for every moisture-density.</td>
</tr>
</tbody>
</table>

1. All acceptance tests shall be conducted from in-place samples.
2. Additional tests shall be conducted when variations occur due to the Contractors, operations, weather conditions, site conditions, etc.
3. The nuclear densometer, if properly calibrated, may be used but only to supplement the required testing frequency and procedures. The densometer shall be calibrated and is recommended for use when the time for complete results becomes critical.
4. Depending on soil conditions, it is anticipated that compaction tests shall be required at depths of 2 feet above the pipe and at each additional 5 feet to the existing surface plus a test at the surface.

### C. HOT MIX ASPHALT TESTING FREQUENCY

The following hot mix asphalt quality control tests shall be completed at the given frequency:

<table>
<thead>
<tr>
<th>Material</th>
<th>Test</th>
<th>Minimum Sampling &amp; Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mix Design (By Contractor)</td>
<td>Submittal</td>
<td>Design Mix (include test results). Aggregate (each size) – 100 pounds. Asphalt - 1 gallon. Mineral Filler – 10 pounds.</td>
</tr>
<tr>
<td>Asphalt (including prime and tack coat)</td>
<td>Sample and Tests</td>
<td>Submit a 1-quart sample and material certification with test results for each shipment or lot of asphalt. A duplicate 1-quart sample shall be retained by the Contractor until the completion of the job.</td>
</tr>
</tbody>
</table>
### Material

<table>
<thead>
<tr>
<th>Material</th>
<th>Test</th>
<th>Minimum Sampling &amp; Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregates (from bins or source)</td>
<td>Gradation</td>
<td>One test prior to start of paving operation and one every 1,500 tons or 1,000 cy.</td>
</tr>
<tr>
<td>Fractured Faces</td>
<td>Same as gradation.</td>
<td></td>
</tr>
<tr>
<td>LA Abrasion</td>
<td>One test prior to start of paving and one test every 10,000 tons thereafter.</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>Same as gradation.</td>
<td></td>
</tr>
<tr>
<td>Hot Mix Asphalt (including Asphalt Treated Base)</td>
<td>Marshall Method Test</td>
<td>One initial test during mix design and one per 3,000 tons thereafter.</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>One per each Marshall test.</td>
<td></td>
</tr>
<tr>
<td>Compaction</td>
<td>One per 50 Tons</td>
<td></td>
</tr>
</tbody>
</table>

### D. CONCRETE TESTING

All testing shall conform to applicable portions of ACI. Special inspections of concrete and concrete reinforcement shall comply with WABO requirements.

All concrete must meet the specified requirements for minimum 28-day compressive strength.

All concrete cylinders shall be molded and tested for strength by an independent testing laboratory employed by the Contractor.

The Contractor shall furnish all concrete required for molding of the cylinders. In cases where cylinders are stored at the project site, the Contractor shall provide storage and protection for the cylinders in accordance with ACI requirements.

Concrete tests and testing frequency shall be in accordance with the more stringent of the testing requirements specified in Section 03300-3.17 of these Specifications, and the following table:

<table>
<thead>
<tr>
<th>Material</th>
<th>Test</th>
<th>Minimum Sampling &amp; Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Aggregate (for each grading size)³</td>
<td>Gradation</td>
<td>One test every 500 cy of concrete.</td>
</tr>
</tbody>
</table>

---

³ See note: In the context of grading sizes, each grading size is tested separately to ensure compliance with the specified requirements.
<table>
<thead>
<tr>
<th>Material</th>
<th>Test</th>
<th>Minimum Sampling &amp; Testing Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deleterious Substances</td>
<td>One test initially and thereafter when appearance makes the material suspect.</td>
<td></td>
</tr>
<tr>
<td>L.A. Abrasion</td>
<td>One every 2,000 tons of aggregate.</td>
<td></td>
</tr>
<tr>
<td>Moisture specific gravity and absorption</td>
<td>One initially and every 250 cy thereafter. One moisture to be conducted prior to any batching and more frequently if hauling and storage does not provide a consistent moisture content.</td>
<td></td>
</tr>
<tr>
<td>Fine Aggregate ¹</td>
<td>Gradation and fineness modules</td>
<td>One every 250 cy of concrete.</td>
</tr>
<tr>
<td>Deleterious Substances</td>
<td>(same as coarse aggregate).</td>
<td></td>
</tr>
<tr>
<td>Moisture, specific gravity and absorption ¹</td>
<td>(same as coarse aggregate).</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>Slump</td>
<td>Conduct one test every day of placement and one additional test for every 50 cy placed and more frequently if batching appears inconsistent. Conduct in conjunction with taking concrete cylinders.</td>
</tr>
<tr>
<td>Entrained Air</td>
<td>Conduct with each slump test.</td>
<td></td>
</tr>
<tr>
<td>Ambient and concrete temperatures</td>
<td>Conduct with each slump test.</td>
<td></td>
</tr>
<tr>
<td>Concrete</td>
<td>Compressive strength and evaluation of results per ACI 214. (includes unit weight of each cylinder)</td>
<td>For all concrete placement, take one set of four cylinders per day and one additional set of cylinders for every 50 cy of each class of structural concrete. Cylinders shall be 4 inch by 8 inch. Test one cylinder at 7 days and two at 28 days. Fourth cylinder shall be held in reserve. A plot and statistical evaluation shall be maintained in accordance with ACI 214 for compressive strength results. Field cure cylinders shall be made when insitu strengths are required to be known.</td>
</tr>
</tbody>
</table>
1. Aggregate moisture tests are to be conducted in conjunction with concrete strength tests for water/cement (w/c) calculations.

E. SPECIAL INSPECTIONS

Contractor shall perform all required Special Inspections per WABO requirements (Chapter 17 of the IBC). Special inspections include cast-in-place concrete, concrete reinforcement, structural welded connections, bolted connections, compaction testing for building and structure foundations, concrete masonry units (CMU), and epoxy adhesive bolting.

*** END OF SECTION ***
SECTION 01500

TEMPORARY FACILITIES

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes the temporary facilities required for this project, but not necessarily limited to:

A.  Temporary utilities such as water, electricity, telephone, off-site staging, and off-site parking.

B.  Temporary piping, pumps, valves, fittings, manholes, vaults, and appurtenances necessary to keep existing facilities fully operational during construction.

C.  Sanitary facilities.

D.  Temporary enclosures such as fences, tarpaulins, barricades, and canopies.

PART 2  PRODUCTS

2.1  UTILITIES

A.  TEMPORARY ELECTRICITY

The Contractor shall provide temporary power for construction at the project site. He shall make arrangements with the electrical utility (to obtain temporary power) and shall pay all costs and fees charged by the utility associated with connection of temporary power. The Contractor shall provide all special connections, receptacles, panelboards, etc., which are required for temporary service, and are not provided by the utility.

The Contractor shall furnish and install all temporary wiring and associated equipment required to keep all portions of the existing facilities in operation at all times.

Area distribution boxes shall be furnished, installed, and so located that the individual trades may use their own construction-type extension cords to obtain proper power and artificial lighting at all points where required. The Contractor shall provide a main disconnect on all temporary wiring panels, labeled “MAIN DISCONNECT,” to ensure the safety of personnel using extension cords and hand tools. Panels shall also be properly
grounded and equipped with GFCI breakers in accordance with WISHA requirements.

The Contractor shall provide the Engineer single line diagrams of the temporary wiring showing all circuit breakers. These diagrams shall be provided prior to installation of this wiring. These diagrams are necessary to provide information to Owner personnel for off-hours operation.

The Contractor shall pay all demand, consumption, taxes, and fees associated with the temporary electrical service.

B. WATER

The Contractor shall be responsible for providing water necessary for construction. This includes costs for supplying potable water for hydrostatic pressure leak testing of all water-holding structures and operational testing of all equipment and processes. Water is available from the Owner free of charge, provided that it is used responsibly. The Contractor shall install a meter with backflow prevention device prior to obtaining water from the Owner.

2.2 TEMPORARY PIPING

The Contractor shall furnish and install all temporary piping and pumping and, upon completion of the work, remove all such temporary piping as required, except as designated on the Plans to remain as a part of the Project. Prior to installation, the Contractor shall submit drawings to the Engineer showing the proposed installation of temporary piping and pumps, including location, type of pipe, fittings, and valves. The Contractor shall obtain the Engineer’s approval for temporary piping and pumping plan prior to installation.

Temporary piping and pumping shall be provided as necessary to maintain the existing facilities in operation until the new facilities are constructed, operational. An effort has been made on the Plans and/or Specifications to note instances and locations where temporary piping and/or pumping may be required; however, this in no way limits the temporary piping and pumping to be provided by the Contractor at these locations.

2.3 SANITARY FACILITIES

The Contractor shall provide toilet and wash-up facilities for his workforce and the Engineer at the site of work. They shall comply with applicable laws, ordinances, and regulations pertaining to the public health and sanitation of dwellings and camps.
2.4 OFF-SITE STAGING AND PARKING

The Contractor shall note that space is limited throughout the construction site. Employees of the Contractor, all subcontractors, vendors, suppliers, and associated personnel shall not be allowed to park onsite during the course of construction. It shall be the responsibility of the Contractor to provide sufficient parking facilities in authorized area(s) other than the construction site for the above-mentioned personnel.

In addition, the Contractor shall not be allowed to stockpile and store equipment and materials throughout the construction site. The Contractor shall coordinate his schedule so that all equipment and materials shall be brought to the construction site only when they are to be installed/utilized.

The Contractor shall provide storage of equipment and materials at an offsite, bonded warehouse, to be approved by the Engineer. The Contractor shall pay all costs associated with off-site delivery, storage, and transfer to the construction site.

2.5 ENCLOSURES

The Contractor shall furnish, install, and maintain during the project time all required scaffolds, tarpaulins, barricades, canopies, warning signs, steps, bridges, platforms, and other temporary construction necessary for proper completion of the work in compliance with all pertinent safety and other regulations.

PART 3 EXECUTION

All temporary facilities and controls shall be maintained as long as required for the safe and proper completion of the work. The Contractor shall remove such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Owner.

*** END OF SECTION ***
SECTION 01505

MOBILIZATION AND DEMOBILIZATION

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section consists of mobilization and demobilization. Mobilization consists of preconstruction activities and preparatory work for the project necessary to mobilize labor, materials, and equipment to the project site. Demobilization consists of activities to remove materials and equipment from the project site upon project completion, including final cleanup. Items which are not considered mobilization or demobilization include but are not limited to:

A. On-going activities throughout the duration of construction.

B. Profit, interest on borrowed money, overhead, or management costs.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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PART 2 PRODUCTS

Products and materials required for mobilization and demobilization are described in the various sections of Division 1 and in other parts of the Contract Documents.

PART 3 EXECUTION

Complete mobilization and demobilization as required by the various sections of Division 1 and other parts of the Contract Documents.

*** END OF SECTION ***
SECTION 01720

RECORD DRAWINGS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the record drawings, which shall be maintained and annotated by the Contractor during construction.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 INFORMATION PROVIDED BY THE OWNER

The Contractor will be provided with the following items to maintain record drawings for the project:

A. One full size paper set of Plans.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall maintain the following record drawings for the project:

A. A neat and legibly marked set of Contract Plans showing the final location of piping, equipment, electrical conduits, outlet boxes and cables;

B. Additional documents such as schedules, lists, drawings, and electrical and instrumentation diagrams included in the Contract Documents; and

C. Contractor layout and installation drawings.

Unless otherwise specified, record drawings shall be full size and maintained in a clean, dry, and legible condition. Record documents shall not be used for construction purposes and shall be available for review by the Engineer during normal working hours at the Contractor’s field office. At the completion of the
work, prior to final payment, all record drawings shall be submitted to the Engineer.

Marking of the drawings shall be kept current and shall be done at the time the material and equipment are installed. Annotations to the record documents shall be made with an erasable colored pencil conforming to the following color code:

A. Additions - Red
B. Deletions - Green
C. Comments - Blue
D. Dimensions - Graphite

Legibly mark drawings to record actual depths, horizontal and vertical location of underground raceways, cables, and appurtenances referenced to permanent surface improvements.

The Contractor’s record drawings (full-size hard-copy) will be reviewed monthly for completeness by the Engineer prior to preparing the progress estimate for payment. If the record drawings do not reflect the work performed, payment for that item of work will not be included in the progress estimate.

*** END OF SECTION ***
SECTION 01740

CLEANUP

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the maintenance of the building, structures, and site(s) in a standard of cleanliness throughout the construction period as described herein.

Throughout the construction period, the Contractor shall maintain the cleanliness of the site and structures as described herein. The Contractor is also to maintain access to all existing, operating equipment such that the equipment may be serviced and operated.

Dust of all kinds, including concrete dust produced by construction activities, shall be controlled to avoid damage to existing, operating equipment. Enclosures, ventilation, and air scrubbing may be required where significant potential for damage is determined by the Engineer.

1.2 RELATED WORK SPECIFIED ELSEWHERE

In addition to standards described in this Section, comply with all requirements for cleaning up when described in other sections of these Contract Documents.

1.3 QUALITY ASSURANCE

A. INSPECTION

The Contractor shall conduct daily site inspections, and more often if necessary, to verify that requirements are being met.

B. CODES AND STANDARDS

In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
2.2 COMPATIBILITY

Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material or as approved by the Engineer.

PART 3 EXECUTION

3.1 PROGRESS CLEANING

A. GENERAL

Retain all stored materials and equipment in an orderly fashion allowing maximum access, not impeding drainage or traffic, and providing protection.

Do not allow the accumulation of scrap, debris, waste material, and other items not required for this work.

At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the project site.

Provide adequate storage for all materials awaiting removal from the project site, observing all requirements for fire protection and protection of the environment.

B. SITE

Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Move these items into a place designated for their storage until disposal becomes available.

Weekly, and more often if necessary, inspect all arrangements of materials stored on the site, restack, arrange, or otherwise service all arrangements to meet the requirements above.

Maintain the site in a neat and orderly condition at all times so as to meet the approval of the Engineer.

C. STRUCTURES

Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris and waste material. Move these items into a place designated for their storage until disposal becomes available.
Weekly, and more often if necessary, sweep clean all interior spaces. “Clean” shall be interpreted to mean free from dust and other materials that can be swept with a broom using reasonable diligence.

In preparing to install succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material. Use all equipment and materials required to achieve the required cleanliness.

D. STREETS

All paved and unpaved streets in the vicinity of the project shall be kept free of material tracked from the project site(s) or dropped from vehicles entering and leaving the site(s). The Contractor shall inspect roads in each active area daily, and all material deposited on the road from the Contractor’s activities shall be removed prior to the end of the workday. This shall include sweeping, as required, to collect any mud, dirt and dust from the surface. All catch basins and culverts in the work area shall be inspected before completion and cleaned as directed by the Engineer.

3.2 FINAL CLEANING

A. DEFINITION

Except as otherwise specifically provided, “clean” shall be interpreted as meaning the level of cleanliness generally provided by commercial building maintenance equipment and materials.

B. GENERAL

Prior to final inspection, remove from the jobsite all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final project cleaning as described below.

C. STRUCTURES

1. Exterior

Visually inspect all exterior surfaces and remove all traces of soil, waste, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. If necessary to achieve a uniform degree of exterior cleanliness, hose down the exterior of the structure. In the event of stubborn stains not removable with
water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.

2. Interior

Visually inspect all interior surfaces and remove all traces of soil, waste, smudges, and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only appropriate cleaning materials and equipment.

3. Glass

Clean all glass inside and outside.

D. TIMING

Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean project, ready for occupancy.

*** END OF SECTION ***
SECTION 01800

TESTING, COMMISSIONING, AND TRAINING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the installation, testing, commissioning, and training for all mechanical, electrical, and instrumentation systems and completed portions of the work.

See also Section 16050 for additional electrical and instrumentation system testing requirements.

1.2 RELATED WORK SPECIFIED ELSEWHERE

<table>
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<tr>
<td>16050</td>
<td>Basic Electrical Materials and Methods</td>
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</table>

1.3 QUALITY ASSURANCE

A. INSTALLATION

All mechanical, electrical, and instrumentation equipment provided under this Contract shall be installed in conformity with the Contract Documents, including the manufacturer’s requirements. Should a manufacturer’s installation recommendation conflict with specific requirements of this Contract Document, the Contractor shall bring the matter to the attention of the Engineer. Any additional costs arising out of changes authorized by the Engineer to accommodate manufacturer’s installation recommendations will be considered extra work. Any costs incurred by the Contractor through failure to timely notify the Engineer of a difference between Contract Document and manufacturer’s installation requirements shall be borne by the Contractor.
B. TESTING

1. General Requirements

All equipment and partially complete or fully completed portions of the work included in this Contract shall be tested and inspected to prove compliance with the Contract requirements. Unless otherwise specified, all costs of testing, including temporary facilities and connections, shall be borne by the Contractor. For the purpose of this Section, equipment shall mean any mechanical, electrical, instrumentation, or other device with one or more moving parts or devices requiring an electrical, pneumatic, or hydraulic connection. Installed leakage tests and other piping tests shall be as specified in Sections 15050. Installed tests for electrical and instrumentation devices and systems shall be in accordance with Division 16.

No tests specified herein shall be applied until the item to be tested has been inspected and approval given for the application of such test.

Tests and inspection shall include:

a. The delivery acceptance test and inspections.

b. The installed tests and inspections. These tests may be performed with water or the process fluid, as described in the accepted test plan.

c. The operational testing of completed sections of the facility. These tests may be performed with water or the process fluid, as described in the accepted test plan.

d. The commissioning of completed sections of the facility by Owner’s personnel. The commissioning shall be performed with the process fluid at normal flows.

Tests and inspections, unless otherwise specified or accepted, shall be in accordance with the recognized standards of the industry. The Contractor shall see that scheduling and performance of all tests are coordinated with involved subcontractors and suppliers. The Contractor shall allow for up to two additional setpoint changes during testing. No extra costs or time allowances shall be provided as long as this setpoint allowance is not exceeded.
The form of evidence of satisfactory fulfillment of delivery acceptance test and inspection requirements shall be, at the discretion of the Engineer, either by tests and inspections carried out in his presence or by certificates or reports of tests and inspections carried out by approved persons or organizations. The Contractor shall provide and use forms that include all test information, including specified operational parameters. The content of the forms used shall be acceptable to the Engineer.

A master test log book shall be maintained by the Contractor, which shall cover all tests including piping, equipment, electrical, and instrumentation. The master test log book shall be provided with loose-leaf pages that shall be copied weekly after updating for transmittal to the Engineer. The master test log book shall be transmitted to the Engineer upon completion of the project.

2. Delivery Acceptance Tests and Inspections

The delivery acceptance tests and inspections shall be at the Contractor’s expense for any equipment specified herein and shall include the following:

a. Test of items at the place of manufacture during and/or on completion of manufacture, comprising hydraulic pressure tests, electric and instrumentation subsystems tests, performance and operating tests and inspections in accordance with the relevant standards of the industry and more particularly as detailed in individual clauses of these Specifications to satisfy the Engineer that the items tested and inspected comply with the requirements of this Contract. Tests other than those specified shall be in accordance with Section 01400.

b. Inspection of all items delivered at the site or to any authorized place of storage so that the Engineer may be satisfied that such items are of the specified quality and workmanship and are in good order and condition at the time of delivery. The Contractor shall be prepared to remove all coverings, containers, or crates to permit the Engineer to conduct his inspection. Should the Engineer find, in his opinion, indication of damage or deficient quality of workmanship, the Contractor shall provide the necessary documentation or conduct such tests deemed necessary by the Engineer to demonstrate compliance.
3. Installed Tests and Inspections

a. General

All equipment shall be tested by the Contractor to the satisfaction of the Engineer before any facility is put into operation. Tests shall be as specified herein and shall be made to determine whether the equipment has been properly assembled, aligned, adjusted and connected. Any changes, adjustments, or replacements required to make the equipment operate as specified shall be carried out by the Contractor as part of the work.

b. Procedures

i. General

The procedures shall be divided into two distinct stages; preoperation checkout and water test. Testing procedures shall be designed to duplicate, as nearly as possible, all conditions of operation and shall be carefully selected to ensure that the equipment is not damaged. Once the testing procedures have been reviewed and approved by the Engineer, the Contractor shall produce checkout, alignment, adjustment and calibration sign-off forms for each item of equipment to be used in the field by the Contractor and the Engineer jointly to ensure that each item of electrical, mechanical and instrumentation equipment has been properly installed and tested. The Contractor is advised that failure to observe these precautions may place the acceptability of the subject equipment in question.

ii. Pre-Operation Checkout

The installed tests and inspection procedures shall incorporate all requirements of these Specifications and shall proceed in a logical, step-wise sequence to ensure that all equipment has been properly serviced, aligned, connected, calibrated, and adjusted prior to operation. Preoperation checkout procedures shall include, but not necessarily be limited to:
(1) Piping system pressure testing and cleaning as specified in Division 15.

(2) Electrical system testing as specified in Division 16.

(3) Alignment of equipment.

(4) Preoperation lubrication.

iii. Water Test

Once all affected equipment has been subjected to the required preoperational checkout procedures and the Engineer has witnessed and has not found deficiencies in that portion of the work, individual systems may be started and operated under simulated operating conditions to determine as nearly as possible whether the equipment and systems meet the requirements of these Specifications. Test media for these systems shall either be the intended fluid or a compatible substitute. The equipment shall be operated a sufficient period of time to determine machine operating characteristics, including temperatures and vibration, to observe performance characteristics, including performance throughout the specified range for blowers, and to permit initial adjustment of operating controls. When testing requires the availability of auxiliary systems such as electrical power, compressed air, control air, or instrumentation which have not yet been placed in service, the Contractor shall provide acceptable substitute sources, capable of meeting the requirements of the machine, device, or system, at no additional cost to the Owner. Disposal methods for test media shall be subject to review by the Engineer.

If under test, any portion of the work should fail to fulfill the Contract requirements and is adjusted, altered, renewed or replaced, tests on that portion when so adjusted, altered, removed or replaced, together with all other portions of the work as are affected thereby, shall, if so required by the
Engineer, be repeated within reasonable time and in accordance with the specified conditions. The Contractor shall pay to the Owner all reasonable expenses incurred by the Owner as a result of repeating such tests.

Once simulated operation has been completed, all machines shall be rechecked for proper alignment, realigned, if necessary, and doweled in place. All equipment shall be checked for loose connections, unusual movement, excessive temperature, noise, and/or vibration or other indications of improper operating characteristics. Any deficiencies shall be corrected to the satisfaction of the Engineer. All machines or devices, which exhibit unusual or unacceptable operating characteristics shall be disassembled and inspected. They shall then be repaired or removed from the site and replaced at no cost to the Owner.

Test results shall be within the tolerances set forth in the detailed Specification sections of the Contract Documents. If no tolerances have been specified, test results shall conform to tolerances established by recognized industry practice. Where, in the case of an otherwise satisfactory installed test, any doubt, dispute, or difference should arise between the Engineer, and the Contractor regarding the test results or the methods or equipment used in the performance of such test, then, the Engineer may order the test to be repeated. If the repeat test, using such modified methods or equipment as the Engineer may require, substantially confirms the previous test, then all costs in connection with the repeat test will be paid by the Owner otherwise the costs shall be borne by the Contractor. Where the results of any installed test fail to comply with the Contract requirements for such test, then such repeat tests as may be necessary to achieve the Contract requirements shall be conducted by the Contractor at his expense.

Unless otherwise specified, the Contractor shall provide at no expense to the Owner, all water, power, fuel, compressed air supplies, labor and all
other necessary items and work required to complete all tests and inspection specified herein. The Contractor shall provide, at no expense to the Owner, temporary heating, ventilating, and air conditioning for any areas requiring it in the case where permanent facilities are not complete and operable at the time of installed tests and inspections. Temporary facilities shall be maintained until permanent systems are in service.

4. Operational Testing

After completion of all installed testing and review by the Engineer that all equipment complies with the requirements of the Specifications, the Contractor shall conduct operational testing. All domestic water, oil, fuel, and chemical systems shall be filled with the specified fluid.

The Contractor shall operate the completed facility for a period of not less than that specified in Part 3.4 of this Section during which all systems shall be operated as a complete facility at various loading conditions, as directed by the Engineer. Should the operational testing period be halted for any reason related to the facilities constructed or the equipment furnished under this Contract, or the Contractor’s temporary testing systems, the operational testing program shall be repeated until the specified continuous period has been accomplished without interruption. All process units shall be brought to full operating conditions, including temperature, pressure, and flow.

Record drawings of facilities involved must be accepted and ready for turnover to the Owner at the time of operational testing.

All costs for water, fuel, power, and chemicals required during operational testing shall be borne by the Owner.

5. Commissioning

After completion of the operational testing and certifications by the Engineer that the systems meet all performance requirements, commissioning will begin. The commissioning period for all systems shall be 30 days. The Contractor shall remove all temporary piping that may have been in use during the operational testing and shall assist the Owner with the placement of the facility into its fully operational mode handling wastewater. The Owner’s
operations and maintenance personnel will be responsible for operation of the facility or portion of the facility during this period of time. The facility or portion thereof shall be fully and continuously operational, accepting all normal flow called for in design and performing all functions as designed.

The Contractor shall be available, with all appropriate subcontractors and trades, at all times during commissioning periods to provide immediate assistance in case of failure of any portion of the system being tested. This assistance shall be available, if needed, on a 24-hour basis. The Engineer will not issue a certificate of Substantial Completion until the end of the commissioning period (including training) and then only when all corrections required to assure a reliable and completely operational facility have been complete. The Contractor shall be responsible for all costs in excess of the Owner’s normal expected costs of operations during the commissioning period. The Contractor shall bear the costs of all necessary repairs or replacements, including labor and materials, required to keep the portion of the plant being commissioned operational.

The commissioning period will be considered completed when the facility has been continuously operated without major interruption, equipment failure, or system breakdown for the specified commissioning period. A major interruption, failure or breakdown shall be a condition or event that prevents the facility from continuously and adequately handling normal flow, cannot be repaired or corrected immediately by the Contractor, and is not caused by improper operation and maintenance of the facilities by the Owner. An interruption of the commissioning period under these circumstances will require a re-start of commissioning once required repairs and corrections are made by the Contractor. Should the commissioning period be halted for any reason related to the facilities constructed or the equipment furnished under this Contract, the commissioning shall be repeated until the specified continuous period has been accomplished without interruption.

Final O&M manuals for the facilities must be accepted and ready for turnover to the Owner before the start of commissioning.

C. TRAINING

During the phase of water testing of equipment, the Contractor shall make available experienced factory-trained representatives of the manufacturers of all the various pieces of equipment, to train the Owner’s personnel in
the operation and maintenance thereof. The time required for this training shall be as covered in the specifications for the specific piece of equipment. The Contractor shall notify the Engineer of the time of the training at least 10 days prior to the start time of the training.

1.4 SUBMITTALS

A. STARTUP AND TESTING PLAN

Prior to receipt of any progress payments in excess of 60 percent of the Contractor’s total bid for the work, the Contractor shall submit to the Engineer five copies of a startup and testing plan with details of the installed tests and inspection procedures he proposes to adopt for testing and startup of all equipment to be operated singly and together.

B. TRAINING OUTLINE

The Contractor shall submit five copies of a detailed outline of training activities to be performed by each manufacturer’s representative 10 days prior to the start time of the training. This outline shall indicate how the manufacturer’s representative is going to allocate the required specified number of training hours to fulfill these contractual obligations.

PART 2 PRODUCTS

2.1 INSTALLATION

Materials employed in the installation shall conform to the requirements of the Contract Documents and the recommendations of the equipment manufacturers.

2.2 TESTING

A. GAUGES, METERS, RECORDERS, AND MONITORS

Gauges, meters, recorders, and monitors shall be provided by the Contractor as required to supplement or augment the instrumentation system provided under this Contract to properly demonstrate that all equipment fully satisfies the requirements of the Specifications. All devices employed for the purpose of measuring the performance of the facility’s equipment and systems shall be specifically selected to be consistent with the variables to be monitored. All instruments shall be recently calibrated, and the Contractor shall be prepared at all times to demonstrate, through recalibration, the accuracy of all instruments employed for testing purposes. Calibration procedures shall be in accordance with applicable standards of ASTM, ISA, and IEEE. The
adequacy of all gauges, meters, recorders and monitors shall be subject to review by the Engineer.

B. RECORDS

The Contractor shall provide sign-off forms for all installed and operational testing to be accomplished under this Contract. Sign-off forms shall be provided for each item of mechanical, electrical and instrumentation equipment provided or installed under this Contract and shall contain provisions for recording relevant performance data for original testing and not less than three retests. Separate sections shall be provided to record values for the preoperation checkout, as well as signatures of representatives of the equipment manufacturers, the Contractor, and the Engineer.

C. TEMPORARY TEST FACILITIES AND MODIFICATIONS

The Contractor shall provide and install all necessary temporary piping, valves, pumps, tanks, controls, and other facilities and modifications to enable the operational testing of the permanent facility components. Operational testing requiring the recirculation of water or process fluids within the facility shall be performed by the Contractor using temporary facilities, if needed, provided and installed by the Contractor. Temporary facilities shall be removed by the Contractor once the required testing is completed.

PART 3 EXECUTION

3.1 INSTALLATION

All equipment and apparatus used in testing shall be installed by specialists properly skilled in the trades and professions required to assure first-class workmanship. Where required by detailed Specifications, the Contractor shall cause the installation of specific equipment testing items to be accomplished under the supervision of factory-trained installation specialists furnished by the equipment manufacturers. The Contractor shall be prepared to document the skills and training of all workmen engaged in the installation of all testing equipment furnished either by the Contractor or the Owner.

3.2 TESTING

Testing shall proceed on a step-by-step basis in accordance with the Contractor’s written testing procedures. The Contractor’s testing work shall be accomplished by a skilled team of specialists under the direction of a coordinator whose sole responsibility shall be the orderly, systematic testing of all equipment, systems,
structures, and the complete facility as a unit. Each individual step in the procedures shall be witnessed by a representative of the Engineer.

During the facility operational testing period, all equipment and systems in operation shall be operated to the greatest extent practicable, at conditions, which represent the full range of operating parameters as defined by the Contract Documents.

3.3 TRAINING

Training of the Owner’s personnel shall be done by experienced technical manufacturers’ representatives. Training shall be provided during a scheduled, dedicated session and shall not be combined with other field services such as equipment testing, startup and check-out. When required by these specifications, the training sessions shall be video and audio-taped by the Contractor and the final DVD delivered to the Owner. These manufacturers’ representatives shall follow the outline presented here:

GENERAL OUTLINE FOR MANUFACTURER PRESENTATIONS

A. FAMILIARIZATION

1. Overview explaining theory of operation.

2. Show catalog, parts lists, drawings, etc., in the shop drawings and O&M manuals. Clearly identify the model or identification number of the equipment for which training is being provided.

3. Check out the installation of the specific equipment items.

4. Demonstrate the unit and show that all parts of the Specifications are met.

5. Answer questions.

B. SAFETY

1. Point out safety references.

2. Discuss proper precautions around equipment.

C. OPERATION

1. Point out reference literature.
2. Explain all modes of operation (including emergency).

3. Check out Owner’s personnel on proper use of the equipment. (Let them do it).

D. PREVENTIVE MAINTENANCE (PM)

1. Pass out PM list including:
   a. Reference material.
   b. Daily, weekly, monthly, quarterly, semi-annual, and annual jobs.

2. Show how to perform PM jobs.

3. Show Owner’s personnel what to look for as indicators of equipment problems.

E. CORRECTIVE MAINTENANCE

1. List possible problems.

2. Discuss repairs - point out special problems.

3. Open up equipment and demonstrate procedures, where practical.

F. PARTS

1. Show how to use parts list and order parts.

2. Check over spare parts on hand. Make recommendations.

G. LOCAL REPRESENTATIVES

1. Where to order parts: Name, address, telephone, fax, e-mail.

2. Service problems:
   a. Who to call.
   b. How to get emergency help.
3.4 FACILITY OPERATIONAL TESTING

The systems described below shall be tested to demonstrate the performance of mechanical, electrical, instrumentation and control subsystems together as an integrated system. Where the testing described in this Section conflicts with the testing requirements specified for individual equipment, or the manufacturer’s recommended testing procedure, those requirements and procedures shall prevail.

Unless otherwise noted, a time period of 5 days shall be allowed for each facility operational test. Unless otherwise noted, each portion of the facility being operationally tested must perform through its complete design range for a period of 5 consecutive 24-hour days. Facility operational testing shall be sequenced in coordination with the work sequence specified in Section 01110. Temporary facilities necessary for operational testing are specified in Paragraph 2.2 of this Section and in Section 01500. Facility operational testing shall be divided as follows:

A. LIQUID STREAM SYSTEMS

Testing of the liquid stream systems shall include, but not be limited to the lift station and force main including electrical controls.

*** END OF SECTION ***
SECTION 01950

TRAFFIC CONTROL

PART 1  GENERAL

1.1  SCOPE

Temporary traffic control refers to the control of all types of traffic, including vehicles, bicyclists and pedestrians (including pedestrians with disabilities). The Contractor, utilizing contractor labor and contractor-provided equipment and materials (except when such labor, equipment, or materials are to be provided by the Owner as specifically identified in the Contract Documents), shall plan, manage, supervise and perform all temporary traffic control activities need to support the work of the Contract.

The Contractor shall provide flaggers, signs, and other traffic control devices not otherwise specified as being furnished by the Owner. The Contractor shall erect and maintain all construction signs, warning signs, detour signs, and other traffic control devices, necessary to warn and protect the public at all times from injury or damage as a result of the Contractor’s operations which may occur on highways, roads or streets. No work shall be done on or adjacent to the roadway until all necessary signs and traffic control devices are in place.

The traffic control resources and activities shall be used for the safety of the public, the Contractor’s employees, the Owner’s personnel and to facilitate the movement of the traveling public. Traffic control resources and activities may be used for the separation or merging of public and construction traffic when in accordance with a specific approved traffic control plan.

Upon failure of the Contractor to immediately provide flaggers; erect, maintain, and remove signs; or provide, erect, maintain, and remove other traffic control devices when ordered to do so by the Owner, the Owner may, without further notice to the Contractor or the Surety, perform any of the above and deduct all of the costs from the Contractor’s payment.

The Contractor shall be responsible for providing adequate flaggers, signs and other traffic control devices for the protection of the work and the public at all times regardless of whether or not the flaggers, signs, and other traffic control devices are ordered by the Owner, furnished by the Owner, or paid for by the Owner.
1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 REFERENCES

This Section references the latest revisions to the following documents:

<table>
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<tr>
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<tr>
<td>MUTCD</td>
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</table>
<pre><code>                    | Washington State Modifications to the MUTCD         |
                    | Quality Guidelines for Temporary Traffic Control Devices |
</code></pre>
<p>| ANSI 107  | High Visibility Garment Standard                    |</p>

1.4 TRAFFIC CONTROL MANAGEMENT

A. GENERAL

It is the Contractor’s responsibility to plan, conduct, and safely perform the work. The Contractor shall manage temporary traffic control with his or her own staff. Traffic control management responsibilities shall be formally assigned to one or more company supervisors who are actively involved in the planning and management of field Contract activities. The Contractor shall provide the Engineer with a copy of the formal assignment. The duties of traffic control management may not be subcontracted.

The Contractor shall designate an individual or individuals to perform the duties of the primary Traffic Control Supervisor (TCS). The designation shall also identify an alternate TCS who can assume the duties of the primary TCS in the event that person’s inability to perform. The TCS shall be responsible for safe implementation of approved Traffic Control Plans provided by the Contractor.

The primary and alternate TCS shall be certified as worksite traffic control supervisors by one of the organizations listed herein. Possession of a current TCS card and flagging card by the primary and alternate TCS is mandatory. A traffic control management assignment and a TCS designation are required on all projects that will utilize traffic control.

The Contractor shall maintain 24-hour telephone numbers at which the Contractor’s assigned traffic control management personnel and the TCS...
can be contacted and be available upon the Engineer’s request at other than normal working hours. These persons shall have the resources, ability and authority to expeditiously correct any deficiency in the traffic control system.

B. The duties of the Contractor’s traffic control management personnel shall include:

1. Overseeing and approving the actions of the Traffic Control Supervisor (TCS) to ensure that proper safety and traffic control measures are implemented and consistent with the specific requirements created by the Contractor’s work zones and the Contract. Some form of oversight shall be in place and effective even when the traffic control management personnel are not present at the jobsite.

2. Providing the Contractor’s designated TCS with approved Traffic Control Plans (TCPs), which are compatible with the work operations, and traffic control for which they will be implemented.

3. Discussing proposed traffic control measures and coordinating implementation of the Contractor-adopted traffic control plan(s) with the Owner.

4. Coordinating all traffic control operations, including those of subcontractors, suppliers, and any adjacent construction or maintenance operations.

5. Coordinating the project’s activities (road closures and lane closures) with appropriate police, fire control agencies, city or county engineering, medical emergency agencies, school districts, and transit companies.

6. Overseeing all requirements of the Contract, which contribute to the convenience, safety, and orderly movement of vehicular and pedestrian traffic.

7. Having the latest adopted edition of the MUTCD including the Modifications to the MUTCD for Streets and Highways for the State of Washington and applicable standards and specifications available at all times on the Project.

8. Attending all Project meetings where traffic management is discussed.
9. Being present onsite a sufficient amount of time to adequately accomplish the above-listed duties.

C. TRAFFIC CONTROL SUPERVISOR

A Traffic Control Supervisor (TCS) shall be on the Project whenever traffic control labor is required or less frequently, as approved by the Owner.

The TCS shall personally perform all the duties of the TCS. The TCS’s duties shall include:

1. Inspecting traffic control devices and nighttime lighting for proper location, installation, message, cleanliness, and effect on the traveling public. Traffic control devices shall be inspected each work shift except that Class A signs and nighttime lighting need to be checked only once a week. Traffic control devices left in place for 24 hours or more should also be inspected once during the nonworking hours when they are initially set up (during daylight or darkness, whichever is opposite of the working hours).

2. Ensuring that corrections are made if traffic control devices are not functioning as required. The TCS may make minor revisions to the approved traffic control plan to accommodate site conditions as long as the original intent of the traffic control plan is maintained and the revision has concurrence of the TCM and/or Owner.

3. Attending traffic control coordinating meetings or coordination activities as authorized by the Owner.

4. Ensuring that all needed traffic control devices are available and in good working condition prior to the need to install those devices.

5. Ensuring that all pedestrian routes or access points, existing or temporary, are kept clear and free of obstructions and that all temporary pedestrian routes or access points are detectable and accessible to persons with disabilities as provided for in the approved plans.

6. Having a current set of approved TCPs and applicable contract provisions as provided by the TCM and the latest adopted edition of the MUTCD including the Washington State Modifications to the MUTCD and applicable standards and specifications.
1.5 TCM AND TCS QUALIFICATIONS

The TCM and TCS shall be certified by one of the following:

The Northwest Laborers – Employers Training Trust  
27055 Ohio Avenue  
Kingston, Washington  98346  
(360) 297-3035  

Evergreen Safety Council  
401 Pontius Avenue N.  
Seattle, Washington  98109  
(800) 521-0778 or (206) 382-4090  

The TCS and all flaggers shall have a current flagging card from the State of Washington, Oregon, or Idaho.

1.6 SUBMITTALS

A. TRAFFIC CONTROL PLAN

The Contractor shall prepare and submit five copies of a Traffic Control Plan(s). All construction signs, flaggers, spotters, and other traffic control devices shall be shown on the traffic control plans. The Contractor shall designate and adopt in writing the specific traffic control plan or plans required for their method of performing the work. The traffic control plan(s) shall be in accordance with the established standards for plan development as shown in the MUTCD, Part VI.

The Traffic Control Plan shall meet the specific requirements of the franchise agreements and right-of-way permits required for this project. In addition, the Traffic Control Plan shall meet the following requirements:

- Maintain at least one-way traffic on state highways and through roads.

- Local access and emergency access on local access roads.

The Contractor, at the end of each day, shall leave the Work area in such condition that it can be traveled without damage to the Work, without danger to traffic, and without one-way traffic control.
PART 2 PRODUCTS

2.1 TRAFFIC CONTROL DEVICES

Flagging, signs and all other traffic control devices furnished or provided shall conform to the standards established in the latest WSDOT adopted edition of the Manual on Uniform Traffic Control Devices (MUTCD) published by the U.S. Department of Transportation and the Washington State Modifications to the MUTCD. Requirements for pedestrian traffic control devices are addressed in the MUTCD.

2.2 CONSTRUCTION SIGNS

All construction signs required by the approved traffic control plan(s) as well as any other appropriate signs prescribed by the Owner shall be furnished by the Contractor. The Contractor shall provide the posts or supports and erect and maintain the signs in a clean, neat, and presentable condition until the necessity for them has ceased. All non-applicable signs shall be removed or completely covered with either metal or plywood during periods when they are not needed. When the need for any of these signs has ceased, the Contractor, upon approval of the Owner, shall take down these signs, post, or supports.

Construction signs will be divided into two classes. Class A construction signs are those signs that remain in service throughout the construction or during a major phase of the work. They are mounted on posts, existing fixed structures, or substantial supports of a semi-permanent nature. Sign and support installation for Class A signs shall be in accordance with the WSDOT Standard Plans. Class A signs shall be designated as such on the Traffic Control Plan. Class B Construction signs are those signs that are placed and removed daily, or are used for short durations which may extend for 1 to 3 days. They are mounted on portable or temporary mountings.

Tripod-mounted signs in place more than 3 days in any one location, unless approved by the Engineer, shall be required to be post-mounted and shall be classified as Class A construction signs. Where it is necessary to add weight to the signs for stability, sandbags or other similar ballast may be used but the top of the ballast shall not be more than 4 inches above the road surface, and shall not interfere with the breakaway features of the device. The Contractor shall follow the manufacturer’s recommendations for sign ballasting.
PART 3 EXECUTION

3.1 GENERAL

The Contractor shall provide all labor and equipment to execute the Traffic Control Plan. It is the Contractor’s responsibility to plan, conduct, and safely perform the work.

The TCS shall be responsible for safe implementation of approved Traffic Control Plans provided by the TCM.

3.2 TRAFFIC CONTROL LABOR

The Contractor shall furnish all personnel for flagging, spotting, for the execution of all procedures related to temporary traffic control and for setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control traffic during construction operations.

Vests and other high-visibility apparel shall be in conformance with ANSI 107.

Flaggers and spotters shall be posted where shown on the approved Traffic Control Plan. Flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, or Idaho. The flagging card shall be immediately available and shown upon request by the Owner.

During hours of darkness, flagging stations shall be illuminated in a manner that insures that flaggers can easily be seen but that does not cause glare to the traveling public. Flagger station illumination shall meet the requirements of the MUTCD.

Flaggers shall be equipped with portable two-way radios, with a range suitable for the project. The radios shall be capable of having direct contact with project management (foreman, superintendents, etc.)

The Contractor shall furnish flagger Stop/Slow paddles conforming to the requirements of the MUTCD, except the minimum width shall be 24 inches.

*** END OF SECTION ***
DIVISION 2

SITEWORK
SECTION 02050

LOCATE EXISTING UTILITIES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the anticipated conflicts, which may exist with existing utilities. A reasonable attempt has been made to locate the existing utilities; however, the exact location, and/or depth are unknown in most instances. Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification. It shall be the responsibility of the Contractor to locate existing utilities and their depth.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall determine the difficulties to be encountered in constructing the Project and his locate effort based upon the information provided on the Plans, field investigation, and the Contractor’s contacts with the existing utility companies. The Contractor shall determine the extent of exploration required to first prevent damage to those existing utilities, and secondly to determine if the proposed improvements are in conflict with existing utilities.

The Contractor shall locate existing utilities sufficiently ahead of construction so that the Engineer can modify the alignment, or grade prior to construction. Where the alignment of the proposed utility cannot be adjusted to miss the existing utility without installation of additional pipe or fittings, the Contractor may be entitled to additional compensation to reroute the proposed utility.
The Contractor shall call the Utility Location Request Center (One Call Center), for field location, not less than 2 nor more than 10 business days before the scheduled date for commencement of excavation that may affect underground utility facilities, unless otherwise agreed upon by the parties involved. A business day is defined as any day other than Saturday, Sunday, or a legal local, State, or Federal holiday. The telephone number for the One Call Center for this project is (800) 424-5555. If no one-number locator service is available, notice shall be provided individually to those owners known to or suspected of having underground facilities within the area of the proposed excavation.

The Contractor is alerted to the existence of Chapter 19.122 RCW, a law relating to underground utilities. Any cost to the Contractor incurred as a result of this law shall be at the Contractor’s expense.

No excavation shall begin until all known facilities in the vicinity of the excavation area have been located and marked.

*** END OF SECTION ***
SECTION 02240
DEWATERING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes dewatering excavations of any kind and location, including but not limited to groundwater, surface water, and precipitation, until backfilling has been completed to finished grade.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 SUBMITTALS

Prior to the start of construction, the Contractor shall submit a dewatering plan in accordance with Section 01300 containing both a graphical and narrative presentation identifying proposed methods, equipment sizes and contingency plans should dewatering cause settlement of any adjacent facilities. The dewatering plan shall show specific locations, in plan and section, where dewatering is expected as well as a general discussion of methods to be employed should water be encountered in other locations. The plan shall detail the depth, diameter and anticipated flow for dewatering wells, well points or sumps.

Acceptance by the Owner of the method, installation, and operation and maintenance details submitted by the Contractor shall not in any way be considered to relieve the Contractor from full responsibility for errors therein or from the entire responsibility for complete and adequate design and performance of the system in controlling the water level in the excavated areas, and for control of the hydrostatic pressures to the depths specified herein. The Contractor shall be solely responsible for the proper design, installation, proper operation, maintenance, and any failure of any component of the dewatering system.

1.4 REFERENCES


02240-1
1.5 QUALITY CONTROL

It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering efforts to avoid all objectionable settlement and subsidence. The Contractor shall comply with local codes and ordinances of governing authorities with regard to disposal of water pumped from dewatering operations.

Proposed discharge points shall be approved by the Owner prior to implementation of dewatering. Water shall be discharged into the existing sanitary sewer manhole located at the intersection of Main Street and Railroad Avenue. This manhole is shown on Sheet 3 of the Plans. The system shall dispose of water so as not to cause injury to public or private property or cause exceedances of water quality standards. The Contractor shall be responsible for taking all reasonable precautions necessary to ensure continuous, successful operation of the system.

PART 2 PRODUCTS

The Contractor shall have sufficient pumping equipment and/or other machinery available onsite before operations begin to assure that the operation of the dewatering system can be maintained.

PART 3 EXECUTION

3.1 INSTALLATION AND APPLICATION

During excavation, the installation of piping, conduits and structures and during the placing of backfill, excavations shall be kept free of water, subsurface or otherwise. The Contractor shall furnish all equipment necessary to dewater the excavations and shall dispose of the water so as not to cause a nuisance or menace to the public. The dewatering system shall be installed and operated by the Contractor so that the groundwater level outside the excavation is not reduced to the extent that would damage or endanger adjacent structures or property. The release of groundwater to its static levels shall be performed so as to maintain the undisturbed state of the foundation soils, prevent disturbance of backfill and prevent movement of all structures and pipelines.

Design implementation and maintenance of any dewatering system shall be the responsibility of the Contractor. Dewatering sufficient to maintain the groundwater level at or below the surface of the trench bottom, the base of the bedding course or other foundation, shall be accomplished prior to pipe laying and jointing.

If dewatering wells are used, the Contractor shall construct all dewatering wells in accordance with WAC 173-160. Wells shall be adequately spaced to provide the necessary dewatering.
The dewatering operation, however accomplished, shall be carried out so that it does not destroy or weaken the strength of the soil under or alongside the excavations.

The Contractor shall design filters and screen slot sizes for all sumps, wells and well points which prevents the movement of fines during pumping. The Contractor shall develop the wells such that they produce no more than 10-ppm silica as measured with a Rossum Sand Tester (Rossum, 1954) or equivalent. It is anticipated that dewatering of the sewer construction will require up to three 200-gpm capacity trash pumps and 3-inch discharge hose as required to discharge to the sewer. Dewatering wells are not anticipated to be required for the sewer construction.

3.2 FIELD QUALITY CONTROL

A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation. The Contractor shall test all dewatering discharge using a Rossum Sand Tester or equivalent to determine the silica content of the discharge. The Contractor shall notify the Owner at least 24 hours prior to testing. Where critical structures or facilities exist immediately adjacent to areas of proposed dewatering, reference points shall be established and observed at frequent intervals to detect any settlement that could develop.

Should settlement be observed, the Contractor shall cease dewatering operations and implement contingency plans as outlined in the Contractor’s approved dewatering plan. The responsibility for conducting the dewatering operation in a manner that protects adjacent structures and facilities rests solely on the Contractor. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor. Permanent piping systems, existing or new, shall not be incorporated into the Contractor’s dewatering system.

*** END OF SECTION ***
SECTION 02250

TEMPORARY SHORING AND BRACING

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes the temporary shoring and bracing for excavations including the trench excavation safety systems as shown on the Plans and as specified herein.

1.2  RELATED WORK SPECIFIED ELSEWHERE

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<td>02536</td>
<td>Sewer Force Mains - Utility</td>
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1.3  WORK INCLUDED

The extent of temporary shoring and bracing work includes, but is not limited to:

A.  Temporary shoring and bracing necessary to protect the following against loss of ground or caving embankments: existing structures, buildings, roads, walkways, utilities, electrical transmission towers and support wiring, other facilities and improvements where required to comply with codes and authorities having jurisdiction.

B.  Trench excavation safety systems, pursuant to RCW Chapter 49.17 and WAC 296-155-655.

C.  Maintenance of shoring and bracing.

1.4  QUALITY ASSURANCE

A.  SHORING CONSULTANT

The Contractor shall engage the services of a qualified geotechnical engineer and qualified structural engineer registered in the State of Washington to design temporary shoring and bracing when required by applicable regulations.
B. SHORING DESIGN

The Contractor shall provide layout and design drawings and specifications for shoring and bracing when a trench box is inadequate for the purpose or will not be used and trench depth exceeds 4 feet and back sloping will not be used. Temporary shoring and bracing system design and calculations shall be prepared, stamped, and signed by a Professional Engineer registered in the State of Washington.

C. REGULATIONS

The Contractor shall design sheeting, shoring and bracing in accordance with the Washington State Safety Code and any local codes and ordinances of governing authorities having jurisdiction.

1.5 SUBMITTALS

The Contractor shall submit shoring and bracing layout and design drawings, calculations and other backup data to the Owner for review in accordance with Section 01300 prior to the start of construction.

1.6 PROJECT CONDITIONS

A. SITE SURVEY

The background survey information provided on the Plans is shown for clarity only. The Contractor shall determine, before commencing work, the exact location of all existing features that may be disrupted by new construction, including existing underground utilities. The Contractor shall be fully responsible for any and all damages, which might be caused by the Contractor’s failure to exactly locate and/or preserve existing site features. Prior to commencing work, the Contractor shall check and verify governing dimensions and elevations.

The Contractor shall survey adjacent structures and facilities, establishing exact elevations at fixed points to act as temporary bench marks to monitor potential settlement from the contractor’s ongoing operations. Clearly identify temporary bench marks and record existing elevations from the control points shown on the Plans.

During excavation, the Contractor shall resurvey bench marks weekly. The Contractor shall maintain and make available at the job site an accurate log of surveyed elevations for comparison with original
elevations, and promptly notify the Owner if changes in elevations occur or if cracks, sags or other damage is evident.

1.7 EXISTING UTILITIES

The Contractor shall protect existing active sewer, water, gas, electrical, and other utility services and structures that may be present. This shall also include all pipelines, services, and structures that are the property of the Owner.

PART 2 PRODUCTS

The Contractor shall provide suitable shoring and bracing materials, which shall support loads imposed. Materials for shoring systems need not be new, but shall be in serviceable conditions.

PART 3 EXCAVATION

3.1 VERIFICATION OF CONDITIONS

The Contractor shall notify the Owner immediately if, during construction, subsurface conditions are different from those encountered in the exploratory holes.

3.2 INSTALLATION AND APPLICATION

The Contractor shall provide shoring systems adequately anchored and braced to resist earth and hydrostatic pressures at locations as needed to support excavations during construction. The Contractor shall locate required bracing to clear all permanent work. Bracing which must be relocated shall be installed prior to the removal of original bracing. The Contractor shall not place bracing where it will be cast into or included in permanent concrete work, except as otherwise acceptable to the Owner. The Contractor shall maintain bracing until structural elements are rebraced by other bracing or until permanent construction is able to withstand lateral earth and hydrostatic pressures.

3.3 REMOVAL

The Contractor shall remove shoring and bracing in stages to avoid disturbances to adjacent and underlying soils and damage to structures, pavements, facilities and utilities. The Contractor shall repair or replace, as acceptable to the Owner, adjacent work damaged or displaced through the installation or removal of shoring and bracing work.
3.4 EXCAVATION SAFETY SYSTEMS

All work shall be carried out with due regard for public safety. Open trenches shall have proper barricades and at night they shall be distinctly indicated by adequately placed lights, as provided for elsewhere in the Specifications.

The Contractor is reminded that the Owner has not so delegated, and the Owner’s Representative does not purport to be a trench or excavation system safety expert, is not so engaged in that capacity under this Contract, and has neither the authority nor the responsibility to enforce construction, safety laws, rules, regulations, or procedures or to order the stoppage of work for claimed violations of trench or excavation safety.

The furnishing by the Owner of resident representation and inspection personnel shall not make the Owner responsible for the enforcement of such laws, rules, regulations, or procedures, nor shall such make the Owner responsible for construction means, methods, techniques, sequences, procedures, or for the Contractor’s failure to properly perform the work necessary for proper trench and excavation safety.

*** END OF SECTION ***
SECTION 02300

EARTHWORK

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the earthwork, including trench excavation and backfill for piping, excavation and backfill for structures, and finish grading.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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<td>Gravel Materials</td>
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PART 2 PRODUCTS

2.1 GRAVEL MATERIALS

All gravel materials shall conform to Section 02700.

PART 3 EXECUTION

3.1 PREPARATION

Excavation may commence once all erosion control measures are in place in accordance with the Plans and Section 02370 and to the satisfaction of the Owner.

3.2 GENERAL REQUIREMENTS

Excavation, compaction and backfill for structures, pipelines and the final site contours shall be formed by either excavating or compacting fill, as required, to provide the cross-sections as shown on the Plans.

All excavation performed on this Project shall be considered unclassified.

Excavation shall consist of the removal of any and all material encountered,
including debris, rubble, concrete, metal, topsoil, cutting and removal of existing surfacing, tree stumps, trees, logs, abandoned rail ties, abandoned piping, piling, riprap, etc.

Excavations shall be kept free of water, both surface water and groundwater, during the excavation, installation of pipelines and structures, and the placement of backfill. For additional requirements see Section 02240.

The Contractor’s attention is also called to the depth of the structures and piping; for this reason, special shoring and bracing may be required. All shoring and bracing or sheeting required to perform and protect the excavation and to safeguard the employees, shall be furnished by the Contractor. For additional requirements see Section 02250.

No timber bracing, lagging, sheathing or other lumber shall be left in any excavation except with permission of the Engineer and in the event such permission is granted, no separate payment shall be allowed for burying such material.

All stockpiles shall be covered with plastic and no stockpile shall be higher than 6 feet above existing grade.

3.3 EXCAVATION AND BACKFILL FOR STRUCTURES

Excavation and backfill for structures shall be in conformance with Section 2-09 of the WSDOT Standard Specifications, and as further described herein. All excavation for structures shall be done to the dimensions and levels indicated on the Plans or specified herein. Excavation shall be made to such width outside the lines of the structures to be constructed as may be required for proper working methods, the erection of forms and the protection of the work.

Excavation shall consist of the removal of any and all material encountered to the elevations shown on the Plans. Excavations for structures shall be continued down to the subgrade which is defined as 12 inches below concrete mat foundations, concrete footings, and slab on grade floors for the installation of foundation gravel material, unless otherwise noted on the Plans.

Fill material placed under structures, including footings and floor slabs, shall be foundation gravel free from debris and organics, as specified in Section 02700.

In the event unsuitable material is encountered below the subgrade shown on the Plans and described herein, the Contractor, as required by the Engineer, shall over-excavate until a suitable foundation is reached. If over-excavation of unsuitable material is required by the Engineer, it will be under the unit price bid item entitled “UNSUITABLE EXCAVATION,” as described in Section 01200.
The Contractor shall then replace the material with compacted foundation gravel, as specified in Section 02700. If imported foundation gravel is required; it will be paid under the unit price bid item titled “FOUNDATION GRAVEL”, as specified in Section 01200. Quantities, if any, shall be calculated by neat line measurement to the depth agreed to in the field by the Engineer.

The Contractor shall notify the Engineer when excavation for compacted fill or structures is complete. No forms, reinforcing steel, or concrete shall be placed until the excavation has been inspected by the Engineer.

Backfill for structures shall be suitable native material, free of organics and particles greater than 4 inches or Bank Run Gravel for Trench Backfill as specified in Section 02700.

There is no warranty that the native material is suitable for backfill or is suitable, as excavated, for placement and compaction as required by these Specifications. In the event that the Contractor is unable to find onsite, sufficient native material to accomplish the structure backfilling, the select material that he shall furnish and install shall be Bank Run Gravel for Trench Backfill, as specified in Section 02700.

3.4 PROTECTION OF FOUNDATION SURFACES

Care shall be taken to preserve the foundation surfaces shown on the Plans in an undisturbed condition. If the Contractor unnecessarily overexcavates or disturbs the foundation surfaces shown on the Plans or specified herein without written authorization of the Engineer the Contractor shall replace such foundations with concrete fill or other suitable material approved by the Owner in a manner which will show by test an equal bearing capacity with the undisturbed foundation material. No additional payment shall be made for the added quantity of concrete fill or other suitable material used because of unnecessary overexcavation caused by the Contractor or his operations.

3.5 EXCAVATION AND BACKFILL FOR TRENCHES

Excavation and backfill for trenches shall be in conformance with Sections 7-08 and 7-09 of the WSDOT Standard Specifications, and as further described herein. The following pipe materials shall be considered flexible:

- PVC
- Polyethylene Tubing
- FRP
- HDPE
- Polyethylene
- Corrugated Polyethylene
All other pipe materials shall be considered rigid.

Upon completion of work each day, all pipeline open trenches shall be completely backfilled, leveled, and temporarily patched or graveled, as herein specified. Under certain conditions, the trench may be left open at the last length of pipe laid during the day to avoid re-excavation the following morning, provided that the opening is adequately plated or covered for vehicle traffic. Special attention shall be given to barricading to keep vehicular traffic away from newly-backfilled trench areas until restored for traffic.

The Engineer reserves the right to restrict the Contractor in the amount of trench for pipeline that can be opened during the working day. Should the Contractor, in the Engineer’s opinion, fail to diligently pursue backfilling, an allowable limit of open trench shall be 100 lineal feet and shall be strictly enforced.

The width of the trench at or below a point 12 inches above the top of the outside diameter of the pipe shall be carefully controlled and maintained to ensure the strength of the pipe and prevent pipe failures. Backfilling shall proceed as follows:

A. SUBGRADE PREPARATION

The subgrade for piping is defined as the elevation of the bottom of the pipe bedding material as shown on the Plans.

In the event unsuitable material is encountered below the subgrade shown on the Plans and described herein, the Contractor, as required by the Engineer, shall over-excavate until a suitable foundation is reached. If over-excavation of unsuitable material is required by the Engineer, it will be paid for under the unit price bid item entitled “UNSUITABLE EXCAVATION,” as found in the Proposal. The Contractor shall then replace the material with compacted foundation gravel, as specified in Section 02700. Imported foundation gravel is required, it will be paid under the unit price bid item titled “FOUNDATION GRAVEL.”

Quantities, if any, shall be calculated by neat line measurement to the depth agreed to in the field by the Engineer.

B. BEDDING FOR RIGID PIPE

Above the foundation material, if any, the bedding material shall be Gravel Backfill for Pipe Bedding, as specified in Section 02700. This material shall be placed in lifts of approximately 8 inches up to a point 12
inches above the pipe. This material shall be hand shoveled in place and carefully worked under and around the pipe.

C. BEDDING FOR FLEXIBLE PIPE

Above the foundation material, if any, Gravel Backfill for Pipe Bedding, as specified in Section 02700, shall be placed in lifts of approximately 8 inches up to a point 12 inches above the pipe. This material shall be hand shoveled in place and carefully worked under and around the pipe.

D. BACKFILL FOR TRENCHES

Partial backfill to protect the pipe will be permitted immediately after the pipe has been properly laid in accordance with the Plans and these Specifications. Complete backfilling of trenches will not be permitted until the section of pipe installed has been inspected by the Engineer.

From the point 12 inches above the top of the pipe barrel, the backfill material to be used in the trench section shall be approved suitable native material or Gravel Backfill for Pipe Beddings, as specified in Section 02700, except where required or shown on the Plans to use other material. The Contractor shall place backfill in horizontal lifts not to exceed 8 inches in thickness. All backfill shall be free of large rocks, organic matter, stumps, trees, pieces of pavement, broken concrete and other deleterious substances.

The Contractor shall remedy, at his expense, any defects that appear in the backfill prior to final acceptance of the work. Cleanup operations shall progress immediately behind backfilling to accommodate the return to normal use of the trench area.

During placement of the initial lifts, the backfill material shall not be bulldozed into the trench or dropped directly over the pipe with less than 3 feet of backfill material above the top of the pipe.

3.6 ROCK EXCAVATION

It is not anticipated that solid rock will be encountered. Should such material be encountered, however, it will be paid for change order as directed by the Engineer and approved by the Owner. Boulders or broken rock less than 2 cubic yards in volume as measured in the field by the Engineer, will not be classified as rock, nor will so-called “hard-pan” or cemented gravel, even though it may be advantageous to use explosives in its removal if blasting were allowed. For the purpose of this contract, rock excavation shall be defined as mineral matter in place and of such hardness and texture that, when it is encountered, cannot be
loosened by three passes of a ripper tooth mounted on the larger of a tracked backhoe of at least 25,000 pounds operating weight and 75 horsepower or the largest backhoe being utilized on the job by the Contractor. Where rocks occur as boulders that are smaller than the larger of: (1) 2 cubic yards in volume, or (2) the volume that can be readily handled by the largest backhoe being utilized on the job by the Contractor, they shall be considered incidental to excavation.

Where removal of a boulder results in a void below the desired elevation of the intended excavation, backfilling of the void shall be handled in the same manner as the replacement of unsuitable excavated material.

3.7 REUSE AND DISPOSAL OF EXCAVATED MATERIAL

Excavated materials shall be properly protected and reused where possible. Excavated materials not used for fill shall be hauled to an approved waste site(s), as selected by the Contractor. The Contractor shall submit a list of approved waste haul site(s) to the Owner prior to the commencement of hauling of waste materials. Any permits required for waste haul and disposal shall be the responsibility of the Contractor.

3.8 FINAL SITE GRADING

The site shall be graded consistent with the elevations shown on the Plans. The slopes between elevations shall be uniform or as shown on the Plans. Excavations and backfill shall be to the elevations required for the placement of all surface restorations, such as asphalt, concrete, gravel surfacing, or landscaping. All areas shall be graded to provide proper drainage. The final ground surface shall be smooth, raked free of debris and stones, and prepared for restoration as specified in Section 02900.

3.9 STRUCTURE COMPACTION

The foundation gravel material placed underneath all structures shall be moisture conditioned to within 3 percent of optimum moisture content and shall be placed in loose, horizontal layers. The thickness of layers placed before compaction shall not exceed 8 inches for heavy equipment compactors and shall not exceed 4 inches for hand-operated mechanical compactors. Water settlement is not allowed for compaction.

Layers shall be compacted to a dense state equaling at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557. Prior to the placement of fill below structures, any and all groundwater and surface water shall be drained or pumped from areas to be filled.
Wall backfill material shall be compacted to at least 90 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557 within 5 feet of all walls and shall be compacted to at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557 beyond 5 feet of all walls. Any and all compaction within 5 feet of all walls shall be accomplished by means of hand-operated mechanical equipment rather than heavy equipment compactors.

3.10 TRENCH COMPACTION

Trench backfill materials shall be moisture conditions to within three percent of optimum moisture content. Water settlement is not allowed for compaction.

Pipe bedding materials, for both rigid and flexible pipes, shall be compacted to at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557.

Compaction of the backfill above the bedding material in all trenches in non-structural and non-paved areas shall be performed by using mechanical equipment to at least 90 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557.

Compaction of the backfill above the bedding material in all trenches in structural or paved areas shall be performed by using mechanical equipment to at least 95 percent of the maximum dry density, using the Modified Proctor, per ASTM D1557.

*** END OF SECTION ***
SECTION 02305

WET WEATHER EARTHWORK

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes the procedures to be followed if earthwork is to be accomplished in wet weather or in wet conditions where control of soil moisture is difficult.

1.2  RELATED WORK SPECIFIED ELSEWHERE

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PART 2  PRODUCTS

The size or type of construction equipment shall be selected as required to prevent soil disturbance. In some instances, it may be necessary to limit equipment size or to excavate soils with a backhoe, Gradall, or equivalent type of equipment to minimize subgrade disturbance caused by construction traffic.

Material used as structural fill during wet weather earthwork shall generally consist of clean granular material containing less than 5 percent fines (material passing the U.S. Standard No. 200 sieve), based on wet sieving the fraction passing the 3/4-inch sieve. The fines shall be non-plastic.

PART 3  EXECUTION

3.1  WET WEATHER EXCAVATION AND FILL PLACEMENT QUALITY CONTROL

Excavation and placement of fill or backfill material will be observed on a full-time basis by the Owner, to determine that all work is being accomplished in accordance with these Specifications.
3.2 WET WEATHER EARTHWORK PROTECTION

The ground surface shall be sloped away from construction areas to promote the rapid runoff of precipitation and prevent ponding of water.

Earthwork shall be accomplished in small sections to minimize exposure to wet weather. Excavation or the removal of unsuitable soil shall be followed immediately by the placement and compaction of a suitable thickness (generally 8 inches or more if approved by the Owner) of clean foundation gravel.

No soil shall be left uncompacted and exposed to moisture. A smooth drum vibratory roller, or equivalent, shall be used to seal the ground surface after placement of fill or backfill materials.

All wet weather work shall meet local, state and federal codes as specified herein and as indicated on the Plans.

*** END OF SECTION ***
SECTION 02530
UTILITY STRUCTURES

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes precast concrete manholes, castings, and steps for a complete installation as shown on the Plans and specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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PART 2 PRODUCTS

2.1 GENERAL

The exterior finish of all precast concrete utility structures shall be smooth with no imperfections larger than 1/8 inch in diameter. The interior finish of all precast concrete utility structures shall be smooth and sacked with non-shrink cementitious materials and epoxy bonding agent. No bug holes, fins, projections, or other defects are acceptable.

2.2 PRECAST CONCRETE MANHOLES

Precast components shall conform to the requirements of ASTM C478. All Portland cement used in the manufacture of the precast sections shall conform to the requirements of ASTM C150 and shall be Type II or Type V.

Precast base sections shall conform to the requirements for precast riser sections. The base shall be a minimum of 6-inches thick underneath the pipe invert. Openings for pipe shall be circular, tapered toward the inside of the section, and shall be of the minimum size possible to accommodate the size of pipe to be inserted and to effectively seal the joint.

Standard precast riser sections shall consist of circular sections in standard nominal inside diameter as shown on the Plans. Reinforcement shall be in accordance with ASTM C478. Minimum height of a riser section shall be 1 foot. The height of riser and base sections shall be arranged so no pipes pass through the joining surfaces.
The taper section (cone) shall be eccentric, tapering to 24-inches inside diameter and shall be between 18-inches and 36-inches high. Joining to the riser sections shall be similar to joining between riser sections, but the top surface shall be flat and at least 5-inches wide, radially, to receive grade rings.

Grade rings above the taper section shall be 24-inches inside diameter and 4-inches high. Grade ring height shall be a minimum of 8 inches, with a maximum of 20 inches. Otherwise another section of manhole rings shall be installed.

2.3 RINGS AND COVERS

Castings for manhole rings shall be gray-iron conforming to the requirements of ASTM A48/AASHTO M105, Grade 30B. Covers shall be ductile iron conforming to ASTM A536, Grade 80-55-06. All rings and covers shall be of uniform quality, free from blowholes, porosity, shrinkage, distortion, cracks, or other defects. Repair of defects shall not be permitted. All mating surfaces shall be machined finished to ensure a nonrocking fit. All covers shall be interchangeable within the dimensions as shown on the Plans and marked “sewer,” “drain,” or “water” as appropriate. Locking/tamperproof covers shall be secured to the ring with three 5/8-inch stainless steel Allen head cap screws. When watertight covers are required the locking style ring and covers shall be used and include a machined groove in the seat of the ring or underside of the cover and a gasket installed to assure a watertight seal. Covers shall be without pickholes. The manufacturer’s identification shall be cast with a minimum of 1/2-inch letters on exposed surfaces. Manhole rings and covers shall have a design wheel load conforming to AASHTO/ASTM A16 design loading HS20-44.

The frames and covers shall be made by Olympic Foundry, Inc., D&L Foundry, East Jordan Iron Works, or Neenah.

2.4 STEPS

Polypropylene manhole steps shall be made of a copolymer polypropylene, superior in its resistance to corrosion, meeting the requirements of ASTM D4101 Type II, Grade 16906, and shall completely encapsulate a deformed 1/2-inch steel reinforcing rod conforming to ASTM A615, Grade 60. Polypropylene steps shall be factory installed in complete accordance with the manufacturer’s instructions. This shall be accomplished by predrilling two parallel 1-inch holes, 3-3/4-inch deep, and 13-inches on center in the cured concrete base, riser, and taper sections of the manhole. The insertion ends of the step shall be fully coated with non-shrink epoxy grout then driven into the holes to the prescribed depth. In no case will the predrilled hole be allowed to penetrate through the wall of the manhole section.
Steps shall be Lane International Corporation Manhole Step or equal.

2.5 GASKETS AND MANHOLE ADAPTERS

Rubber gaskets shall conform to Section 9-04.4 of the WSDOT Standard Specifications. Pipe connections to existing manholes shall be made using a heavy duty sand collar with gasket, head, or equal. Pipe connections to new manholes or vaults shall utilize an adaptor coupling with gasket or watertight flexible rubber boot, Kor-n-Seal or equal. The Contractor shall provide Kor-n-Seal cavity O-rings to fill the annular spaces between the pipe and the manhole or vault wall.

PART 3 EXECUTION

3.1 MANHOLES

Manhole installation shall be as shown on the Plans. Precast sections with damaged joint surfaces or with cracks or damage that would permit infiltration shall not be installed. Precast base sections shall be set on prepared bedding materials. Before the precast base is set in place, the bedding material shall be carefully leveled to provide full bearing for the entire base section.

Precast riser sections and cones shall be set using the specified joint sealant or gasket. Priming and preparation of surfaces and installation of jointing material shall be in strict conformance with the manufacturer’s instructions. Only one 12-inch-high riser section shall be used per manhole and it shall be placed immediately below the cone. Grade rings shall be set in a full bed of cement grout.

All pipe connections to manholes shall be made with manhole adaptors.

Manhole frames shall be set carefully to the established surface grade in a full bed of cement grout. The manhole rim elevation shall be set flush with the existing pavement or grade in paved and improved areas. In unimproved areas, manhole rim elevations shall be set 2 inches above grade unless otherwise shown on the Plans to be set higher.

After placement, channel decks shall be given a light broom finish and shall be sloped to drain into the channels. Patch all lifters after removed picking eyes. Patch all joints inside and outside flush with walls.

Steps shall be installed in base sections, riser sections and tapered sections so that the completed manhole will have a continuous vertical ladder with equally spaced rungs as shown on the Plans. Steps shall be firmly cast or grouted in place. Infiltration from or around steps will not be permitted.
Pipe connections to existing manholes or vaults shall be in accordance with Section 7-05.3(3) of the WSDOT Standard Specifications and as further shown on the Plans.

3.2 FINAL ADJUSTMENT AND CLEANUP

After installation is complete, the Contractor shall cleanout all precast structures prior to placing the new facilities into service. The adjustment of castings shall be done in a manner satisfactory to the Owner. Adjustment shall be done only with precast grade rings. Bricks are unacceptable. Grouting and final adjustment of castings shall be done with non-shrink grout.

*** END OF SECTION ***
SECTION 02533
TELEVISION INSPECTION

PART 1  GENERAL

1.1   SCOPE

The work specified in this Section includes post construction television inspection of each sewer main and side sewer installed as shown on the Plans.

1.2   RELATED WORK SPECIFIED ELSEWHERE

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1.3   SUBMITTALS

The Contractor shall submit to the Owner two DVD color audio-visual recordings of each television inspection together with two written logs of each television inspection within two working days of the work.

1.4   QUALITY ASSURANCE

The Owner will review television inspection DVDs and logs within 5 workings days of the television inspection to ensure compliance with the Specifications. Any television inspection results found to be non-compliant, in the sole determination of the Owner, shall be corrected by the Contractor at the Contractor’s sole expense.

PART 2  PRODUCTS

2.1   GENERAL

The inspections shall be performed by a National Association of Sanitary Sewer Companies (NASSCO) Pipeline Assessment Certification Program (PACP) certified operator and shall meet the coding and reporting standards and guidelines as set by the PACP. All report annotations, pipe conditions, and pipe defects shall be identified properly using PACP codes and severity ratings shall be calculated according to PACP.
2.2 EQUIPMENT

The camera utilized for sewer main television inspection shall be capable of pan-and-tilt radial viewing and equipped with adequate light and focusing to allow inspection of the sewer main, side sewers connections, and full circumference inspection of main line joints and fittings. Lighting intensity shall be remote-controlled and shall be adjusted to minimize reflective glare. The camera shall be equipped with camera height adjustment to keep the camera lens centered at one-half the inside pipe diameter. Cameras shall be capable of a minimum of 1,000 feet of continuous inspection.

The camera used for side sewer television inspections shall be a push camera capable of accessing a side sewer and navigating bends commonly found in private-side plumbing and capable of a minimum of 300 feet of continuous inspection. The camera shall have imaging capabilities of similar quality and be similarly equipped to the camera used to inspect sewer mains. The Contractor may use a camera capable of being launched into a side sewer connection from inside the sewer main for television inspection of side sewers in lieu of a push camera. Launch camera capabilities shall be of similar quality and shall be similarly equipped to the camera used to inspect sewer mains.

Cameras shall also be equipped with a calibrated footage counter capable of recording distance traveled measurements accurate to plus or minus 2 feet in 1,000 feet.

Television inspection footage shall be recorded in color and submitted in high quality MPEG format on DVD discs.

PART 3 EXECUTION

3.1 NOTIFICATION

The Contractor shall notify the Owner a minimum of 48 hours in advance of any television inspection.

3.2 SEWER CLEANING

Sewer cleaning shall meet the requirements of Section 02535.

3.3 TELEVISION INSPECTION

The Contractor shall perform complete television inspection of all new sewer mains installed on the project. After the new sewer mains have been cleaned and flushed, the manhole channeled, and all side sewer reconnections made, the Contractor shall provide a complete televised inspection of all new sewer mains,
from center of starting manhole to center of ending manhole, before final acceptance. All television inspections shall begin prior to the camera head entering the pipeline.

Immediately prior to the televised inspection, the Contractor shall run water through each sewer line for 5 to 10 minutes to provide water for detection of any adverse grade sections visible by the presence of ponded water. The camera shall be stopped periodically at the ponded areas and the depth of water shall be measured with a ball of known diameter on the pull line. During the inspection, all tees and other fittings shall be logged as to exact location within 1 percent maximum error in measurement, wherein accuracy is checked with various fittings and the terminating manhole.

The Contractor shall also perform complete television inspection of all new side sewers installed on the project. After the new side sewers have been cleaned and flushed, all new cleanouts have been installed, the Contractor shall provide a complete televised inspection of all new side sewers, from the sewer main to the cleanouts, before final acceptance.

The Contractor shall bear all costs incurred to provide the initial post-construction television inspection, to correct any deficiencies found during the initial post-construction television inspection (pipe sags in sections constructed by open cut methods only, misaligned or offset joints or side sewer connections, missed side sewer connections, etc.), to provide any additional television inspection that may be required by the Owner to verify the correction of said deficiency, and to provide any television inspection performed solely for the benefit of the Contractor.

*** END OF SECTION ***
SECTION 02535
SANITARY SEWERS

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes pipe, fittings, and accessories described herein and as required to completely install sanitary sewers and side sewers by open trench excavation as shown on the Plans.

1.2  RELATED WORK SPECIFIED ELSEWHERE

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PART 2  PRODUCTS

2.1  GENERAL

All materials delivered to the job site shall be new, free from defects, and marked to identify the material, class, and other appropriate data such as thickness for piping.

Acceptance of materials shall be subject to strength and quality testing in addition to inspection of the complete product. Acceptance of installed piping systems shall be based on inspection and leakage tests as specified in Part 3 of this Section.

2.2  PVC PIPE AND FITTINGS

Gravity PVC sewer pipe and fittings shall comply with ASTM D3034, SDR 35 for pipe sizes up to 15 inches. Gravity PVC sewer pipe and fittings larger than 15 inches shall comply with ASTM F679 using a minimum pipe stiffness of 46 psi in accordance with Table 1. Pipe and fittings shall be furnished with bells and spigots, which are integral with the pipe wall and with a rubber gasket securely
locked in place in the bell. Pipe joints shall conform to ASTM D3212 using flexible elastomeric gaskets conforming to ASTM F477.

2.3 MISCELLANEOUS FITTINGS

Flexible couplings shall be Calder-type where specifically indicated on the Plans. Calder-type flexible couplings shall consist of all elastomeric PVC sleeve secured to the pipes with stainless steel clamping bands. Adapter couplings shall be furnished for transitions between piping of different outside diameters as necessary.

Calder-type flexible couplings shall be as manufactured by Calder Co., Fernco, or equal.

2.4 SEWER CLEANOUTS

Sewer cleanout rings, covers and accessories shall be as shown on the Plans.

2.5 DETECTABLE MARKING TAPE

The Contractor shall furnish and install detectable marking tape over all sewer mains and service pipes as shown on the Plans. The tape shall extend its full length. Detectable marking tape shall be as manufactured by Pro-Line Safety Products, or equal, and shall be a minimum of six inches in width, a minimum of five mil (0.0050") overall thickness, and shall have no less than 0.35-mil solid aluminum foil core.

The foil shall be visible from both sides of the tape and shall be Safety Brown in color to identify buried sewer systems and shall be printed to identify same. Printing shall be encased in the plastic jacket to avoid ink rub-off. Adhesives used to bond the plastic jacket to the foil shall not contain any dilutants, pigments, or contaminants and shall be specifically formulated to resist degradation by elements normally encountered in the soil.

PART 3 INSTALLATION

3.1 PIPE HANDLING

All types of pipe shall be handled in a manner that will prevent damage to the pipe.

Dirt or other foreign material shall be prevented from entering the pipe or pipe joint during handling or laying operations, and any pipe or fitting that has been installed with dirt or foreign material in it shall be removed, cleaned, and relaid. A clean whiskbroom shall be used for this purpose and for brushing to remove
foreign matter prior to joining of pipe ends. At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or by other means approved by the Owner to ensure cleanliness inside the pipe.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails, or other similar supports.

3.2 INSTALLATION

Minimum horizontal and vertical separation shall be maintained between water and sewer utilities as required by the Washington State Department of Ecology Criteria for Sewage Works Design.

The Contractor shall limit his excavation to the limits of the maximum payment width shown on the Plans. If the contractor purposely or neglectfully excavates trenches to width beyond the neat line payment limit of the trench as shown on the Plans, the expenses associated with any additional trenching, wastehaul, trench backfill, compaction and testing and surface restoration as a result of excavating beyond the neat line payment limits shall be borne by the contractor.

All pipe shall be laid in straight lines and at a uniform rate for grade between manholes. Variation in the invert elevation between adjoin ends of pipe due to non-concentricity of joining surface and pipe interior surfaces shall not exceed 1/64 inches per inch of pipe diameter, or ½-inch maximum.

3.3 EXCAVATION

All earthwork, excavation, bedding, backfill and compaction shall meet the requirements of Section 02300.

3.4 DEWATERING

Dewatering of excavations, if necessary, shall meet the requirements of Section 02240.

3.5 TEMPORARY SHORING AND BRACING

Temporary shoring and bracing, including trench excavation safety systems, shall meet the requirements of Section 02250.
3.6 **BELL AND SPIGOT PIPING**

All bell and spigot connections shall be made up in strict compliance with the manufacturer’s recommendations and all sewer pipe manufacture and handling shall meet or exceed the ASTM and SPAW recommended specifications, current revisions.

Pipe handling after the gasket has been affixed shall be carefully controlled to avoid disturbing the gasket and knocking it out of position, or loading it with dirt or other foreign material. Any gaskets so disturbed shall be removed, cleaned, relubricated if required, and replaced before the rejoining is attempted.

Care shall be taken to properly align the pipe before joints are entirely forced home. During insertion of the tongue or spigot, the pipe shall be partially supported by hand, sling or crane to minimize unequal lateral pressure on the gasket and to maintain concentricity until the gasket is properly positioned. Since most flexible gasketed joints tend to creep apart when the end pipe is deflected and straightened, such movement shall be held to a minimum once the joint is home.

Sufficient pressure shall be applied in making the joint to assure that it is home, as described in the installation instruction provided by the pipe manufacturer. Sufficient restraint shall be applied to the line to assure that joints once home are held so, until fill material under and alongside the pipe has been sufficiently compacted.

3.7 **CONNECTIONS TO EXISTING MANHOLES**

The Contractor shall verify invert elevations prior to construction. Discrepancies in invert elevations shall be immediately brought to the attention of the Owner. The crown elevation of the lateral pipes shall be the same as the crown elevation of the incoming pipe. The existing base shall be reshaped to provide a channel equivalent to the specified for a rechanneled manhole.

The Contractor shall excavate completely around the manhole to prevent unbalanced loading. The manhole shall be kept in operation at all times, and the necessary precautions shall be taken to prevent debris or other material from entering the sewer.

The Contractor shall core drill an opening to match the size of pipe to be inserted. All openings must provide a minimum of 1 inch and a maximum of 2 inches of clearance around the circumference of the pipe. After all pipes have been placed in their final position, the surface area around the opening of the manhole and the surface of the pipe shall be cleaned of all dirt, dust, grease, oil and other
contaminants and then roughened and wetted with water. The opening between pipe and broken out concrete shall be grouted as shown on the Drawings.

3.8 RECHANNEL MANHOLE

Manhole channels shall be made to conform accurately to the sewer grade and shall be brought together smoothly with well-rounded junctions. Channel sides shall be carried up vertically to the crown elevation of the various pipes, and the concrete shelf between channels shall be smoothly finished and warped evenly with slope to drain.

Concrete for manhole channels shall be Class 3000.

3.9 SIDE SEWERS

Side sewer to sewer main connection shall be made with machine-made tap and saddle shall be installed per manufacturer’s specifications.

All side sewers shall be constructed in accordance with the detail shown on the Plans. Side sewers shall be constructed with a maximum joint deflection not to exceed the manufacturer’s printed recommendations and in no case shall exceed 2 inches per foot in any joint. Larger changes in direction shall be made by use of standard 1/8-bends.

Side sewers shall not be backfilled prior to inspection.

Side sewers shall not be constructed on private property prior to completion and acceptance of the main line and side sewer on public right-of-way or easement unless approved in writing by the Owner.

3.10 SEWER CLEANOUT

All sewer cleanouts shall be constructed in accordance with the details shown on the Plans.

3.11 LOW PRESSURE AIR TEST

Low pressure air tests shall be performed on all new gravity sewers that can be constructed without removing existing gravity sewers from service. Clean and flush the gravity sewer prior to leakage testing. The sewer pipe shall be tested for leaks through the use of air in the following manner:

A. Following the pipe cleaning and utility installation, but prior to final paving or surface restoration, the pipe installation shall be tested with low pressure air. Air shall be slowly supplied to the plugged pipe installation
until the internal air pressure reaches 4.0 pounds per square inch (psi) greater than the average back pressure of any ground water that may submerge the pipe. At least two minutes shall be allowed for temperature stabilization before proceeding further.

B. The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 psi while maintaining the stipulated pressure greater than the pipe section’s average adjacent groundwater back pressure.

The pipeline shall be considered acceptable if the total rate of air loss from any section tested in its entirety between manholes, cleanouts or pipe ends is equal to or greater than the allowable time, as calculated in accordance with Section 7-17.3(2)F of the WSDOT Standard Specifications.

If the pipe installation fails to meet these requirements, the Contractor shall determine at his own expense the source or sources of leakage, and he shall repair (if the extent and type of repairs proposed by the Contractor appear reasonable to the Owner) or replace all defective materials or workmanship. The completed pipe installation shall meet the requirements of this low pressure air test before being considered for acceptance.

Plugs used to close the sewer pipe for the air test shall be securely braced to prevent the unintentional release of the plug, which can become a high velocity projectile. Gauges, air piping manifolds and valves shall be located at the top of the ground. No one shall be permitted to enter a manhole where a plugged pipe is under pressure. Air testing apparatus shall be equipped with a pressure release device such as a rupture disk or a pressure relief valve designed to relieve pressure on the pipe under test at 6 psi.

For the purposes of testing, all side sewers constructed in conjunction with the sewer main shall have a 4-inch or 6-inch fitting pipe, as applicable, placed at the point where the side sewer crosses the street or other public right-of-way margin. The tee opening shall be positioned perpendicular to the side sewer slope, unless otherwise directed by the Owner.

When side sewers are not tested simultaneously with the testing of the sewer main, the Contractor, at no additional expense to the Owner, shall furnish and place an additional tee in the first pipe out of the main sewer tee or wye branch, so that an inflatable rubber ball can be inserted for sealing off the side sewer and thus permit separate tests.
3.12 POST-CONSTRUCTION TELEVISION INSPECTION

Post-construction television inspection shall meet the requirements of Section 02533.

*** END OF SECTION ***
SECTION 02536

SEWER FORCE MAINS

PART 1  GENERAL

1.1  SCOPE

The work specified in this Section includes pipe, fittings, and accessories described herein and as required to completely install the sewer force mains as shown on the Plans.

1.2  RELATED WORK SPECIFIED ELSEWHERE

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PART 2  PRODUCTS

2.1  GENERAL

Pipe sizes are nominal inside diameter unless otherwise noted.

All materials delivered to the job site shall be new, free from defects, and marked to identify the material, class, and other appropriate data such as thickness for piping.

Acceptance of materials shall be subject to strength and quality testing in addition to inspection of the complete product. Acceptance of installed piping systems shall be based on inspection and leakage tests as specified in Part 3 of this Section.

2.2  HIGH DENSITY POLYETHYLENE (HDPE) PIPE

All HDPE shall be butt welded 4710 HDPE pipe conforming to ASTM D3350 having a cell classification of PE 345434C and ASTM D1248 pipe grade resin type III, Class C, Category 5, grade P34 polyethylene compound. Pipe
dimensions and workmanship shall conform to ASTM F714. Pipe shall be Iron Pipe Size (IPS). HDPE pipe shall have an SDR of 11.

Manufacturer shall provide certification that stress regression testing has been performed on the product. Stress regression testing shall be done in accordance with ASTM D2837. Pipe shall be free of cracks, holes, inclusions, voids or other inclusions. Pipe manufacturer shall meet the minimum quality control requirements of ASTM D3035 and ASTM F174.

Fittings shall be standard HDPE fittings, meet the above HDPE pipe specifications, and be manufactured by injection molding or extrusion and machining. All fittings shall have the same working pressure as the pipe.

Pipe sections shall be joined by butt fusion complying with ASTM D2657 and the joints shall be equal or greater in strength than the pipe. Socket fusion joints shall not be used. Class 150, ANSI B16.5 flanges shall be use for connections for flanged connections of another material. Flange backing rings used shall be 316 stainless steel with 316 stainless steel nuts, bolts and washers. All bolts, buried and unburied, shall be coated with Armite Anti-Seize Compound No. 609, or equal, prior to installation.

2.3 MISCELLANEOUS FITTINGS

A. FLEXIBLE COUPLINGS

Flexible couplings shall be Romac 501 or equal. Middle ring and follower shall have fusion bonded epoxy coating. All buried flexible couplings shall be furnished with stainless steel bolts and nuts.

B. FLANGED COUPLING ADAPTERS

Flanged coupling adapters shall be Smith-Blair Type 912 Dresser Style 127, or equal.

C. ADAPTER FLANGES

Adapter flanges for ductile iron pipe shall be manufactured of high strength ductile iron, ASTM A536, Grade 65-45-12. Flange dimensions shall be in accordance with ANSI B16.1, 125-lb. pattern. Gasket shall be Buna-N. Setscrews shall be AISI 4140, high strength, low alloy steel. The adapter flanges shall be Uni-Flange Series 400, or equal.
D. REstrained Flanged Coupling Adapters

Restrained flanged coupling adapters shall comply with AWWA C219 and shall be manufactured of high-strength ductile iron, ASTM A536, Grade 64-45-12. Gaskets shall be compounded for water service in accordance with ASTM D2000. Restrained flanged coupling adapters shall be Smith-Blair Type 911, Romac RFCA, or equal.

E. Dielectric Insulated Unions

Dielectric insulated unions shall be used to connect dissimilar metals. They shall separate the metals so that the passage of more than 1 percent of the galvanic current, which would exist with metal to metal contact, is prevented. Unions shall be of the same material as the pipe to which attached, and pressure and temperature ratings shall be no lower than that of the piping system in which it is installed.

2.4 Detectable Marking Tape

The Contractor shall furnish and install detectable marking tape over all force mains and service pipes as shown on the Plans. The tape shall extend its full length. Detectable marking tape shall be as manufactured by Pro-Line Safety Products, or equal, and shall be a minimum of six inches in width, a minimum of five mil (0.0050") overall thickness, and shall have no less than 0.35 mil solid aluminum foil core.

The foil shall be visible from both sides of the tape and shall be Brown in color to identify buried sewer systems and shall be printed to identify same. Printing shall be encased in the plastic jacket to avoid ink rub-off. Adhesives used to bond the plastic jacket to the foil shall not contain any dilutants, pigments, or contaminants and shall be specifically formulated to resist degradation by elements normally encountered in the soil.

In addition, the Contractor shall furnish and install 12 gauge coated copper wire, taped to the top of the water main and service pipe. The wire shall be brought up and tied off in valve boxes and meter boxes (as applicable).

PART 3 EXECUTION

3.1 Pipe Handling

All types of pipe shall be handled in a manner that will prevent damage to the pipe, pipe lining, or coating. Pipe and fittings shall be loaded and unloaded using hoists and slings in a manner to avoid shock or damage, and under no circumstances shall they be dropped, skidded, or rolled against other pipe. If any
part of the coating or lining is damaged, repair thereof shall be made by the Contractor at no additional expense to the Owner and in a manner satisfactory to the Owner. Damaged pipe shall be rejected, and the Contractor shall immediately place damaged pipe apart from the undamaged and shall remove the damaged pipe from the site within 24 hours. Methods of pipe handling and storage shall be corrected by the Contractor should the Owner determine that these methods are damaging to the pipe.

Pipe shall be stacked in such a manner as to prevent damage to the pipe, to prevent dirt and debris from entering the pipe, and to prevent any movement of the pipe. The bottom tiers of the stack shall be kept off the ground on timbers, rails, or other similar supports.

Pipe shall not be strung across driveways, in ditches, or in the construction zone without specific on-site Owner approval.

Valves and fittings shall be stored on pallets or similar materials to keep them off the ground and prevent dirt and debris from entering them.

3.2 EXCAVATION

All earthwork, excavation, bedding, backfill and compaction shall meet the requirements of Section 02300.

3.3 DEWATERING

Dewatering of excavations, if necessary, shall meet the requirements of Section 02240.

3.4 TEMPORARY SHORING AND BRACING

Temporary shoring and bracing, including trench excavation safety systems, shall meet the requirements of Section 02250.

3.5 CUTTING PIPE

Whenever it becomes necessary to cut a length of pipe, the cut shall be made by abrasive saw or by a special pipe cutter. Pipe ends shall be square with the longitudinal axis of the pipe and shall be reamed and otherwise smoothed so that good connections can be made. Oxyacetylene torch cutting of ductile iron pipe shall not be allowed.
3.6 **HIGH DENSITY POLYETHYLENE (HDPE) PIPING**

HDPE pipe shall be installed in accordance with the manufacturer’s instructions as shown on the Plans and as specified herein. Pipe trenching shall be done in accordance with ASTM D2321.

3.7 **THREADED PIPING**

Threads for threaded joint piping shall be neatly cut with sharp tools and jointing procedure shall conform to best practice. Before jointing, all scale shall be removed from pipe by some suitable means such as pounding. After cutting, all pipe shall be reamed. All pipe shall be screwed together with an application of approved pipe compound applied to all male threads. Once a joint has been tightened, it shall not be backed off unless threads are recleaned and new compound applied. This application neatly made; all compound, dirt thoroughly wiped off outside of every joint.

Unions shall be installed in all threaded joint piping to facilitate removal of sections for maintenance, repair in accordance with best trade practice. All such unions shall be included in bid price whether shown on Plans or not.

3.8 **PRESSURE TESTING**

All pipelines shall be tested and disinfected prior to acceptance of work. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment necessary for performing the test shall be furnished, installed and operated by the Contractor. The Contractor shall provide an oil-filled pressure gauge with a range of 0 to 300 psi.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place and time allowed for the concrete to cure before testing.

All piping systems will be tested to demonstrate leak tightness prior to acceptance. The Contractor shall provide all equipment and labor necessary to perform all testing required herein. Gauges used in testing shall be certified by an approved laboratory.

All water lines and appurtenances shall be tested at a pressure of 225 psi. Testing is to be done in sections between valves with no back pressure against the valves to ensure water tightness of the valves in either direction.

The pipeline shall be backfilled sufficiently to prevent movement of the pipe under pressure. All thrust blocks shall be in place for at least 24 hours to allow concrete to cure before testing.
Prior to the acceptance test, the lines shall be filled and allowed to stand under pressure for a sufficient length of time to allow the escape of entrapped air and to allow any pipe lining to absorb water.

Testing will be done by pumping up the line to 225 psi and closing a valve between the pump and the line. The line shall be pumped back up to 225 psi at 15-minute intervals. The test shall be conducted for a period of two hours.

The quantity of water lost during the test period shall not exceed the number of gallons as determined by the following formula:

\[ L = \frac{SD\sqrt{P}}{266,400} \]

Where

- \( L \) = allowable leakage, gallons/hour
- \( S \) = gross length of pipe tested, feet
- \( D \) = nominal diameter of the pipe, inches
- \( P \) = test pressure during the leakage test, psi

Make-up water shall be pumped from a container that will allow the amount of water pumped to be easily computed or verified.

There should be no appreciable loss of pressure during the 15-minute test intervals.

All leaks shall be repaired or defective material replaced and the test repeated as directed by the Engineer.

The Contractor shall be responsible for repair of any damage resulting from or caused by leak testing.

After the pipe is filled with water and all air expelled, it shall be pumped to a test pressure of 1.5 times the design operating pressure at the lowest point in the section under test pressure and minimum of 1.25 times the highest point on the line. If test is not completed due to leakage, equipment failure, etc. depressurize the test section and allow it to relax for eight hours before retesting. The test procedure consists of initial expansion phase of three hours and a test phase of 1 hour.

During the initial expansion phase the test section is pressurized to the test pressure and enough make-up liquid is added each hour to maintain the test pressure for 3 hours.
During the test phase, reduce pressure by 10 psi and hold pressure for one hour. If pressure remains steady (within 5 percent of target value) no leakage is indicated. Allowable makeup water for the test phase per hundred feet of pipe is 1.7 gallons of water for 16-inch pipe, 1.1 gallons for 12-inch pipe and 0.5 gallons for 8-inch pipe.

*** END OF SECTION ***
SECTION 02700
GRAVEL MATERIALS

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the various types of granular materials that are to be used in trenches and other excavations as shown on the Plans and as specified herein.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 SUBMITTALS

The Contractor shall provide certificates of laboratory tests in accordance with Section 01300, indicating particle size distribution for review for each type of granular material furnished and proctor test reports for all material to be placed as pipe bedding material, trench backfill, backfill under and around structures and underneath crushed surfacing and asphalt concrete pavements.

The certificates and proctor test reports shall be provided to the Owner at least 5 calendar days prior to placement.

PART 2 PRODUCTS

2.1 FOUNDATION GRAVEL

Foundation gravel shall be Class A Gravel Backfill for Foundations in conformance with Section 9-03.12(1)A of the WSDOT Standard Specifications.

2.2 GRAVEL BACKFILL FOR PIPE BEDDING

Gravel backfill for pipe bedding shall meet the requirements of Section 9-03.12(3) of the WSDOT Standard Specifications except that no more than 5 percent passing shall pass the No. 200 Sieve.
2.3 **STRUCTURAL FILL**

Structural fill shall consist of clean, non-plastic, free-draining sand and gravel free from organic matter or other deleterious materials, in conformance with Section 9-03.14(1) of the WSDOT Standard Specifications. The material shall contain particles less than 4-inches maximum dimension with less than 7-percent passing the U.S. No. 200 size sieve.

During period of wet weather the allowable fines content of the structural fill materials shall be no more than 5 percent passing the U.S. Standard No. 200 size sieve. Alternatively, crushed surfacing base course, in conformance with Section 9-03.9 (3) of the WSDOT Standard Specifications may be used.

2.4 **BANK RUN GRAVEL FOR TRENCH BACKFILL**

Bank run gravel for trench backfill shall be free from organic matter or other deleterious materials and in conformance with Section 9-03.19 of the WSDOT Standard Specifications.

2.5 **CRUSHED SURFACING**

Crushed surfacing base course and top course shall conform to Section 9-03.9(3) of the WSDOT Standard Specifications.

2.6 **MISCELLANEOUS GRAVEL**

If the Plans call for a gravel that is not herein specified than the gravel shall conform to the type of gravel called for as per the WSDOT Specifications.

**PART 3 EXECUTION**

3.1 **FOUNDATION GRAVEL**

Foundation gravel shall be placed and compacted underneath all structures to a minimum depth of 12 inches unless indicated otherwise on the Plans, and to a greater depth where foundations are unstable and excess suitable excavated material is unavailable to stabilize such foundations.

In the event the Contractor unnecessarily overexcavates the pipe trench or structure foundation, or if the width of the pipe trench becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor’s sole expense.
3.2 GRAVEL BACKFILL FOR PIPE BEDDING

Bedding material shall be placed simultaneously on both sides of the pipe for the full width of the trench in lifts not exceeding 6 inches. To assure uniform support, the material shall be carefully worked underneath the pipe haunches with a tool capable of preventing the formation of void spaces around the pipe. In the event the Contractor overexcavates the pipe trench, or if the width of the pipe trench becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor’s sole expense.

3.3 STRUCTURAL FILL

Provide structural fill as shown on the Plans or where excavated material is unsuitable as directed by the Engineer. Structural fill shall be installed in lifts not to exceed 8 to 10 inches maximum thickness. Structural fill placed under structures shall be compacted to at least 95 percent of the maximum dry density as determined by the modified Proctor, per ASTM D1557.

3.4 BANK RUN GRAVEL FOR TRENCH BACKFILL

Bank run gravel for trench backfill shall be used where excavated material is unsuitable or unavailable for the backfill of trenches as approved by the Owner.

In the event the Contractor overexcavates the pipe trench, or if the width of the pipe trench becomes wider than the pay limit shown on the Plans, all material so placed shall be at the Contractor’s sole expense.

3.5 CRUSHED SURFACING

Crushed surfacing base course and/or top course shall be placed underneath asphalt paving, to the lines and grades shown on the Plans or as required by the Plans and shall be compacted to a dense, unyielding state of at least 95 percent of the maximum dry density, using the modified Proctor, per ASTM D1557.

3.6 MISCELLANEOUS GRAVEL

Miscellaneous gravel shall be installed per the Plans.

*** END OF SECTION ***
SECTION 02740

HOT MIX ASPHALT PAVING

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes the construction of hot mix asphalt (HMA) paving.

The work in this section shall be accomplished in accordance with the Standard Specifications for Road, Bridge and Municipal Construction, 2016 edition, as issued by the Washington State Department of Transportation (WSDOT) and the American Public Works Association (APWA), Washington State Chapter (hereafter “Standard Specifications”). The Standard Specifications, as modified or supplemented by the Amendments to the Standard Specifications and Technical Specifications shall govern the Work. Delete the WSDOT Section 5-04, Hot Mix Asphalt (April 4, 2016 and August 1, 2016) Amendments.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 SUBMITTALS

The Contractor shall provide certificates of laboratory tests indicating current sieve analysis data and mix design for asphalt-treated base and hot mix asphalt pavement mix designs in accordance with Section 01300 and as further specified herein. The certificates shall be provided to the Owner at least 5 consecutive calendar days prior to placement of any materials.

PART 2 PRODUCTS

2.1 HOT MIX ASPHALT PAVEMENT

A. Hot mix asphalt pavement, HMA, CL. 1/2" PG 64-28, shall conform to Section 5-04.2 of the WSDOT Standard Specifications. Prior to the production of HMA, the Contractor shall determine a design aggregate
structure and asphalt binder content in accordance with WSDOT Standard Operating Procedure 732. Once the design aggregate structure and asphalt binder content have been determined, the Contractor shall submit the HMA mix design on DOT form 350-042 demonstrating the design meets the requirements of Sections 9-03.8(2) and 9-03.8(6) of the WSDOT Standard Specifications. Mix designs shall be accepted by commercial evaluation. The contractor shall only complete the first page of form 350-042. The contractor shall provide verification of mix design in one of the following processes:

1. Submit samples to WSDOT State Materials Lab for WSDOT verification testing in accordance with WSDOT Standard Specifications.

2. Reference a mix design that has been previously verified by the WSDOT Field Verification Testing Process or verified by WSDOT State Materials Lab on a previous project.

**ESAL’s**

The number of ESAL’s for the design and acceptance of the HMA shall be 1 million.

**B.** Mix design verification is valid for one year from the date of verification. At the discretion of the Owner, the Owner may accept mix designs verified beyond the verification year with certification from the Contractor that the materials and sources are the same as those shown on the original mix design.

**C.** In no case shall the paving begin before the determination of anti-strip requirements has been made. Anti-strip requirements will be determined by:

1. Testing by Contractor in accordance with WSDOT TM 718.

2. Historical aggregate source anti-strip use provided by WDOT.

3. If the determination of anti-strip requirements has not been made through Item a. or b. above, then a minimum of 0.25 percent anti-strip will be used.

**D.** The mix design will be the initial Job Mix Formula (JMF) for the HMA being produced. Any additional adjustments to the JMF will require the approval of the Owner and may be made per WSDOT Standard Specifications Section 9-03.8(7).
PART 3 EXECUTION

3.1 GENERAL

The contractor shall maintain access to the facility at all times. The Contractor shall coordinate all work with the Owner to insure his paving plan does not interfere with the Owners on going operations.

The Contractor shall provide, place and maintain all temporary markings and signage as required to warn and direct facility traffic as necessary during his paving operations.

3.2 ASPHALT CONCRETE PAVEMENT PLACEMENT

Asphalt concrete pavement materials shall be placed on compacted subgrade materials, as shown on the Plans, as indicated elsewhere in these Specifications, and in conformance with Sections 5-04.3(1), 5-04.3(2), 5-04.3(3), 5-04.3(4), 5-04.3(9), 5-04.3(10), 5-04.3(11), 5-04.3(12), 5-04.3(13), 5-04.3(14) 5-04.3(16) and 5-04.3(20) of the WSDOT Standard Specifications.

No material transfer devices or vehicles shall be used on this project.

3.3 ASPHALT JOINTS

All joints of hot mix asphalt pavement shall be sealed with hot poured sealant meeting the requirements of WSDOT Standard Specification 9-04.2

3.4 QUALITY CONTROL

The Contractor shall be responsible for testing the ATB and HMA paving in accordance with the WSDOT Standard Specifications as specified herein, and with Section 01400. Testing shall include asphalt content and grading testing of hot mix asphalt mix samples, aggregate void content, fracture, and equivalence testing, and in-place density testing.

3.5 SAWCUTTING

Where shown on the Plans or where directed in the field by the Owner, the Contractor shall make a neat vertical sawcut at the boundaries of the area to be removed. Care shall be taken during sawcutting so as to prevent damage to the existing asphalt concrete, or concrete, to remain in place. Any pavement or concrete damaged by the Contractor outside the area scheduled for removal due to the Contractor’s operations or negligence shall be repaired or replaced to the Owner’s satisfaction by the Contractor at no additional cost to the Owner.
All cuts shall be continuous, full depth, and shall be made with saws specifically equipped for this purpose. No skip cutting, wheel cutting or jack hammering will be allowed unless specifically approved otherwise in writing by the Owner. However, even if preapproved as a method of cutting, no payment will be made for this type of work, and it shall be considered incidental and included in the various unit contract and lump sum prices listed in the Proposal.

The location of all pavement cuts shall be preapproved by the Owner in the field before cutting commences.

All water and slurry material resulting from sawcutting operations shall not be allowed to enter the storm drainage or sanitary sewer system and shall be removed from the site and disposed of in accordance with the Washington State Department of Ecology regulations.

All existing asphalt concrete pavement edges shall be saw cut back to sound material, in uniform lines immediately prior to paving operations. Any edges broken between the time of cutting and placement of new paving shall be recut to the satisfaction of the Owner at no additional cost to the Owner. All excess excavated materials shall be hauled to waste.

3.6 ASPHALT TRENCH PATCH

This work shall consist of the preparation, placing and compaction of asphalt trench sections, in accordance with the details included on the plans and the requirements outlined herein. The work shall be in conformance with Sections 3.3 herein unless specifically directed otherwise by the Owner.

The Contractor shall restore all asphalt surfaces excavated or disturbed to a condition acceptable to the Owner.

The trench section shall be patched as indicated on the plans and in accordance with the following steps:

A. Crushed rock shall be installed to the top of the existing pavement. Crushed rock shall be installed in the trench section on a daily basis as required to maintain the existing pavement surface elevation. The area will be open to traffic. This restoration shall be maintained as directed by the Owner.

B. Crushed rock shall be removed to the depth of existing pavement or to the depth of the asphalt section specified on the plans, whichever is thicker. The trench shall be paved to match the existing pavement surface. HMA trench patching shall be constructed by the Friday following pipe
installation. All trench areas shall be patched and cleaned by close of work that day.

Before any HMA material is placed, all pavement cuts shall be trued so that marginal lines of the patch will form a rectangle with straight edges and vertical faces a minimum of 1 foot back from the maximum trench width.

The asphalt shall be placed and compacted in 2-inch lifts. The asphalt trench patch thickness shall match existing asphalt thickness or the minimum pavement repair section indicated on the plans whichever is thicker.

Seal all joints scheduled to not receive an asphalt overlay.

3.7 PAVEMENT MARKINGS

In those areas where the proposed work causes existing pavement with striping and/or pavement markings to be removed, the Contractor shall not only replace the pavement, as noted herein, and as shown on the Plans, but shall also re-mark and re-stripe the new pavement so as to restore the new pavement to its former condition.

Pavement markings shall conform to Section 8-22.2 and 8-22.3 of the WSDOT Standard Specifications, and the latest edition and amendments thereto of the Manual on Uniform Traffic Control Devices (MUTCD) as adopted by the State of Washington, and shall be constructed as shown in the Plans except as modified herein.

Raised pavement markers shall conform to Section 8-09.2 and 8-09.3.

3.8 ADJUSTING STRUCTURES TO GRADE

All utility castings and monuments within the existing and/or new pavement area shall be referenced by the Contractor prior to any pavement removal or planning. The Contractor shall keep a record of such references, and submit a copy to the Owner.

Existing structures and new structures shall be adjusted to the finished grade as shown on the Plans and as further specified herein. Existing boxes, rings, grates, covers, and lids shall be reset in a careful and workmanlike manner to conform to the required grades.
The new and existing utility castings and monuments shall be adjusted to grade in the following manner:

As soon as the street has been paved past each structure or casting, the asphalt concrete mat shall be scored around the location of the structure or casting. After rolling has been completed and the mat has cooled, it shall be cut along the scored lines. The structure or casting shall then be raised to finished pavement grade and the annular spaces filled as indicated on the Plans. The Contractor shall install the pavement to give a smooth finished appearance. All covers, lids, frames, and grates shall be thoroughly cleaned.

After pavement is in place, all new pavement joints shall be sealed with a 6-inch wide strip of hot asphalt sealer. A sand blanket shall be applied to the surface of the hot asphalt sealer immediately after the placement of the sealer to help alleviate the tracking of the asphalt. The sealer shall meet the requirements of Section 9-04.2 of the WSDOT Standard Specifications.

*** END OF SECTION ***
DIVISION 3

CONCRETE
SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section includes schedules, notes, and details for the construction of cast-in-place concrete structures, landings, equipment piers, housekeeping pads and slabs on grade.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 REFERENCES

This Section references the latest revisions of the following documents:

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ASTM C172  Sampling Freshly Mixed Concrete
ASTM C173  Air Content of Freshly Mixed Concrete by the Volumetric Method
ASTM C231  Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C260  Air-Entraining Admixtures for Concrete
ASTM C309  Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C494  Chemical Admixtures for Concrete
ASTM C555  Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
ASTM C618  Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete
ASTM C881  Epoxy-Resin-Base Bonding Systems for Concrete

1.4 SUBMITTALS

Submittals shall be in accordance with Section 01300.

A. GENERAL

The submittal for each included concrete mix shall include, as a complete package, the following as defined below:

1. Concrete Mix Design
2. Certified Test Results
3. Sieve Analysis
4. Product Data

An incomplete concrete mix submittal package may render a rejection of the mix or could delay the review process.

B. CONCRETE MIX DESIGN

Submit mix design for the proposed mix to be used on the Project, indicating components, and proportions by weight, including any
admixtures. Mix design shall state chloride content. Mix designs to be provided are:

1. Unspecified Concrete for Liquid Containment Structures
2. Unspecified Concrete
3. Lean Concrete
4. Cement Grout

C. CERTIFIED TEST RESULTS

Submit laboratory test results indicating compressive strength of concrete in compliance with requirements specified herein and in accordance with ACI 301.

D. SIEVE ANALYSIS

Submit sieve analysis for proposed coarse and fine aggregates indicating components, source, gradation, and WSDOT aggregate source approval report, including WSDOT Aggregate Source ID.

E. PRODUCT DATA

Provide product data on all proposed admixtures, accessories, and embedded items to be used on the Project, including, but not limited to:

1. Cement; source and type
2. Air Entraining Agent
3. Water Reducing Admixtures
4. Pozzolans
5. Bonding Agents
6. Curing Compounds
7. Plastic Joint Formers

For admixtures other than those proposed for air entrainment, submit a letter from the manufacturer describing the benefits of its use for the project and effect of its use on the properties of the concrete. Product data
shall expressly state admixtures are chloride free, or the manufacturer shall submit a letter certification stating the same.

F. MATERIAL DELIVERY TICKETS

Provide copies of all concrete and grout material delivery tickets for the Project to the Engineer.

1.5 QUALITY ASSURANCE

Perform work in accordance with ACI 301. Acquire cement and aggregates from same source for all work performed on the Project. Conform to ACI 305 when concreting during hot weather. Conform to ACI 306 when concreting during cold weather. Provide or coordinate field and laboratory testing as described later in this Section and under provisions of Section 01400.

1.6 COORDINATION

Coordinate work in accordance with provisions of Section 01310. Coordinate the placement of embedded items with erection of concrete formwork and placement of form accessories.

PART 2 PRODUCTS

2.1 FORM MATERIALS

A. FORMS FOR EXPOSED FINISH CONCRETE

Plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on the Plans.

B. FORMS FOR UNEXPOSED FINISH CONCRETE

Plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.

C. FORM COATINGS

Provide commercial formulation form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.
2.2 CONCRETE MATERIALS

A. CEMENT

ASTM C150, Type II – Moderate or Type I - II. Use one brand of cement throughout the project, unless otherwise approved by the Engineer. Provide low alkali cement where Alkali-Silica Reaction (ASR) mitigation measures are required by WSDOT Aggregate Source Approval.

B. FINE AND COARSE AGGREGATES

Comply with ASTM C33. Provide aggregates from a single source. Coarse aggregate shall be size designation 467 (Nominal size 1-1/2 inch to No. 4 sieve) for all liquid containing structures, and size designation 67 (Nominal size 3/4-inch to No. 4 sieve) for all other concrete. Aggregates shall show a loss of weight not exceeding 35 percent after 500 revolutions in a Los Angeles wear machine, when tested in accordance with ASTM C131 or ASTM C535. Aggregates shall be from a WSDOT approved source.

C. WATER

Clean, potable, and not detrimental to concrete, in compliance with ASTM C94.

2.3 ADMIXTURES

Except for air entrainment, use of all other admixtures used shall be subject to approval of the Engineer and at no additional cost to the Owner. Only admixtures expressly stated by the manufacturer as being chloride-free shall be used. Subject to compliance with requirements, products, which may be incorporated into the work include, but are not limited to, the following:

A. AIR ENTRAINMENT

ASTM C260 certified by manufacturer to be compatible with other proposed admixtures.

Master Builders MB AE 90 or MICRO-AIR
Sika AER
W.R. Grace Daravair or Darex Series
B. WATER REDUCING ADMIXTURE

ASTM C494 Type A.

Master Builders PolyHeed
Sika Plastocrete 161
W.R. Grace WRDA Series

C. ACCELERATING ADMIXTURE

ASTM C494 Type C.

Master Builders Pozzolith NC534
Sika Plastocrete 161 FL
W.R. Grace Polarset or DCI

D. WATER REDUCING, RETARDING ADMIXTURE

ASTM C494, Type D.

Master Builders Pozzolith 100XR
Sika Plastiment
W.R. Grace Daratard Series

E. WATER REDUCING, ACCELERATING ADMIXTURE

ASTM C494, Type E.

Euclid Chemical Co. Accelguard 80
Master Builders Pozzutec 20
W.R. Grace Daraccel

F. HIGH RANGE WATER REDUCER (HRWR)

ASTM C494, Type F.

Master Builders Rheobuild 1000/3000 FC
Sika Sikament 10 ESL
W.R. Grace ADVA 100
G. HIGH RANGE WATER REDUCER AND RETARDER

ASTM C494, Type G.

Master Builders Pozzolith 440N
W.R. Grace Daracem-100

H. POZZOLAN

ASTM C618 - CLASS F, with a CaO maximum content of 10 percent.

2.4 ACCESSORIES

A. BONDING AGENT

ASTM C881, Type I and II, Grade 2, Class C, Epoxy Resin. Subject to Contract requirements, provide one of the following or equal:

Sika Armatec 110
Conspec SpecBond 100
W.R. Meadows Sealtight Rezi Weld 1000

B. CURING COMPOUND

ASTM C309, Type I, Class A and B. Subject to Contract requirements, provide one of the following or equal:

W.R. Meadows Sealtight 1100-Clear
Conspec RX cure
Chemrex, Inc. Masterkure
Burke Spartan-Cote WB

C. PLASTIC JOINT FORMER

Provide and install, per manufacturer’s recommendations, where shown on the Plans or at locations approved by the Engineer. Subject to compliance with requirements, manufacturers offering products, which may be incorporated in the work, include, but are not limited to, the following:

Greenstreak
Vinylex Corporation
W.R. Meadows
2.5 CONCRETE MIX

A. GENERAL

Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method is used, use an independent testing facility acceptable to the Engineer for preparing and reporting proposed mix designs. The testing facility shall not be the same as that used for field quality control testing.

The maximum water soluble chloride ion content, expressed as a percent of the cement, contributed from all ingredients of the concrete mix, including water, aggregates, cementitious materials, and admixtures, shall not exceed 0.10 percent. Pozzolans may be counted as part of the total cementitious material in the concrete mix design. The cementitious material is the “minimum cement content” specified in the mix design for each type of concrete. When pozzolans are used as part of this “cement content,” the minimum content shall be 15 percent by weight of the total cementitious materials (Portland cement and pozzolans) and not more than 20 percent.

Where ASR mitigation measures are required by WSDOT, provide a minimum of 15 percent pozzolan included in the cementitious material in the design mix.

B. MIX DESIGNS

Provide normal weight concrete with the following properties, unless noted otherwise on the Plans.

1. Typical Concrete

Structural concrete of general use in structures, sidewalks, and where no specific class of concrete is designated.

Minimum compressive strength @ 28 days: 3,000 psi
Minimum cement content: 5.5 sacks per cubic yard
Maximum water cement ratio by weight: 0.45
Nominal coarse aggregate size: 3/4" to No. 4
(size designation 67)
C. ADMIXTURES

1. Air Entrainment

Use air-entraining admixture complying with ASTM C260 in all exterior exposed concrete. Add air-entraining admixture at manufacturer’s prescribed rate to result in concrete at point of placement in accordance with ASTM C173 or C231 having total air content with a tolerance of plus or minus 1 percent within the following limits:

- 5.5 percent for 1.5 inch max. coarse aggregate size
- 6.0 percent for 1.0 inch max. coarse aggregate size
- 7.0 percent 0.50 inch or less max. coarse aggregate size

2. Other Admixtures

Use of all other admixtures shall be subject to the approval of the Engineer, and shall be in accordance with ACI 212.3 and Manufacturer’s recommendations. Only admixtures stated by the manufacturer to be chloride free shall be used.

D. SLUMP LIMITS

Proportion and design mixes to result in concrete slump (1 inch ± of the maximum) at the point of placement in accordance with ASTM C143 as follows:

- Ramps, slabs, and sloping surfaces: 3 inches.
- Reinforced foundation systems: 3 inches.
- Other concrete: 4 inches.
- Concrete containing HRWR admixture (super-plasticizer): Not more than 8 inches after addition of HRWR to site-verified 2- to 3-inch slump concrete.

E. CONCRETE MIXING

Comply with requirements of ASTM C94, and as herein specified.

During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than that specified in ASTM C94 may be required.
PART 3  EXECUTION

3.1  GENERAL

Coordinate the installation of joint materials and vapor barriers with placement of forms and reinforcing steel.

3.2  FORMS

Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances complying with ACI 347.

Design formwork to be readily removable without impact, shock, or damage to cast-in-place concrete surfaces and adjacent materials.

Construct forms to sizes, shapes, lines, and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the work. Use selected materials to obtain required finishes. Solidly butt joints and provide back up at all joints to prevent leakage of cement paste.

Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast-in-place concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Provide Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.

Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

Chamfer all exposed corners and edges and other areas shown on the Plans, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings,
recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.

3.3 JOINTS AND WATERSTOPS

A. CONSTRUCTION JOINTS

Locate and install construction joints where indicated, or locate so as not to impair strength and appearance of the structure, as acceptable to the Engineer. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise shown on the Plans.

B. ISOLATION JOINTS IN SLABS-ON-GRADE

Unless otherwise noted, construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as column pedestals, foundation walls, grade beams, and elsewhere as shown on the Plans.

Joint filler and sealant materials are specified in Division 7.

C. SLAB (CONTROL) JOINTS

Construct joints in slabs-on-grade as shown on the Plans. Use saw cuts 1/8 of an inch wide x 1/4 of the slab depth or inserts 1/4-inch wide x 1/4 of the slab depth.

D. PREMOLDED (CONTROL) JOINTS

Insert premolded plastic, hardboard or fiberboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris.

E. EDGE FORMS AND SCREED STRIPS FOR SLABS

Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently to support types of screed strips by use of strike-off templates or accepted compacting type screeds.
3.4 INSTALLATION OF EMBEDDED ITEMS:

A. GENERAL

Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use installation drawings, diagrams, instructions, and directions provided by suppliers of items to be embedded.

B. CLEANING AND TIGHTENING

Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

C. REGLETS

Install reglets to receive top edge of foundation sheet waterproofing, and to receive thru-wall flashing as shown at lintels, relieving angles, and other conditions.

3.5 PREPARATION OF FORM SURFACES

Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.

Thin form coating compounds only with thinning agent of type, amount, and under conditions of form-coating compound manufacturer’s directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer’s instructions.

Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.6 PREPARATION OF EXISTING CONCRETE SURFACES

The Contractor shall bush hammer all existing concrete surfaces that are to have new concrete cast against them. Apply epoxy bonding agent prior to placing concrete.
3.7 CONCRETE PLACEMENT

A. GENERAL

Comply with ACI 304 and as herein specified.

Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Apply temporary protective covering to lower 2 feet of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during concrete placement.

B. PLACING CONCRETE IN FORMS

Deposit concrete in forms in horizontal layers not deeper than 24 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.

Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

C. PLACING CONCRETE SLABS

Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. Maintain reinforcing in proper position during concrete placement operations.
D. COLD WEATHER PLACING

Protect concrete work from physical damage or reduced strength, which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

When air temperature has fallen to or is expected to fall below 40 degrees F (4 degrees C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 degrees C), and not more than 80 degrees F (27 degrees C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

E. HOT WEATHER PLACING

When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F (32 degrees C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is at Contractor’s option. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete. Fog spray forms, reinforcing steel, and subgrade just before concrete is placed. Upon approval, water-reducing retarding admixture (Type D) may be used when required by high temperatures, low humidity, or other adverse placing conditions.

3.8 FINISH OF FORMED SURFACES

Provide smooth form finish for all formed concrete surfaces exposed-to-view including all surfaces exposed to water or wastewater, or that are to be covered with a coating material applied directly to the concrete, or a covering material applied directly to concrete, such as veneer plaster, painting, or other similar type of system.
Provide smooth form finish for surfaces to be waterproofed or dampproofed. Surfaces must comply with recommendations of the manufacturer of the product being utilized.

Provide rough form finish for formed concrete surfaces not exposed-to-view in the finished work or by other construction, unless otherwise indicated.

A. SMOOTH FORM FINISH

This is to be the as-cast concrete surface obtained utilizing selected form facing material, arranged orderly and symmetrically with a minimum of seams, and as specified herein.

Repair and patch tie holes and defective areas, with all fins or other projections completely removed and smoothed, by one of the following methods:

1. Provide smooth rubbed finish to concrete surfaces after form removal. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.

2. Provide grout “sacked” cleaned finish. The sacking grout shall be one part Portland cement to 1-1/2 parts fine sand by volume, and mixed with water to consistency of thick paint. Proprietary additives such as epoxy bonding agents or adhesives may be used at Contractor’s option. Blend standard Portland cement and white Portland cement, amounts to be determined by trial patches, so that final color of dry grout matches adjacent surfaces. Thoroughly wet concrete surfaces and apply grout to coat surfaces and fill small holes. Remove excess grout by scraping and rubbing with clean burlap. Keep sacked surfaces damp by fog spray or other acceptable method so surfaces do not dry out.

B. ROUGH FORM FINISH

This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/8 of an inch in height rubbed down or chipped off. All “bug holes” exceeding 1/2 inch in diameter and exceeding 1/4-inch depth shall be repaired or filled in.
C. RELATED UNFORMED SURFACES

At tops of walls, horizontal offsets, and similar unformed surfaces occurring at adjacent formed surfaces, continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

D. TOLERANCES FOR FORMED SURFACES

1. Variations from the plumb:
   a. In the lines and surfaces of columns, pier, walls and in arises
      In any 10 feet of length – 1/4 inch. Maximum for entire length – 1 inch
   b. For exposed corner columns, control-joint grooves, and other conspicuous lines
      In any 20 feet of length – 1/4 inch. Maximum for entire length – 1/2 inch

2. Variations from level or from the grades indicated on the Plans:
   a. In slab soffits, ceilings, beam soffits, and in arises, measured before removal of supporting shores
      In any 10 feet of length – 1/4 inch. In any bay or opening, or in any 20 feet of length – 3/8 of an inch. Maximum for entire length – 3/4 inch
   b. In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines
      In any bay or opening, or in any 20 feet of length – 1/4 inch. Maximum for entire length – 1/2 inch

3. Variations in the linear building lines from the established position in plan view
   In 20 feet of length – 1/2 inch. Maximum for entire length – 1 inch
4. Variations in distance between walls, columns and partitions
   In any 10 feet of distance – 1/4 inch. In any bay or opening – 1/2 inch. Maximum total variation – 1-inch.

5. Variations in the sizes and locations of sleeves, floor openings and wall openings
   Minus – 1/4 inch
   Plus – 1/2 inch

6. Variations in cross-sectional dimensions of columns and beams and in the thickness of slabs and walls
   Minus – 1/4 inch
   Plus – 1/2 inch

7. Variations in footings:
   a. Variation from dimensions on Plans when formed or plus 3-inches when placed against unformed excavations
      Minus – 1/2 inch
      Plus – 2 inches
   b. Misplacement of eccentricity
      2 percent of the footing width in the direction of the misplacement, but not more than 2 inches
   c. Reduction in thickness of specified thickness
      Minus – 5 percent

8. Variations in steps:
   a. In a flight of stairs
      Riser – 1/8 of an inch
      Tread – 1/4 inch
   b. In consecutive steps
      Riser – 1/16 of an inch
      Tread – 1/8 of an inch

3.9 MONOLITHIC SLAB FINISHES:

A. FLOAT FINISH

Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be
covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.

After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.

B. TROWEL FINISH

Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks and uniform in texture and appearance. Grind smooth surface defects that would telegraph up through applied floor covering system.

C. NON-SLIP BROOM FINISH

Apply non-slip broom finish to exterior concrete platforms, landings, steps, and ramps, sidewalks and elsewhere as indicated. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Owner before application.

D. TOLERANCES FOR MONOLITHIC SLAB FINISHES

The flatness of the concrete shall be carefully controlled and the tolerances shall be measured by the straight edge system as specified in paragraph 4.5.7 of ACI 117, using a 10-foot straight edge, within 72 hours after floor slab installation and before shores and/or forms are removed. The listed tolerances shall be met at any and every location at which the straight edge can be placed.

- Bullfloated 1/2 inch
- Float Finish 3/16 inch
- Trowel Finish 1/8 inch
- Straightedges 5/16 inch
3.10 CONCRETE CURING AND PROTECTION

A. GENERAL

Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep concrete continuously wet for not less than 7 days. Begin final curing procedures immediately following initial curing and before concrete has dried out. Continue final curing for at least 7 days in accordance with ACI 301 curing methods. Avoid rapid drying of concrete at the end of final curing period.

B. CURING METHODS

Perform curing of concrete by use of curing and sealing compound, by moist curing, by moisture-retaining cover curing, or by combinations thereof, as herein specified.

Provide moisture curing by the following methods. Keep concrete surface continuously wet by covering with water, or provide continuous water-fog spray.

Covering concrete surface with absorptive cover, thoroughly saturating cover with water and keeping continuously thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4-inch lap over adjacent absorptive covers.

Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in wide as practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

Provide curing and sealing compound to exposed interior slabs and to exterior slabs, walls, sidewalks, and curbs, as follows:

Apply curing and sealing compound to concrete slabs and walls as soon as initial curing operations are complete or immediately after the forms have been stripped (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer’s directions. Completely cover the concrete surfaces with curing and sealing compound. Reccoat areas subjected to heavy rainfall within 3 hours after
initial application. Maintain continuity of coating and repair any damage during curing period.

Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials, unless otherwise acceptable to the Engineer.

C. CURING FORMED SURFACES

Cure formed concrete surfaces, including undersides of beams, supported slabs, and other similar surfaces by moist curing with forms in place for full curing period and until forms are removed. When forms are removed, continue curing by methods specified above, as applicable.

D. CURING UNFORMED SURFACES

Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of an appropriate curing method.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture retaining cover.

3.11 SHORES AND SUPPORTS

A. GENERAL

Comply with ACI 347 for shoring, and as herein specified. Extend shoring from ground to roof for structures four stories or less, unless otherwise permitted. Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support work without excessive stress or deflection.

Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required, until all concrete has attained its required 28 day strength and heavy loads due to construction operations have been removed.

B. REMOVAL OF FORMS

Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F (10 degrees C) for 24 hours after placing concrete, provided concrete is sufficiently hard to
not be damaged by form removal operations, and provided curing and protection operations are maintained.

Formwork supporting weight of concrete, such as beam soffits, joints, suspended slabs, and other structural elements, may not be removed in less than 14 days and until concrete has attained 70 percent of the design minimum compressive strength at 28 days. Determine potential compressive strength of in-place concrete by testing field-cured specimens, representative of concrete location or members.

Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.12 REUSE OF FORMS

Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Provide new form facing material. Apply new form coating compound as specified for new formwork prior to reuse of forms.

When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use “patched” forms for exposed concrete surfaces, unless approved by the Engineer and acceptable to the Owner.

3.13 MISCELLANEOUS CONCRETE ITEMS

A. FILLING-IN

Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work. Fill-in all form tie holes and other forming system holes with non-shrink grout.

B. CURBS

Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
C. BASE PLATE, EQUIPMENT BASES AND FOUNDATIONS

Provide machine and equipment bases (housekeeping pad/pier) and foundations, as shown on the Plans. Set anchor bolts for machines and equipment with template at correct elevations, complying with certified diagrams or templates of manufacturers furnishing machines and equipment.

Provide 4-inch-high, square or rectangular concrete pad around all conduits and small diameter pipes that penetrate through floor slabs.

Provide leveling grout under base plates and equipment frames using non-metallic, non-shrink grout. Minimum thickness for leveling grout shall be 1/2 inches unless noted otherwise on the Plans or specified by equipment manufacturer.

3.14 CONCRETE SURFACE REPAIRS

A. PATCHING DEFECTIVE AREAS

Repair and patch defective areas immediately after removal of forms. Cut out honeycomb, rock pockets, voids or bugholes over 1/4 inch in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with specified bonding agent. For water and wastewater containment structures, utilize an epoxy resin bonding agent. Place patching mortar after bonding compound has dried.

For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

B. REPAIR OF FORMED SURFACES

Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of the Engineer. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, bug holes, honeycomb, rock pockets; fins and other discolorations that cannot be removed by cleaning. Flush out form tie holes and form bolt holes, fill with non-shrink grout, or precast concrete cone plugs or rubber plugs secured in place with bonding agent or epoxy adhesive.
Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. All repairs shall be approved by the Engineer. If defects cannot be repaired, the Contractor shall remove and replace the concrete.

C. REPAIR OF UNFORMED SURFACES

Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.

Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01 inches wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Engineer.

Repair defective areas, except random cracks and single holes not exceeding 1-inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3 inches of clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
Perform structural repairs with prior approval of the Engineer for method and procedure, using specified epoxy adhesive and mortar. Repair methods not specified above may be used, subject to approval of the Engineer. If acceptable repairs cannot be made, the Contractor shall remove and replace the concrete at no cost to the Owner.

3.15 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. GENERAL

Sampling and testing for quality control during placement of concrete shall include the following:

1. Sampling Fresh Concrete

   ASTM C172, except modified for slump to comply with ASTM C94.

2. Slump

   ASTM C143: one test at point of discharge for each day’s placement of each type of concrete; additional tests when concrete consistency seems to have changed.

3. Air Content

   ASTM C173, volumetric method for lightweight or normal weight concrete; ASTM C231 pressure method for normal weight concrete; one for each day’s placement of each type of air-entrained concrete.

4. Concrete Temperature

   Test hourly when air temperature is 40 degrees F (4 degrees C) and below, and when 80 degrees F (27 degrees C) and above; and each time a set of compression test specimens is made.

5. Compressive Strength Tests

   ASTM C39; one set for each day’s placement exceeding 5 cubic yards plus additional sets for each 50 cubic yards over and above the first 25 cubic yards of each concrete class placed in any 1 day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
When total quantity of a given class of concrete is less than 50 cubic yards, Engineer may waive strength test if, in his judgment, adequate evidence of satisfactory strength is provided.

When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

Test results will be reported in writing to Engineer and Contractor within 24 hours after testing. FAX of test results is acceptable; however, mailing hard copies of test results is also required. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7 day tests and 28-day tests.

6. Nondestructive Testing

Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection of concrete.

7. Additional Tests

The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in a structure, as directed by the Owner. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed. Contractor shall pay for cost of such tests when unacceptable concrete is verified.

*** END OF SECTION ***
DIVISION 11

EQUIPMENT
SECTION 11000

EQUIPMENT GENERAL PROVISIONS

PART 1 GENERAL

1.1 SCOPE

The provisions of this Section apply to all Sections of Divisions 11 and 16, unless specifically revised therein.

The Contractor shall direct the attention of all subcontractors and suppliers of equipment and related appurtenances for the work to the applicable provisions in the Contract Provisions wherever they may occur.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 STANDARDS FOR THE WORK

Pipe, fittings, wiring and supports shall be provided to produce complete, operable systems with all elements properly interconnected as shown in schematic diagrams or to provide specified operations. If a specific dimensioned location is not shown for interconnections or smaller system elements, the Contractor shall select appropriate locations and show them on Shop Drawing submittals for review.

Equipment and material shall be new and without imperfections and shall be erected in a neat and workmanlike manner; aligned, leveled, cleaned and adjusted for satisfactory operation; installed in accordance with the recommendations of the manufacturers and the best standard practices for this type of work so that connecting and disconnecting of piping and accessories can be readily made and so that all parts are easily accessible for inspection, operation, maintenance and repair. Oil and lubrication fittings shall be located clear of and away from guards, base, and equipment and within reach from the operating floor. In order to meet these requirements with equipment as furnished, minor deviation from the Plans may be made as authorized by the Engineer. All such minor deviations from the
Plans that may include extending oil and lubrication fittings for accessibility and safety shall be executed at no additional cost to the Owner.

1.4 MANUFACTURER’S INSTRUCTIONS

The recommendations and instructions of the manufacturers of products used in the work are hereby made part of these Specifications, except as they may be superseded by other requirements of these Specifications.

1.5 SUBMITTALS

A. GENERAL

Product Submittals shall be provided to the Engineer for all equipment specified in Divisions 11 and 16, in accordance with Specification 01300, this Section and the respective equipment specification section. Submittals shall be dated and signed as certified for use in construction of this project.

B. MANUFACTURER’S LITERATURE

Manufacturer’s literature shall be submitted for equipment, including, as applicable, performance characteristics, fan curves and pump curves, motor data sheets and methods of assembly.

The following minimum requirements shall accompany all manufacturers’ literature submittals:

1. Description of materials.

2. Rating data - Mechanical and Electrical as applicable.

3. Motor Data including bearing and enclosure information.

4. List of any special tools and/or spare parts required and to be furnished, if any.

5. Exceptions taken to the specification and detailed explanation why the exception is being taken.

6. Additional specific information that is specified in the equipment sections.

7. For motor driven equipment served by variable frequency drives (VFDs), provide vibration and critical speed requirements of the
equipment, minimum speed requirements of motor and driven machinery, acceleration and deceleration requirements of the equipment, and torque and speed information as per Part 1.6 of this Section.

C. SHOP DRAWINGS

Shop Drawings shall be submitted showing sizes and arrangement of equipment, foundations and anchor bolts required, control diagrams, wiring diagrams, pipe hanging details, ductwork layouts and connections to other work. The arrangement of mechanical equipment and appurtenant piping shown on the Plans may be varied as necessary to fit the certified manufacturer’s installation drawings. However, the manufacturer’s drawings shall not deviate from the Plans and Specifications as to location, size, type and design of equipment.

The following minimum requirements shall accompany all shop drawing submittals:

1. Overall dimensions.
2. Mounting arrangement and dimensions.
3. Connection sizes and orientation.
4. Capacity and location of lifting eyes.
5. Motor arrangement showing location of electrical connections.
6. Detail electrical wiring diagrams, showing component designation and rating, and the connection points and associated terminals and cable identification for connection to the process control system.
7. The Contractor shall ascertain the location of all electrical (power and control) connections in order to properly orient electrical conduits.

D. DESIGN CALCULATIONS

Seismic design calculations shall be submitted for equipment and for supports and anchorage for equipment.
E. FACTORY TEST REPORTS

Factory tests shall be performed for each piece of equipment where specifically called for in the Section specifying that equipment. Note that factory tests are inherent in many reference standards. The requirement for a factory test in a referenced standard shall make that requirement a part of these Specifications. Conduct factory tests at the same speeds at which the equipment will operate in the field except as noted.

Where specifically noted, the Engineer may witness performance test. The Contractor shall inform the Engineer in sufficient time to allow arrangements to be made for witness of such tests. When non-witnessed tests are performed, certified results shall be supplied by the Contractor to the Engineer.

Factory testing of pumps shall be done in accordance with the requirements and standards of the Hydraulic Institute. Tests of other equipment shall conform to the requirements set forth in these Specifications.

F. IDENTIFICATION OF DELIVERED EQUIPMENT

Each piece of equipment delivered to the project site shall be accompanied by a completed form which will contain at least the following information:

1. Owner’s name and location of project.
2. Contractor’s name and subcontractor if applicable.
3. Name of item being submitted.
4. Specification reference by section, paragraph and page.
5. Data on item (manufacturer, general descriptive data, dimensions, size of connections, speeds, performance curves, serial number).
6. Motor data, type, voltage, frequency, phase, full load amperes, starting method, frame size, enclosure, insulation type, NEMA Code letter, dimensions, service factor, serial number.
7. Date and signature of person certifying performance.
G. MANUFACTURER’S AFFIDAVITS

Equipment manufacturers, or their authorized representatives, shall each submit a signed and dated written report with respect to his equipment certifying the following:

1. The equipment has been properly installed and lubricated
2. The equipment is in accurate alignment
3. The manufacturer was present when the equipment was placed into operation
4. The manufacturer has checked, inspected, and adjusted the equipment as necessary
5. The equipment is free from any undue stress imposed by connecting piping or anchor bolts
6. The equipment is not imposing any undue stress on any connecting members
7. The equipment has been operated satisfactorily under full load conditions
8. The manufacturer has inspected his equipment during the operational demonstrations and system validation tests to the extent specified
9. The equipment is fully covered under the terms of the guarantee

PART 2 PRODUCTS

2.1 DESIGN

All equipment shall be designed for the service intended, of rugged construction, of ample strength for all stresses which may occur during fabrication, transportation, erection and during continuous or intermittent operation, shall be adequately stayed, braced and anchored, and shall be installed in a neat and workmanlike manner. Appearance, safety, and utility shall be given consideration in the design of equipment. Materials of construction shall be cathodically compatible.
2.2 STANDARD REQUIREMENTS

A. MATERIALS

Design, fabricate and assemble equipment and systems with new materials and in accordance with acceptable engineering and shop practices. Manufacture individual parts to standard sizes and gauges so repair parts can be installed in the field. Make like parts of duplicate units interchangeable. Do not place equipment in service at any time prior to delivery except as required for factory or shop tests.

B. UNIFORMITY

Unless otherwise specified, equipment or material of the same type or classification used for the same purpose shall be the product of the same manufacturer and shall be the same model.

C. SEISMIC REQUIREMENTS

Supports and anchorage of equipment(s) shall comply with the requirements of the 2015 International Building Code (IBC) Section 1613 and ASCE 7-10 Minimum Design Loads for Buildings and Other Structures, Chapter 13 Seismic Design for Nonstructural Components, as referenced and amended by the IBC. For the following design parameters:

- Risk Category III
- Site Class E
- The component Importance Factor: $I_p = 1.0$
- Design response acceleration coefficients:
  - $S_{DS} = 0.45g$
  - $S_{D1} = 30g$

- Seismic Design Category D

D. STANDARDS

Provide equipment and materials suitable for service conditions and meeting standard requirements of ANSI, ASME, AWWA, ASTM, NEMA, IBC, NPC, UL and OSHA.
2.3 LUBRICATION

Provide lubricants of types recommended by equipment manufacturers, in quantities sufficient for a minimum of 1-year’s consumption prior to completion, testing and final acceptance.

2.4 EQUIPMENT BASES AND BEDPLATES

Mount equipment assemblies on a single heavy cast iron or welded steel bedplate on a grout or concrete base unless otherwise shown or specified. Provide bases and bedplates with machined support pads, vibration pads, tapered dowels for alignment or mating of adjacent items, adequate openings to facilitate grouting, and openings for electrical conduits. Corners shall be rounded or chamfered and ground smooth. Continuously weld seams and contact edges between steel plates and shapes, and grind welds smooth. Do not support machinery or piping on bedplates other than that which is factory installed. Provide leveling screws in equipment bases and bedplates to aid in leveling prior to grouting.

2.5 ANCHORS AND FASTENERS

Each equipment manufacturer shall furnish the required anchor bolts, nuts and washers of adequate design for securing bases and bedplates to concrete bases. Provide anchor bolts of length to allow for 1-1/2-inch of grout under baseplates and adequate anchorage into structural concrete unless otherwise shown or specified. The manufacturer shall submit to the Engineer design calculations regarding recommended sizing and type of anchor bolts, nuts, and washers for securing the equipment, in accordance with the project seismic requirements.

Anchor and assembly bolts and nuts shall be of ample size and strength for the purpose intended. All nuts, bolts and washers shall be Type 316 stainless steel. All leveling nuts shall be Type 316 stainless steel.

All motor-driven equipment shall be furnished with cast-in-place anchor bolts or drilled-in anchors set with epoxy adhesive. Do not provide expansion type anchors for motor-driven equipment, or equipment or piping subject to vibration.

Expansion type anchors are not to be used for any submerged applications unless specifically noted on the Plans.

Anchor all non-motor-driven equipment with cast-in-place anchor bolts or drilled-in anchors set with epoxy adhesive except that, where specifically allowed by note on the Plans, expansion type anchors may be used.
2.6 SAFETY GUARDS

Cover belt or chain drives, fan blades, couplings, exposed shafts and other moving or rotating parts on all sides with safety guards conforming to all applicable Federal, State, and local codes and regulations; conform to the most restrictive requirement. Design guards for easy installation and removal, complete with necessary supports, accessories, and fasteners, all hot-dip galvanized. Design guards in outdoor locations to prevent entrance of rain and dripping water. Provide tachometer test opening in line with ends of shafts. Typically, guards shall be expanded metal on a structural steel frame except that outdoor guards may be of solid material. Provide spring loaded hinged doors with latch for service and lubrication access.

All pipes, manifolds, heaters, and other surfaces, which have a surface temperature sufficient to burn human tissue, shall be covered with a thermal insulating material or otherwise guarded against contact.

Guards shall comply with the requirements of these Specifications, WISHA Standards, and “The Principles and Techniques of Mechanical Guarding” (OSHA 2057, 1973), whichever is more stringent.

2.7 LIFTING EYES

All equipment weighing over 100 pounds shall be supplied with lifting eyes. Parts of equipment assemblies, which are normally serviced separately, such as motors, shall have individual lifting eyes.

2.8 ELECTRICAL COMPONENTS

Equipment shall be manufactured, fabricated and installed in a manner which permits conduit connection to electrical power and control equipment from below the connection point, terminal box, or connection box without offsets or bends such that the conduit will drain away from the equipment.

Electric motors, control panels, accessories, etc., shall conform to the requirements of Division 11 and Division 16, Electrical.

If any motor fails during the warranty period, the Contractor shall replace the motor with a new motor. Rewinding a failed motor shall not be acceptable.

All electrical components shall be recognized or labeled and listed by a recognized electrical testing laboratory for the application, or approved by the Washington State Department of Labor and Industries for installation on the Project.
2.9 MOTOR PROTECTIVE DEVICE COORDINATION AND DOCUMENTATION

The Contractor shall maintain a spreadsheet or database list of the motor characteristics that are necessary to size, select, and/or set the various motor protective devices, such as thermal overloads, breaker trip devices, motor protection relays, etc. This list shall also include any additional information needed to set-up, program or adjust the variable frequency drive which serves motor driven equipment such as minimum speed, acceleration, etc. The list shall be sent with each equipment submittal for motor driven equipment and shall be updated to reflect the motor information for the submitted equipment.

The Contractor shall record the size and/or settings of each motor protective device at the time of startup and after any subsequent adjustments on the motor characteristics list described in the preceding paragraph.

In addition, the Contractor shall take a digital photo of each motor nameplate when the motor arrives at the jobsite. Each digital photo shall be emailed to the Engineer, noting any discrepancy between the motor nameplate data and the submitted motor data.

2.10 NAMEPLATES/DATA PLATES/IDENTIFICATION

Each piece of equipment and its driver shall be furnished with a stainless steel metal nameplate fastened to the item in an accessible position. This nameplate shall contain the manufacturer’s name, equipment rating, capacity, size, model, serial number and speed. Data for motors shall be NEMA standard. All information written or printed shall be in English. Each item of equipment shall bear a different serial number. Measurement units shall be given for ratings and capacity.

Nameplates for tanks and pressure vessels shall give working pressure, test pressure, vessel plate thickness and ASME Code data.

Each piece of rotating equipment shall have a direction of rotation arrow.

Each piece of equipment shall be labeled using a plastic laminate label with the functional name and number of the equipment shown on the Plans or provided by the Engineer. Name and number shall correspond to those used on Motor Control Centers and Panels.

Labels shall be fastened to the equipment base or other acceptable location. The letters shall be at least ½-inch high with a border trim on all sides not less than ¼-inch. Color shall be green background with white letters. Fasteners shall be brass.
or stainless steel screwed into inserts, anchor shields or tapped holes in equipment
or base.

Units of measure shall be shown on the indicating and totalizing dials of all
meters, gauges and other measuring devices.

2.11 PROTECTION AGAINST ELECTROLYSIS

Where dissimilar metals are used in conjunction with each other, suitable
insulation shall be provided between adjacent surfaces so as to eliminate direct
contact and any resultant electrolysis. The insulation shall be bituminous
impregnated felt, heavy bituminous coatings, non-metallic separators or washers.
Connections of dissimilar piping materials shall utilize dielectric unions, flanges,
couplings or bushings.

2.12 NOISE

Mechanical and electrical equipment shall not create sound levels that are in
excess of that permitted by WISHA for 8 hours per day worker exposure unless
otherwise noted for the specific piece of equipment involved.

2.13 PRESSURE GAUGE CONNECTIONS

Provide tapped and plugged suction and discharge gauge connections on the
pump nozzles or flanges. Where this is not possible, provide gauge connections
on the piping immediately adjacent to the pump.

2.14 PUMP SEAL WATER

The Plans show a seal water system applicable to some pump installations. The
Contractor shall review each pump installation with the pump manufacturer and
shall provide seal water installations in strict accordance with the manufacturer’s
recommendations at no additional cost to the Owner.

PART 3 EXECUTION

3.1 INSPECTION

Inspect each item of equipment for damage, defects, completeness, and correct
operation before installing. Inspect previously installed related work and verify
that it is ready for new equipment installation.
3.2 PREPARATION

Prior to installing equipment, ensure that the areas are clean and that concrete or masonry operations are completed. Maintain the areas in a broom-clean condition during installation operations. Clean, condition, and service the equipment in accordance with the Operation and Maintenance Instruction Manuals and specific requirements included in applicable Sections of these Specifications.

3.3 SPARE AND LOOSE PARTS

Prior to equipment startup provide an inventory of spare and loose parts supplied under the project. Turn over inventory and parts to the Owner. The Owner’s written acknowledgment of receipt is required for project completion. Loose parts are defined as items such as special tools, keys, safety equipment, and portable equipment.

3.4 INSTALLATION

A. EQUIPMENT

Equipment shall conform to the approved submittals and Operation and Maintenance Instruction Manuals. Employ skilled craftsmen experienced in installation of the types of equipment specified. Use specialized tools and equipment, such as precision machinist levels, dial indicators, gauges, and micrometers, as applicable. Produce acceptable installations free of vibration or other defects.

B. ANCHOR BOLTS

Deliver bolts with templates or setting drawings and verify that bolts are correctly located before structural concrete is placed. Prior to assembly, the Contractor shall coat all stainless steel bolts and nut threads with anti-seizing compound.

C. BASE AND BEDPLATE GROUTING

Do not place grout until initial fitting and alignment of connected piping is completed. Level and align equipment on the concrete foundations, then entirely fill the space under base or bedplates with grout. Bevel exposed grout at 45-degree angle, except around exposed grout at horizontal surfaces for drainage. Trowel or point exposed grout to a smooth, dense finish and damp cure with burlap for 3 days. When grout is fully hardened, remove jacking screws and tighten nuts on anchor bolts. Check the installation for alignment and level, and perform corrective work as required to conform to
the tolerances given in the applicable Operation and Maintenance Instruction Manual.

The Contractor shall make an allowance of at least 1-1/2 inches for grout under the equipment bases, whether or not shown on the Plans. Shims used to level and adjust the bases shall be steel. Shims may be left embedded in the grout, in which case they shall be installed neatly and so as to be as inconspicuous as possible in the complete work. Unless otherwise authorized, all grout shall be a non-shrink, non-metallic grout as stated in Section 03300.

Where practicable, the grout shall be placed through the grout holes in the equipment base and worked outward and under the edges of the base and across the rough top of the concrete foundation to a peripheral form so constructed as to provide a suitable chamfer around the top edge of the finished foundation.

D. PRESSURE GAUGES

Pressure gauges shall be installed on all pump discharge piping at a location where the gauges can be easily read. The gauges shall be located upstream of the isolation valves, if possible. Gauges shall be installed on other equipment items as specified. The gauges are specified in Division 13 and shall be installed as detailed on the Plans.

3.5 EQUIPMENT STARTUP AND ADJUSTMENT

The Contractor, at his/her own expense, shall arrange for an authorized factory-trained representative of the company or companies supplying the various items of equipment to:

- Supervise the equipment installation in accordance with the Operation and Maintenance Instruction Manual.
- Be present when the equipment is first put into operation.
- Inspect, check, adjust as necessary, and approve the installation.
- Repeat the inspection, check and adjust until all trouble or defects are corrected and the equipment installation and operation are acceptable.
- Witness and supervise operational demonstrations and system validation tests to the extent specified.
- Prepare and submit the specified Manufacturer’s Affidavit.
The representative shall be experienced and knowledgeable regarding the equipment being tested.

The Contractor shall give initial lubrication to all equipment in accordance with the manufacturer’s recommendations.

The manufacturer shall provide a formal test procedure and report forms for recording data. The Contractor shall submit the report forms to the Engineer prior to operational testing.

All equipment shall be field tested and demonstrated to the Engineer that proper operation and capacity have been fully complied with. For pumps, this shall include measurement of suction and discharge pressure at the pump and measurement of pumping rate by volumetric means, or through a suitably calibrated meter for two points on the performance curve. Current draw and voltage on the motor for each phase shall be measured for each pumping rate measurement. For two-speed pumps, such tests shall be conducted at both speeds. For variable speed pumps, blowers or fans, these tests shall be conducted at minimum and maximum speeds and at the specified duty point.

The Contractor shall furnish and test equipment or measuring devices (including portable flow meters) required that are not part of the permanent installation. Tests for variable speed pumps, blowers, and other equipment shall be performed at 60 Hz and at the initial anticipated flow or capacity levels.

The field test shall demonstrate under all conditions of operation that the equipment:

- Has not been damaged by transportation or installation.
- Has been properly installed.
- Has no mechanical defects.
- Is in proper alignment.
- Has been properly connected.
- Is free of overheating of any parts.
- Is free of excessive noise.
- Is free of overloading of any parts.
- Shall operate as specified with the specified control system.
In addition, the entire facilities shall be demonstrated to be in full operating order prior to the acceptance of the work. Should any equipment or part thereof fail to operate as intended, it shall be immediately removed and replaced, all at the Contractor’s expense.

Equipment start-up and adjustment shall take place before instruction of the Owner’s personnel is performed.

3.6 INSTRUCTION OF OWNER’S PERSONNEL

Conduct an instruction program for up to six operations personnel designated by the Owner in accordance with Specification Section 01800. Furnish the services of qualified instructors from the various equipment manufacturers for the duration specified in each specific Section. Include instruction covering basic system operation theory, routine maintenance and repair, and “hands on” operation of equipment.

*** END OF SECTION ***
SECTION 11316

GRINDER PUMP STATION

PART 1 GENERAL

1.1 SCOPE

The work specified in this Section specifies that there shall be furnished and installed a commercial (quadplex, explosion-proof) grinder pump station, as directed by the Owner. Plans for the commercial grinder pump station are included in the plan set.

1.2 RELATED WORK SPECIFIED ELSEWHERE

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1.3 PERFORMANCE REQUIREMENTS

The residential grinder pump stations shall be capable of meeting the following performance requirements.

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<td>Grinder Pump Station</td>
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<td>Design Capacity (0 ft TDH)</td>
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<td>15 gpm</td>
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<tr>
<td>Design Capacity (92 ft TDH)</td>
<td>1</td>
<td>11 gpm</td>
</tr>
<tr>
<td>Design Capacity (185 ft TDH)</td>
<td>1</td>
<td>7.8 gpm</td>
</tr>
<tr>
<td>Pump – type</td>
<td>--</td>
<td>Progressing Cavity</td>
</tr>
<tr>
<td>Motor – horsepower</td>
<td>--</td>
<td>1 hp</td>
</tr>
<tr>
<td>Discharge Size</td>
<td>--</td>
<td>1-1/2 Inch</td>
</tr>
</tbody>
</table>

1.4 WARRANTY

The manufacturer shall warrant the units being supplied to the Owner against defects in workmanship and material for a period of 2 years, post installation, under normal use, operation, and service. The warranty shall be a parts and labor warranty on the complete station and accessories, including, but not limited to, the panel. The warranty shall be in printed form and apply to all units supplied.
PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

Grinder Pump Stations shall be Environment One Extreme Series Model WX484-122 or approved equal.

2.2 GRINDER PUMP STATION

The Contractor shall furnish a complete factory-built and tested quadplex grinder pump station, consisting of grinder pump cores suitably mounted on an integral stand of stainless steel, high density polyethylene (HDPE) tank, electrical quick disconnect (NEMA 6P), pump removal harness, stainless steel discharge assembly/shut-off valve, anti-siphon valve/check valve assembly, electrical alarm assembly and all necessary internal wiring and controls. For ease of serviceability, all pump motor/grinder units shall be of like type and horsepower throughout the system.

The pump shall be capable of delivering 15 gpm against a rated total dynamic head of 0 feet (0 psig), 11 gpm against a rated total dynamic head of 92 feet (40 psig), and 7.8 gpm against a rated total dynamic head of 185 feet (80 psig). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor.

2.3 PUMP CONFIGURATION

The pump shall be a custom designed, integral, vertical rotor, motor driven, solids handling pump of the progressing cavity type with a single mechanical seal. Double radial O-ring seals are required at all casting joints to minimize corrosion and create a protective barrier. Explosion-proof pumps are required. All pump castings shall be cast iron, fully epoxy coated to 8 to 10 mil nominal dry thickness, wet applied. The rotor shall be through-hardened, highly polished, precipitation hardened stainless steel. The stator shall be of a specifically compounded ethylene propylene synthetic elastomer. This material shall be suitable for domestic wastewater service. Its physical properties shall include high tear and abrasion resistance, grease resistance, water and detergent resistance, temperature stability, excellent aging properties, and outstanding wear resistance. Buna-N is not acceptable as a stator material because it does not exhibit the properties as outlined above and required for wastewater service.

2.4 GRINDER

The grinder shall be placed immediately below the pumping elements and shall be direct-driven by a single, one-piece motor shaft. The grinder impeller (cutter wheel) assembly shall be securely fastened to the pump motor shaft by means of a
threaded connection attaching the grinder impeller to the motor shaft. Attachment by means of pins or keys will not be acceptable. The grinder impeller shall be a one-piece, 4140 cutter wheel of the rotating type with inductively hardened cutter teeth. The cutter teeth shall be inductively hardened to Rockwell 50 – 60c for abrasion resistance. The shredder ring shall be of the stationary type and the material shall be white cast iron. The teeth shall be ground into the material to achieve effective grinding. The shredder ring shall have a staggered tooth pattern with only one edge engaged at a time, maximizing the cutting torque. These materials have been chosen for their capacity to perform in the intended environment as they are materials with wear and corrosive resistant properties.

This assembly shall be dynamically balanced and operate without objectionable noise or vibration over the entire range of recommended operating pressures. The grinder shall be constructed so as to minimize clogging and jamming under all normal operating conditions including starting. Sufficient vortex action shall be created to scour the tank free of deposits or sludge banks which would impair the operation of the pump. These requirements shall be accomplished by the following, in conjunction with the pump:

A. The grinder shall be positioned in such a way that solids are fed in an upward flow direction.

B. The maximum flow rate through the cutting mechanism must not exceed 4 feet per second. This is a critical design element to minimize jamming and as such must be adhered to.

C. The inlet shroud shall have a diameter of no less than 5 inches. Inlet shrouds that are less than 5 inches in diameter will not be accepted due to their inability to maintain the specified 4 feet per second maximum inlet velocity which by design prevents unnecessary jamming of the cutter mechanism and minimizes blinding of the pump by large objects that block the inlet shroud.

D. The impeller mechanism must rotate at a nominal speed of no greater than 1,800 rpm.

The grinder shall be capable of reducing all components in normal domestic sewage, including a reasonable amount of “foreign objects,” such as paper, wood, plastic, glass, wipes, rubber and the like, to finely-divided particles which will pass freely through the passages of the pump and the 1-1/4-inch-diameter stainless steel discharge piping.
2.5 MOTOR

A. MOTOR PERFORMANCE CHARACTERISTICS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinder Pump Station</td>
<td></td>
</tr>
<tr>
<td>Motor Size</td>
<td>1 hp</td>
</tr>
<tr>
<td>Operating Voltage</td>
<td>240 VAC</td>
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<tr>
<td>Phase</td>
<td>1</td>
</tr>
<tr>
<td>Frequency</td>
<td>60 Hz</td>
</tr>
<tr>
<td>Synchronous Speed</td>
<td>1,725 rpm</td>
</tr>
</tbody>
</table>

B. GENERAL MOTOR REQUIREMENTS

The motor shall be an air-cooled induction type with Class F installation, low starting current not to exceed 30 amperes and high starting torque of 8.4 foot-pounds. The motor shall be press-fit into the casting for better heat transfer and longer winding life. Inherent protection against running overloads or locked rotor conditions for the pump motor shall be provided by the use of an automatic-reset, integral thermal overload protector incorporated into the motor. This motor protector combination shall have been specifically investigated and listed by Underwriters Laboratories, Inc., for the application. Non-capacitor start motors or permanent split capacitor motors will not be accepted because of their reduced starting torque and consequent diminished grinding capability. The wet portion of the motor armature must be 300 Series stainless. Oil-filled motors will not be accepted.

The pump/core shall be provided with a mechanical shaft seal to prevent leakage between the motor and pump. The seal shall have a stationary ceramic seat and carbon rotating surface with faces precision lapped and held in position by a stainless-steel spring.

2.6 TANK AND INTEGRAL ACCESSWAY

The tank shall be a wet well design made of high-density polyethylene, with a grade selected to provide the necessary environmental stress cracking resistance. Corrugated sections are to be made of a double wall construction with the internal wall being generally smooth to promote scouring. The corrugations of the outside wall are to be minimum amplitude of 1-1/2 inch to provide necessary transverse stiffness. Any incidental sections of a single wall construction are to be 0.250-inch thick (minimum). All seams created during tank construction are to be thermally welded and factory tested for leak tightness. The tank wall and bottom must withstand the pressure exerted by saturated soil loading at maximum burial...
depth. All station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure.

The tank shall be furnished with one EPDM grommet fitting to accept an 8.00" SDR-35 pipe.

The drywell accessway shall be an integral extension of the wetwell assembly and shall include a lockable cover assembly providing low profile mounting and watertight capability. The accessway design and construction shall enable field adjustment of the station height in increments of 4" or less without the use of any adhesives or sealants requiring cure time before installation can be completed.

The station shall have all necessary penetrations molded in and factory sealed. All discharge piping shall be constructed of 304 Series stainless steel. The discharge shall terminate outside the accessway bulkhead with a stainless steel, 1-1/4-inch female NPT fitting. The discharge piping shall include a stainless-steel ball valve rated for 235 psi WOG; PVC ball valves or brass ball/gate will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The power and control cable shall connect to the pump by means of the provided NEMA 6P Electrical Disconnect (EQD) and shall enter the tank through a field installed watertight strain relief connector supplied by the manufacturer. An electrical junction box shall not be permitted in the tank. Installation of the inlet grommet and cable strain relief shall require field penetration of the tank wall by the installing party. The tank shall also be vented to prevent sewage gases from accumulating inside the tank by means of a factory-provided, field-installed mushroom vent. The station cover shall be factory drilled to accept the mushroom vent. The tank and stainless-steel discharge bulkhead shall be factory-tested to be watertight.

Station tank shall be 48-inches diameter and tank height shall be as shown on the Contract Drawings.

All discharge fittings and piping shall be constructed of polypropylene, EPDM or PVC. The discharge hose assembly shall include a shut-off valve rated for 200 psi WOG and a quick disconnect feature to simplify installation and pump removal. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.

The grinder pump core shall include a factory-installed NEMA 6P electrical quick disconnect (EQD) for all power and control functions. The EQD will be supplied with electrical supply cable (ESC) to connect to the control panel. The EQD shall require no tools for assembly, seal against water before the electrical connection is made, and include radial seals to assure a watertight seal regardless of
tightening torque. Plug-type connections of the power cable onto the pump housing will not be acceptable due to the potential for leaks and electrical shorts. Junction boxes are not acceptable due to the large number of potential leak points. The EQD shall be so designed to be conducive to field wiring as required.

2.7 PUMP DISCHARGE VALVES

The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless-steel discharge piping. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Moving parts will be made of a 300 Series stainless steel and fabric reinforced synthetic elastomer to ensure corrosion resistance, dimensional stability, and fatigue strength. A nonmetallic hinge shall be an integral part of the flapper assembly providing a maximum degree of freedom to assure seating even at a very low back-pressure. The valve body shall be an injection molded part made of an engineered thermoplastic resin. The valve shall be rated for continuous operating pressure of 235 psi. Ball-type check valves are unacceptable due to their limited seating capacity in slurry applications.

2.8 CORE UNIT

The grinder pump station shall have an easily removable core assembly containing pump, motor, grinder, all motor controls, check valve, anti-siphon valve, level controls, electrical quick disconnect and wiring. The core unit shall be installed in the basin by the manufacturer. The watertight integrity of the core unit shall be established by a 100 percent factory test at a minimum of 5 psig.

2.9 CONTROLS

All necessary motor starting controls shall be located in the cast iron enclosure of the core unit secured by stainless steel fasteners. Locating motor starting controls in a plastic enclosure is not acceptable. Wastewater level sensing controls shall be housed in a separate enclosure from motor starting controls. Level sensor housing must be sealed via a radial type seal; solvents or glues are not acceptable. Level sensing control housing must be integrally attached to pump assembly so that it may be removed from the station with the pump and in such a way as to minimize the potential for the accumulation of grease and debris accumulation, etc. Level sensing housing must be a high-impact thermoplastic copolymer over-molded with a thermoplastic elastomer. The use of PVC for the level sensing housing is not acceptable.

Non-fouling wastewater level controls for controlling pump operation shall be accomplished by monitoring the pressure changes in an integral air column connected to a pressure switch. The air column shall be integrally molded from a
thermoplastic elastomer suitable for use in wastewater and with excellent impact resistance. The air column shall be integrally molded from a thermoplastic elastomer suitable for use in wastewater and with excellent impact resistance. The air column shall have only a single connection between the water level being monitored and the pressure switch. Any connections are to be radial sealed with redundant O-rings. The level detection device shall have no moving parts in direct contact with the wastewater and shall be integral to the pump core assembly in a single, readily-exchanged unit. Depressing the push to run button must operate the pump even when the level sensor housing is removed from the pump.

All fasteners throughout the assembly shall be 300 Series stainless steel. High-level sensing will be accomplished in the manner detailed above by a separate air column sensor and pressure switch of the same type. Closure of the high-level sensing device will energize an alarm circuit as well as a redundant pump-on circuit. For increased reliability, pump ON/OFF and high-level alarm functions shall not be controlled by the same switch. Float switches of any kind, including float trees, will not be accepted due to the periodic need to maintain (rinsing, cleaning) such devices and their tendency to malfunction because of incorrect wiring, tangling, grease buildup, and mechanical cord fatigue. To assure reliable operation of the pressure switches, each core shall be equipped with a factory installed equalizer diaphragm that compensates for any atmospheric pressure or temperature changes. Tube or piping runs outside of the station tank or into tank-mounted junction boxes providing pressure switch equalization will not be permitted due to their susceptibility to condensation, kinking, pinching, and insect infestation. The grinder pump will be furnished with a 6 conductor 14 gauge, type SJOW cable, prewired and watertight to meet UL requirements with a factory installed NEMA 6P EQD half attached to it.

The level control system in the quadplex grinder pump station shall be electrically connected to the motor controls using inductive means that require no wiring between compartments. This control system shall be approved to comply with FM3610 Intrinsically Safe Controls. All fasteners throughout the assembly shall be 300 Series stainless steel.

### 2.10 ALARM PANEL

The grinder pump station shall include a NEMA 4X, UL-listed control/alarm panel suitable for wall or pole mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic polyester to ensure corrosion resistance. The enclosure shall include a hinged, lockable cover with padlock, preventing access to electrical components, and creating a secured safety front to allow access only to authorized personnel. The enclosure shall not exceed 10.5” W x 14” H x 7” D, or 12.5” W x 16” H x 7.5” D if certain options are included.
The alarm panel shall contain one 15-amp, double-pole circuit breaker for each pump core power circuit and one 15-amp single-pole circuit breaker for the alarm circuit. The panel shall contain a push-to-run feature, an internal run indicator, and a complete alarm circuit. All circuit boards in the alarm panel are to be protected with a conformal coating on both sides and the AC power circuit shall include an auto resetting fuse.

The alarm panel shall include the following features: visual alarm; push-to-run switch; redundant pump start; and high level alarm capability. The alarm sequence is to be as follows when the pump and alarm breakers are on:

1. When liquid level in the sewage wet-well rises above the alarm level, visual alarms are activated, the contacts on the alarm pressure switch activate, and the redundant pump starting system is energized.

2. Visual alarm remains illuminated until the sewage level in the wet-well drops below the “off” setting of the alarm pressure switch.

The visual alarm lamp shall be inside a red, oblong lens at least 3.75" L x 2.38" W x 1.5" H. Visual alarm shall be mounted to the top of the enclosure in such a manner as to maintain the NEMA 4X rating.

In addition to the above, two high level indicator lights shall be mounted within the enclosure on the duplex panel’s alarm circuit board. During high level alarm indication on duplex stations, the appropriate indicator light will illuminate to indicate which core requires service.

The entire alarm panel, as manufactured and including any of the following options, shall be listed by Underwriters Laboratories, Inc.

- Alarm Activated Dry Contacts – Normally open relay contact closes upon alarm activation.

- Alarm Activated Remote Powered Terminal – Normally open relay contact closes upon alarm activation supplying an output voltage which will be equal to the alarm circuit input supply voltage.

The alarm panel shall include a 20-amp, 250 VAC generator plug receptable with a spring-loaded, gasketed cover suitably mounted to provide access for connection of an external generator while maintaining a 4X rating. Automatic transfer capability shall be provided that automatically transfers from AC power to generator power during a power outage. The automatic transfer must be able to be accomplished without opening the panel to protect the panel internals from the elements (wind, rain, snow, sleet, etc.) and for operator safety. The alarm board
power shall be provided through the generator receptacle during a power outage, allowing the visual alarms to function normally in generator mode. When AC power is restored, the panel shall be automatically transferred back to the AC power mode (manual switches that require operator assistance to switch from one mode to the other can be inadvertently left in the generator position after pumping down the station in generator mode so they shall not be allowed).

A separate, internal breaker rated and approved for use as “service equipment” and acts as a main service disconnect of the grinder pump station shall be provided.

A run-time or hour meter to display the total run-time or operation time for the pump core shall be provided.

An event or cycle counter to display the number of operations of the pump core(s) shall be provided.

2.11 SERVICEABILITY

The grinder pump core, including level sensor assembly, shall have two lifting hooks complete with lift-out harness connected to its top housing to facilitate easy core removal when necessary. The level sensor assembly must be easily removed from the pump assembly for service or replacement. All mechanical and electrical connections must provide easy disconnect capability for core unit removal and installation. Each EQD half must include a water-tight cover to protect the internal electrical pins while the EQD is unplugged. A pump push-to-run feature will be provided for field trouble shooting. The push-to-run feature must operate the pump even if the level sensor assembly has been removed from the pump assembly.

All motor control components shall be mounted on a readily replaceable bracket for ease of field service.

All maintenance tasks for the grinder pump station must be possible without entry into the grinder pump station (as per OSHA 1910.146 Permit-required confined spaces). “Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant’s body breaks the plane of an opening into the space.”

The grinder pump shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled and wired grinder pump station shall be listed by Underwriters Laboratories, Inc., to be safe and appropriate for the intended use.
UL listing of components of the station, or third-party testing to UL standard are not acceptable.

The grinder pump shall meet accepted standards for plumbing equipment for use in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low pressure sewer system applications. As evidence of compliance with this requirement, the grinder pump shall bear the seal of NSF International. Third-party testing to NSF standard is not acceptable.

PART 3 EXECUTION

3.1 GENERAL

Pump assemblies shall be installed as shown on the Drawings and in strict accordance with the manufacturer’s written recommendations.

All grinder pump core units, including level controls, will be delivered to the job site 100 percent completely assembled, including testing, ready for installation. Grinder pump cores will be shipped separately from the tanks. Installing the cores and discharge piping/hose into the tanks is the only assembly step required and allowed due to the workmanship issues associated with other on-site assembly. Grinder pump cores must be boxed for ease of handling.

3.2 FACTORY TEST

Each grinder pump shall be submerged and operated for 1.5 minutes (minimum). Included in this procedure will be the testing of all ancillary components such as, the anti-siphon valve, check valve, discharge assembly and each unit’s dedicated level controls and motor controls. All factory tests shall incorporate each of the above listed items. Actual appurtenances and controls which will be installed in the field shall be particular to the tested pump only. A common set of appurtenances and controls for all pumps is not acceptable. Certified test results shall be available upon request showing the operation of each grinder pump at two different points on its curve. Additional validation tests include: integral level control performance, continuity to ground and acoustic tests of the rotating components.

3.3 STARTUP AND TESTING

The manufacturer shall provide the services of qualified factory trained technician(s) who shall inspect the placement and wiring of each station, perform field tests as specified herein, and instruct the Owner’s personnel in the operation and maintenance of the equipment before the stations are accepted by the Owner.
The services of a trained, factory-authorized technician shall be provided for 1 day. Upon completion of the installation, the authorized factory technician(s) will perform the following test on each station:

A. Make certain the discharge shut-off valve in the station is fully open.

B. Turn ON the alarm power circuit and verify the alarm is functioning properly.

C. Turn ON the pump power circuit. Initiate the pump operation to verify automatic “on/off” controls are operative. The pump should immediately turn ON.

D. Consult the Manufacturer’s Service Manual for detailed start-up procedures.

Upon completion of the startup and testing, the manufacturer shall submit to the Engineer the startup authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed and any installation deficiencies corrected.

*** END OF SECTION ***
SECTION 16010
BASIC ELECTRICAL REQUIREMENTS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. Section Includes:
   1. General requirements for electrical work.
      a. Systems Descriptions
      b. Area classifications
      c. Submittals
      d. Records
      e. Coordination

B. Related Sections include but are not necessarily limited to:
   1. General Conditions.
   2. Division 1 - General Technical Requirements.
   3. Division 2 - Site work.
   4. Division 3 - Concrete.
   5. Division 11 - Equipment.

C. Installation of systems and equipment is subject to clarification as indicated in reviewed shop drawings and field coordination drawings.

1.3 WORK DESCRIPTION
A. Provide the labor, materials, and equipment necessary to furnish, install, and place into operation the power, lighting, instrumentation, control, alarm, and associated electrical systems of this Contract.

B. Provide functioning systems in compliance with manufacturer's instructions, performance requirements specified or indicated, and modifications resulting from reviewed shop drawings and field coordinated drawings.

C. Provide electrical connections to motors, instrumentation, controls, meters, and any other electrical device installed or provided as part of the project.
D. Test, adjust and calibrate equipment and start-up all electrical equipment, instrumentation equipment, and its associated mechanical attachments as necessary to place the project into operation.

E. Mark and identify circuits, equipment, and enclosures with wire numbers, nameplates, and warning signs.

1.4 SYSTEMS DESCRIPTIONS

A. Provide complete 240/120 volt power distribution systems including raceways, wiring, and power supply to equipment:

1.5 AREA CLASSIFICATIONS

A. Areas of the project are classified as “damp” or “wet” as defined in Article 100 - Definitions of the NEC. For the purposes of this specification, areas considered as damp under the NEC shall be considered wet. Areas are also classified as wet as listed below:

1. Areas outdoors or underground.
2. Areas in below grade vaults, manholes, or pullholes.
3. Areas in buildings or structures that are below grade.

B. Hazardous (Classified) Areas: Areas of the project may be classified as hazardous in accordance with NFPA standards. Hazardous (Classified) locations are generally indicated on the plans and/or noted in these specifications.

1. The pump station wetwell is a Class I Division 1 Groups C&D location.
2. Hazardous areas may also be considered corrosive.

C. Corrosive Areas: Corrosive areas are those areas where equipment or devices will be exposed to gases, fumes, vapors, liquids, or other agents that have a deteriorating effect on the device or equipment. Corrosive areas are generally indicated on the drawings and/or noted in these specifications. The following shall be considered Corrosive Locations:

1. Areas below grade in vaults, structures, manholes, pullholes, junction boxes etc.
2. Corrosive areas may also be considered hazardous.

D. Process Areas:

1. Lift station and control panel

1.6 DEFINITIONS

A. Outdoor Areas:
1. Those locations on the Project site where the equipment is normally exposed to wind, dust, rain, snow, or similar natural environmental conditions.

B. Indoor Areas:
   1. Those locations on the Project site where the equipment is normally protected from wind, dust, rain, snow, and similar natural environmental conditions by a building or structure with a complete floor-wall-roof/ceiling enclosure.

C. Shop Fabricated:
   1. Manufactured or assembled equipment for which a NRTL test procedure has not been established.

D. NRTL: Nationally Recognized Testing Laboratory.

E. NEC: National Electrical Code

F. NFPA: National Fire Protection Association

G. NECA: National Electrical Contractors Association

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7, or a full member company of the InterNational Electrical Testing Association (NETA).

1. Testing Agency Field Supervision: Use persons currently certified by NETA or the National Institute for Certification in Engineering Technologies, or equal, to supervise on-site testing specified in Part 3.
2. Comply with NEC for components and installation.
3. Comply with WAC and RCW requirements.

B. Listing and Labeling: Provide products specified in these specifications that are listed and labeled.

1. The Terms "Listed and Labeled": As defined in the NEC, Article 100.
2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.
3. Comply with WAC and RCW requirements.

C. Electrical Component Standard: Provide components that comply with NFPA 70.
D. When a specific code or standard has not been cited, the applicable codes and standards of the following code-making authorities and standards organizations apply:

1. American Association of State Highway and Transportation Officials (AASHTO).
5. ETL Testing Laboratories, Inc (ETL).
6. Insulated Cable Engineers Association (ICEA).
7. Institute of Electrical and Electronic Engineers (IEEE).
8. Illuminating Engineering Society of North America (IES).
10. Joint Industrial Council (JIC).
11. Lightning Protection Institute (LPI).
15. Underwriters Laboratories, Inc. (UL).

E. In case of conflict or disagreement between codes, standards, laws, ordinances, rules, regulations, plans and specifications, or within either document itself, the more stringent condition governs.

1.8 SUBMITTALS

A. See Section 01300.

B. Make submittals as soon as practical after the date of notice to proceed, but prior to purchase, fabrication, or installation of materials or equipment. Make submittals as a single package for each specification section or group related sections in one submittal, with proposed products and materials grouped according to the sections specified in Division 16. Do not split submittals having a common bill of materials. Group Division 16 submittals with Division 13 submittals where submittals have related items.

C. Submit only one manufacturer for each product type. Multiple manufacturers for the same product will be rejected.

D. Submit Electrical System Study Report (ESSR) with or before the submittal information for panelboards, circuit breakers and similar items that may affect or be affected by each study. Equipment that is submitted prior to ESSR will not be reviewed and will be returned as “Not
Reviewed”. Equipment shall not be ordered until the ESSR has been reviewed and approved.

E. Product Data:

1. Provide manufacturer's product technical data, including, but not limited to:
   a. Identification of the manufacturer.
   b. Manufacturer’s product descriptive bulletin.
   c. Current, voltage, nameplate, load, impedance, and other electrical data pertinent to the Project and necessary to assure compliance with the Specifications and Plans.
   d. Equipment weights and dimensions.

2. Clearly indicate by using arrows or brackets precisely what is being submitted on. Designate optional accessories, which are being included and those which are excluded in the submittal.

F. Shop Drawings: Submit Shop Drawings containing detailed drawings, diagrams and instructions for installing, operating and maintaining the material and equipment proposed for installation in the electrical work.

1. See individual Division 16 sections for specific additional requirements.

2. Prior to submittal, coordinate the electrical equipment (particularly switchgear, motor control equipment, switchboards, control panels, and instrumentation) and materials, with other applicable equipment and systems of the contract documents, particularly process equipment and systems. Any modifications to the electrical equipment or other equipment, due to the use or submittal of process or other equipment which is different from that specified, shall be reflected in the submittal of the electrical equipment so affected. (Refer also to section 01300, 1.1 SCOPE and Section 01300, 3.5 PREQUALIFICATION AND SUBSTITUTION.)

   a. Where electrical equipment submitted by the Contractor is a different size than the scaled dimensions shown on the plan, section or elevation drawings of the Contract Documents or requires clearance (for Code compliance, ventilation or other reasons), the Contractor shall mark and submit copies of the Contract Documents (or provide a modified AutoCAD drawing) showing the actual size of the proposed equipment, its placement drawn to scale in red pencil on the copies and any necessary clearances which demonstrate the suitability of
the proposed equipment for the conditions of installation i.e. adequate space, clearance etc.. Submittals which do not meet this requirement will be rejected as incomplete.

b. Where equipment dimensions, layout, conduit connection routing, or conductor and conduit quantities, sizes or types are required to be different than indicated on the Contract Plans to accommodate the submitted equipment, the submittal shall clearly indicate the required changes (increased sizes, ratings of equipment or devices) and shall note that they are being provided to accommodate the submitted equipment without additional cost. The submittal shall indicate increased ratings, sizes. Submittals which do not meet this requirement will be rejected as incomplete.

c. Enclosures for equipment submitted by the Contractor shall be able to accept the quantities and sizes of conduits as shown on the Contract Plans. Submittals which do not meet this requirement will be rejected.

d. Lugs or connections for equipment submitted by the Contractor shall be able to accept the quantities and sizes of conductors as shown on the Contract Plans. Submittals which do not meet this requirement will be rejected.

3. Provide technical drawings as follows:

a. Provide diagrams and drawings similar to the Contract Plans and named in a similar fashion for all technical drawings submittals.

b. Use diagrams and symbols for shop drawings that conform to Joint Industry Conference (JIC) Electrical Standards for Industrial Equipment and/or NEMA, Industrial Control Systems, ANSI and IEEE standards, latest revisions. Prepare drawings on size A, B or D sheets in a format similar to the Contract Plans or other nationally recognized drawing standard.

c. Provide electrical elementary wiring diagrams for the electrical control systems showing the interconnecting wiring of electrical control items, such as motor starters and controllers, control systems, interlocks, switches, programmable controllers, microprocessor controllers, and relays. Use equipment manufacturer’s approved submittal drawings as a reference for motor control centers, variable frequency drives, control panels, field instruments etc.
d. Provide scaled and dimensioned panel or enclosure face layout drawing; panel/subpanel material of construction, dimensions, and weight; conduit and wiring access locations; and material wiring and terminal block drawings for each control panel.

e. Provide schematic interconnection diagrams and/or Process Instrumentation Drawings (PID) diagrams for each separate control system or control panel. Each control diagram shall show a schematic representation of process equipment and locations of switches, meters, automatic valves, and indicators, controllers and recorders. Correct operating settings and ranges for each control instrument shall be marked on these diagrams.

G. Clearly indicate on submittals that equipment or material is NRTL listed or is constructed utilizing listed or recognized components. Where a NRTL standard has not been established clearly identify that no NRTL standard exists for that equipment.

H. Operation and Maintenance Manuals:

1. See specific sections for information specific to each type of equipment which is to be included in O&M manuals.

2. Provide preliminary manuals of each equipment item to the Owner for review no later than when the electrical equipment is submitted for approval and accepted.

3. Provide final manual copies before the equipment is shipped to the job site. For equipment which also requires third party (NETA) testing, provide reports with O&M manuals after installation but before equipment is put into use. Equipment installation will not be accepted without O&M manuals and third party testing reports.

4. Drawings and Bill of Materials included in final manuals shall show “as shipped” wiring and components. Provide updates to the final manuals with Record Drawings of the work upon completion of the work, folded and punched for insertion into the manual after they are reviewed by the Owner.

5. Clearly indicate by using arrows or brackets precisely what has been provided. Designate optional accessories, which are being included and those which are excluded in the manual.

6. Final manuals for the electrical system shall consist of 3-post, expandable metal hinge binders labeled with the job name and the Contractor's name with tab dividers for each major type of equipment.
a. Provide manufacturer's installation, operation, maintenance, and service information for each item of equipment furnished under Division 16.
b. Assemble and index each section listing the contents individually on the tab divider for that section.
c. Compile a spare parts list and a suppliers index for each section and assemble in the section provided.
d. Assemble records of tests, measurements, and calibration settings made for each device. Provide Record Drawings of the work upon completion of the work. Fold, punch, and insert these records into the manual after they are reviewed by the Owner.

1.9 RECORDS

A. Maintain and annotate on the job at all times a separate set of Record Drawings in accordance with the General Conditions. Show changes from the Contract Documents plan drawings including: routing of raceways, stubups, actual equipment and fixture locations, equipment sizes and dimensions and building or structure outline changes. Review the drawings with the Owner as the work progresses whenever requested and provide color copies of record drawings when requested. At the end of the project, forward to the Owner a complete set of drawings marked in red pencil in a manner consistent with the Contract Plans, indicating the changes made on the job.

B. Equipment furnished under this Contract for use on future work and all concealed materials, including conduits, shall be dimensioned from visible and permanent building/structure features or drawn to scale on the record drawings.

C. Record voltage, current, and megohmeter and ground ohmer resistance test measurements made on the electrical work, the size, type and settings of trip units, fuses, and overload relay elements installed in the equipment. Record the setting of all pressure, temperature, level, and similar instrumentation and control devices. When the project is operating, turn over these records to the Owner.

D. Digital Record Photographs

1. Requirements for the Photographs

a. Digital photographs shall be at the native resolution of the camera or smart phone. The file format of the photographs shall be JPEG using the modest compression. (Where the
b. JPEG files shall be stored so that the EXIF (Exchangeable Image File Format) data is maintained. Prior to taking any photographs, the camera time should be set so that EXIF data includes the time and date of the photograph. The JPEG files shall be stored so that the creation (or modification) time and date of the file also reflect the time and date of the photograph. (The EXIF data should be viewable under Windows 7.)

c. The camera shall have a native resolution of at least 8.0 megapixels.

d. Photographs of signs, nameplates, or labels shall be taken using macro modes. The photographs shall be taken so that settings, serial numbers, catalog numbers, order numbers, etc. are legible. The photographs of reflective items shall be taken at an angle to the item to reduce glare.

2. Take photographs of electrical equipment possibly requiring coordination when the equipment arrives on site. The photographs shall include nameplates and labels if available. The equipment shall include but not necessarily be limited to, the following:

   a. Motors
   b. Control Panels

3. Take photographs of conduits prior to concealing them. The photograph files shall be labeled with location or shall contain adequate context to determine location such as a tape measure showing distance from a wall or depth below grade. The photographs shall include the following:

   a. Conduit placement prior to pouring concrete or backfilling
   b. Conduit placement prior to covering walls
   c. Stub up locations prior to placing equipment such as Switchgear, Switchboards or Motor Control Centers.

4. Take photographs of electrical equipment following installation or modification. The photographs shall include nameplates, labels, and similar identifiers. The equipment shall include but not necessarily be limited to, the following:

   a. Motors
   b. Control Panels
c. Instrumentation providing electrical signals including transmitters, sensors, and switches.

d. Panelboards

e. Circuit Protective Devices showing catalog number, serial number and adjustable trip settings.

f. Motor Overload showing catalog number, serial number and adjustable trip settings

5. Photographs shall be supplied to the Owner at least once every day. Photographs shall be supplied to the Owner no later than one day after they are taken. Photographs shall be supplied on optical media (CD-R, DVD-R, or DVD+R), by email or by another method by prior arrangement with the Owner.

1.10 COORDINATION

A. Coordinate and schedule connecting electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

B. Coordinate the interruption of electrical systems to any part of the facility in use by the Owner at least 48 hours before interruption of the system.

C. Coordinate the cutting of existing structures with the new and existing electrical systems. Identify, locate, and protect existing and underground, underslab or embedded conduits/cables where excavation or cutting of existing structures is to be performed.

D. Coordinate installing electrical identifying devices and markings prior to installing acoustical ceilings and similar finishes that conceal such items.

E. Coordinate installing electrical identification after completion of finishing where identification is applied to field-finished surfaces.

F. Coordinate requirements for access panels and doors where electrical items requiring access are concealed by finished surfaces.

G. Coordinate the electrical work with the requirements of equipment provided under other Divisions. Portions of the electrical design are based upon the equipment specified in other Divisions. Where modifications to the specified electrical systems or equipment devices or materials are required to accommodate actual electrical requirements of equipment which is specified under other Divisions of the Contract but which has electrical requirements different from those specified under those Divisions for the equipment, make modifications to the electrical system or systems required to accommodate the equipment, and pay for all such
changes. No additional payment, “extras”, or additive change orders are allowed for changes required to accommodate substitutions or changes proposed by the Contractor.

H. Where changes in the work, or substitutions in material or equipment specified under this Division are proposed, ensure that sizes, weights, openings, etc., are provided that do not require changes in the work outside this Division. If changes to work outside this Division are required to accommodate substitutions or changes proposed by the Contractor, submit complete descriptions of these changes for approval by the Owner, and pay for all such changes. No additional payment or “extras” are allowed for changes required to accommodate substitutions or changes proposed by the Contractor.

I. Coordinate the installation of electrical equipment with other trades:

1. Arrange for the building-in of equipment and materials during structure construction. Arrange for the building in of anchors, supports, sleeves, or other equipment and materials during concrete placement, framing, precasting or other structure construction. Coordinate installing required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed. Install sleeves for cable and raceway penetrations of concrete slabs and walls, except where core-drilled holes are used. Install for cable and raceway penetrations of masonry and gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls. Gypsum wall sleeves may be cut-in after erection if desired.

2. Where equipment or materials cannot be built-in during construction, arrange for chases, slots, box-outs or other openings in the structure, as required to allow installation of equipment after structure construction is complete.

3. Where penetration of completed or permanent construction elements such as walls, beams, ceilings, floors, etc. is required, obtain approval from Owner for penetration (drilling, cutting, shooting, punching) of structural components prior to penetrating the element or component.

4. Accurately locate panelboards, outlets, switches, control stations and similar devices with respect to equipment and the finished work of others. Verify dimensions and locations with the general, civil, structural, mechanical, process, architectural and other Contract plans as well as shop drawings/supplier’s drawings and trades.
5. Coordinate installing large equipment requiring special access openings or positioning prior to closing in the building.

J. Coordinate electrical work with work under other Divisions. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Cooperate in locating equipment to avoid interference with work of others, and plan this work to harmonize with the work of other trades so that all work may proceed as expeditiously as possible. No extras are allowed because of moving work required to avoid interference with work of other trades or contractors.

K. Coordinate connecting electrical circuits to components furnished under other Divisions. Coordinate the location of motors, switches, panel connections and other points of connection with the equipment manufacturers or vendors prior to conduit installation, and route circuits to the actual connection point. Remove and reinstall conduit, outlet boxes and other electrical connections, even if removal and reinstallation of building materials is necessary, where electrical connections are not made to the appropriate equipment location.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store electrical materials and equipment in accordance with the manufacturer’s instructions.

B. Protect materials and equipment from damage, corrosion, or disfiguring; protect nameplates on electrical equipment from defacing. Deliver equipment to their final locations in protective wrappings, containers, and other protection that will exclude dirt and moisture and prevent damage from construction operations. Remove protection only after equipment is safe from such hazards. Field repair of material or equipment made defective by improper storage or site construction damage by other trades is not acceptable.

C. Repair, restore, or replace damaged, corroded and rejected items at no additional cost to the Owner.

D. Provide dry, heated storage for materials and equipment intended to be installed indoors which is not protected by packaging suitable for outdoor storage by the manufacturer and for equipment that requires an electrical connection or heater to mitigate water condensation and like hazards.

E. Keep electrical equipment rooms clean and vacuumed after each day when work is performed in the area. Do not place electrical equipment rated for indoor installation into its final location until this location is weathertight and heated with openings to the outside closed with temporary weather
barriers or with the installation of permanent doors, fans, and ducts. (The final location shall be the electrical equipment location shown on the Contract Plans or otherwise described in the Contract Documents.)

F. Ensure that equipment is not used as steps, ladders, scaffolds, platforms, or for storage - either inside or on top of enclosures.

G. Protect nameplates on electrical equipment from defacing.

H. Repair, restore, or replace damaged, corroded and rejected items at no additional cost to the Owner.

1.12 EXTRA MATERIALS

A. Provide extra materials including spare parts where noted in individual specification sections.

B. Extra materials including spare parts shall be provided with the equipment or like materials at the time the equipment or materials arrive on site. It is not acceptable to provide extra materials after the equipment or materials are delivered to the site or house equipment in a storage area not accessible to the Owner. Provide an inventory and listing of the spare parts to the Owner when the parts (and spares) arrive onsite.

PART 2 — PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Refer to individual Division 16 sections.

   1. Provide equipment, which is of a similar type, made by one manufacturer throughout the project unless otherwise noted in the Specifications.

B. Submit requests for substitution in accordance with Specification Section 01300

2.2 MATERIALS

A. Except as otherwise indicated, provide new materials and equipment which are standard products of manufacturers regularly engaged in production of such equipment. Provide similar items of equipment of the same manufacturer and quality. Where systems are specified, provide components of the system from one manufacturer.

B. Trade names and catalog numbers may be used in the Plans or Specifications to establish quality standards and basis of design:

   1. Other listed manufacturers in the applicable specification sections with equal equipment may be acceptable.
2. If no other manufacturer is listed then any manufacturer of equal equipment may be acceptable.

C. Provide material or equipment approved and labeled for the purpose for which it is to be used by a nationally recognized electrical testing laboratory (NRTL) or other organization acceptable to the State of Washington Department of Labor and Industries.

1. Where NRTL test procedures have been established for the product type, provide electrical equipment approved under that procedure and bearing the NRTL label.

D. Where voltage, current, power, temperature or other ratings are specified that do not correspond to standard ratings of the manufacturer selected by the Contractor, furnish the next rating level which increases the capacity of the device or material in question.

E. Furnish materials, devices, equipment or supplies of materials that are inherently non-corrosive or are coated or covered in a manner, acceptable to the Owner, which renders them non-corrosive. Do not provide materials which contain polychlorinated biphenyls, asbestos or other hazardous or detrimental materials. Do not install materials in a manner, location or construction that produces galvanic action or any other materials corroding or eroding action. Material that may cause rusting or streaking on a building/structure surface shall not be used.

F. Fabricate equipment or devices in the field equivalent in every respect to manufactured items used for the same purpose. Where cutting, drilling, grinding, or similar actions are performed on galvanized or painted metal, regalvanize or repaint, respectively, to match original finish.

G. When equipment is shop fabricated for the Project, use electrical devices and enclosures which are NRTL listed and labeled or recognized.

2.3 ELECTRICAL SYSTEM STUDY REPORT (ESSR)

A. The short circuit calculation and withstand evaluation report, and arc flash studies shall comprise the Electrical System Study Report (ESSR).

B. Create reports for existing, new and modified electrical distribution equipment including the Utility Point of Service and submit reports of equipment submittals for approval. Distribution equipment shall include panelboards etc.

C. Short circuit calculation and withstand evaluation report, and arc flash studies shall be stamped and signed by an electrical engineer registered in the State of Washington.
D. Short circuit calculation and withstand evaluation report, or arc flash studies shall be submitted with or before the distribution and control equipment being provided on the project. It is not acceptable to submit the ESSR after the distribution equipment has been submitted. As a minimum, include the following in the report:

1. Utility source information including primary system & service transformer impedance, X/R ratio, symmetrical and asymmetrical fault currents for 3 phase, line-to-line and line-to-neutral faults.
2. Equipment manufacturer’s information used to prepare the study.
3. Assumptions made during the study.
4. Short circuit calculations listing short circuit levels at each bus.
5. Comparison of short circuit duties of each bus to the bracing and interrupting capacity of the equipment connected to that bus.

E. Elements of short circuit calculation and withstand evaluation report

1. One-line Diagram:
   a. Location and function of each protective device in the system, such as relays, direct-acting trips, fuses, etc.
   b. Type designation, current rating, range or adjustment manufacturer’s style and catalog transformers.
   c. Power, voltage ratings, impedance, primary and secondary connections of all transformers.
   d. Nameplate ratings of all motors and generator with their subtransient reactances.
   e. Sources of short circuit elements such as utility ties, generators, and induction motors.
   f. All significant circuit elements such as transformers, cables, breakers, fuses, reactors, etc.

2. Impedance Diagram
   a. Available MVA or impedance from the utility company.
   b. Bus impedance.
   c. Transformer and/or reactor impedances.
   d. Cable impedances.
   e. Equipment impedances.
   f. System voltages.
   g. Grounding scheme (solid grounding, resistance grounding, or no grounding).

3. Calculations:
a. 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.
b. Calculate the maximum and minimum ground-fault currents.

F. Arc Flash Study
1. Prepare a report summarizing the arc flash study and conclusions or recommendations which may affect the integrity of the electric power distribution system.
2. Determine the incident energy, arc flash boundary, and minimum PPE requirements for locations throughout the studied portions of the power system. Arc flash warning labels are to be produced and attached to the electrical equipment. These labels must indicate approach boundaries, incident energy level, and the minimum PPE that is required when servicing the equipment within the arc flash boundary.
3. As a minimum, include the following in the report:
   a. Assumptions made during the study.
      1) Estimated available fault current for each bus.
      2) Estimated arc fault current for each bus.
      3) Trip settings for all circuit protective devices (protective relays, circuit breaker and fuses) upstream of any bus evaluated.
      4) Material, quantity, size, and length of each conductor of feeder and raceway material of each feeder.
   b. Reduced copy of the one line drawing.
   c. Arc flash evaluations summary spreadsheet
      1) Bus name.
      2) Upstream protective device name, type, settings.
      3) Bus line to line voltage.
      4) Bus bolted fault.
      5) Protective device bolted fault current.
      6) Arcing fault current.
      7) Protective device trip/delay time.
      8) Breaker opening time.
      9) Solidly grounded column.
     10) Equipment type.
     11) Gap.
     12) Arc flash boundary.
     13) Working distance.
14) Incident energy.
15) Suggested electric arc rated PPE rating.

d. Arc flash warning labels printed in color on adhesive backed labels.

4. Provide the arc flash warning labels containing information suggested by NFPA 70E and affix warning labels to each piece of electrical equipment evaluated in the Arc Flash Study. In addition to the information suggested by NFPA 70E, the arc flash warning labels shall also indicate the report date and date of circuit protective device testing (as of the time of the arc flash study). Arc Flash Warning labels shall be installed prior to the Contractor energizing the equipment. The third party testing agency shall confirm the circuit protective devices (protective relays, circuit breakers and fuses) match as recommended in the arc flash study prior to equipment energization.

5. The Contractor shall provide four hours (minimum) of arc flash training to the Owner at an Owner’s designated facility prior to the Contractor energizing the electrical equipment. Arc Flash training shall include consultation with facility manager regarding plant safety plan based on NFPA 70E, Handbook for Electrical Safety in the Workplace.

b. Training shall include site specific features, such as arc flash mitigation procedures, electrically safe procedures, Owner provided personal protective equipment (PPE) use and care procedures.

PART 3 — EXECUTION

3.1 INSTALLATION

A. Make arrangements for and pay for necessary permits, licenses, and inspections.

B. Equipment shall be installed in accordance with the requirements of the National Electrical Code, National Electrical Safety Code, and applicable state and local regulations and ordinances.

C. Install equipment in accordance with the manufacturer's instructions and the NECA “NEIS” (National Electric Installation Standards).
D. Provide on-site testing as listed in individual specification sections. Test results shall be in writing.

E. Equipment Dimensions and Clearances:
   1. Dimensions indicated for electrical equipment and dimensions indicated for the installation of electrical equipment are restrictive dimensions. Verify that equipment will fit within the indicated locations and spaces. Do not use equipment that impinges upon the required clearance, reduces actual clearance, or exceeds the indicated dimensions:
      a. Except as approved in writing by the Owner.
   2. Do not use arrangements of equipment that impinge upon the required clearance, reduce actual clearances or exceed the space allocation.

F. Equipment Access:
   1. Install equipment so it is readily accessible for operation and maintenance.
   2. Access to equipment shall not be blocked or concealed by conduits, supporting devices, boxes, or other items.
   3. Do not install electrical equipment such that it interferes with normal maintenance requirements of other equipment.

G. Install materials and equipment in a manner, location and construction that does not produce galvanic action or any other materials corroding or eroding action. Equipment fabricated from aluminum shall not be placed in direct contact with earth or concrete.

H. Screen openings and seal all raceways into equipment to prevent the entrance of moisture, rodents and insects.

I. Plans indicate the approximate location and arrangement of electrical equipment and the approximate location of other equipment requiring electrical work. The general arrangement of panelboards, outlets and other equipment is diagrammatic and approximate as to locations. To avoid interference with structural members and equipment of other trades, it may be necessary to adjust the intended location of electrical equipment. Where minor changes are required because of structural or finish conditions or for the convenience of the Owner, provide such changes without additional expense to the Owner. Unless specifically dimensioned or detailed, the Contractor may, at his discretion, make minor adjustments in equipment location without obtaining the Owner's approval. Minor adjustments are defined as a distance not to exceed:
1. 1 FT for equipment in any direction in the horizontal plane.
2. Changes in equipment location exceeding those defined above require the Owner's approval.
3. Particular attention shall be paid to door swings, piping, radiation, ductwork, and structural steel:
   a. In general, waste and vent lines and large pipe mains and ductwork shall be given priority for the locations and space shown.
   b. No additional compensation will be allowed for the moving of misplaced outlets, wiring, or equipment.

3.2 DEMONSTRATION
   A. Demonstrate equipment in accordance with Section 01800.
   B. Demonstrate to the Owner that the electrical installation is working by operating all electrical systems and equipment. Simulate control and emergency conditions, artificially where necessary, for complete system tests. Adjust installed equipment for proper operation of all electrical and mechanical components.

3.3 ASSISTANCE
   A. Provide assistance to the Owner during the demonstration or testing of equipment by operating devices and equipment, during construction observation by opening enclosures for inspection, checking record drawing information, and similar tasks, as necessary, in the Owner’s judgment to verify all work provided.

END OF SECTION
SECTION 16050
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes the following:
      1. Supporting devices.
      2. Electrical identification.
      3. Electrical demolition.
      4. Cutting and patching
      5. Cleaning and finish touchup painting.
      6. Testing

1.3 SUBMITTALS
   A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
   B. Product Data: For each type of material specified.
      1. In addition to the requirements of 16010 and Division 1 Specification sections, submit only one manufacturer for each product type. Multiple manufacturers for the same product will be rejected.
   C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
      1. Testing Reports. (See section 3.8 for further information)

1.4 QUALITY ASSURANCE
   A. Refer to Section 16010 paragraph 1.7.
PART 2 — PRODUCTS

2.1 SUPPORTING DEVICES

A. Provide tubing, channel and angle support systems, hangers, sleeves, brackets, fabricated items, and fasteners for secure support of electrical equipment, devices, components and materials:

1. Material:
   a. Wet locations (including outdoors and in below-grade structures): Stainless steel or hot-dipped galvanized.
   b. Class I Hazardous locations and/or Corrosive areas: 304 stainless steel or 40 mil PVC coated galvanized steel.
   c. Other locations: Steel, except as otherwise indicated, protected from corrosion with zinc coating, cadmium plating, or with treatment of equivalent corrosion resistance using approved alternative finish or inherent material characteristics.

B. Conduit clamps: one hole or beam clamps

1. Rigid Steel Conduit: cast iron hot dipped galvanized clamps with cast iron hot dipped galvanized clamp back (AKA foot or spacer).
2. PRMC: cast iron PVC coated or stainless steel clamps with cast iron PVC coated or stainless steel clamp back (AKA foot or spacer).

C. Anchors: stainless steel in wet, hazardous or corrosive areas; cadmium plated or galvanized steel in dry areas.

1. lag screws or Type A tapping screws for wood.
2. Toggle bolts with springhead for light loads in masonry.
3. thru-bolt with fender washers for loads in masonry.
4. toggle bolts with springhead for hollow partitions.
5. epoxy set or self drilling anchors with threaded studs for concrete.
6. clamps or U-bolts for structural steel.
7. Epoxy set or self drilling anchors with extension rods for hollow tile over concrete.
8. hanger rods: 1/4-inch diameter or larger threaded steel, except as otherwise indicated.

D. Sleeves:

1. Wet, hazardous or corrosive areas:

   a. ASTM A 53, Type E, Grade A, Schedule 40, hot dipped galvanized steel, plain ends.
b. Hot dipped galvanized cast iron, with weep rings.

2.2 ELECTRICAL ENCLOSURES

A. Enclosures for use with Electrical Equipment:
   1. Standards:
      a. NEMA ICS-6, Enclosures for Industrial Controls and Systems.
      b. UL 508, Industrial Control Equipment.
      c. UL 698, Industrial Control Equipment for Use in Hazardous Locations.
   2. Provide NEMA enclosure types as indicated on the Contract Documents. Where the enclosure type is not indicated by the Contract Documents provide enclosures as follows:
      a. NEMA 1: Use in electrical rooms and in dry indoor finished areas.
      b. NEMA 12: Use in unclassified (non-hazardous and non-corrosive) indoor locations which are neither wet nor damp.
      c. NEMA 4X: Use in all non-hazardous wet or corrosive locations.
      d. NEMA 7: Use in all hazardous locations.

B. Shop or Factory Finishes:
   1. Exteriors of painted enclosures shall be ANSI gray.
   2. Interiors of painted enclosures shall be either white or light gray.

2.3 ELECTRICAL IDENTIFICATION

A. Manufacturer's Standard Products: Where more than one type is listed for a specified application, selection is Contractor's option, but provide single type for each application category. Use colors prescribed by ANSI A13.1, NEC and these Specifications.

B. Colored Adhesive Marking Tape for Raceways, Wires, and Cables: Self-adhesive vinyl tape not less than 3 mils thick by 1 inch wide.

C. Underground Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape with the following features:
   1. Size: Not less than 4 mils thick by 6 inches wide.
   2. Compounded for permanent direct-burial service.

D. Color-Coding Cable Ties: Type 6/6 nylon, self-locking type. Colors to suit coding scheme.
E. Engraved, Plastic-Laminated Labels, Signs, and Instruction Plates: Engraving stock, melamine plastic laminate punched for mechanical fasteners 1/16 inch minimum thick for signs up to 20 sq. in., 1/8 inch thick for larger sizes. Engraved legend in white letters on black face.

F. Fasteners for Plastic-Laminated and Metal Signs: Self-tapping stainless-steel screws or stainless-steel No. 10/32 machine screws with nuts and flat and lock washers.

G. Wire markers: machine printed, black ink, alpha-numerical identifiers on yellow polyolefin shrink tubing. Kroy K4350 Shrink Tube, or approved equal.

1. Where it is not possible to use shrink tubing (i.e. on pre-terminated cables) it is acceptable to use the following:
   a. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

2.4 TOUCHUP PAINT

A. For Equipment: Provided by equipment manufacturer and selected to match equipment finish.

B. For Non-equipment Surfaces: Matching type and color of undamaged, adjacent finish.

C. For Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 — EXECUTION

3.1 INSTALLATION

A. Comply with NECA's "Standard of Installation."

B. Install the equipment and materials in a neat and workmanlike manner employing workmen skilled in the particular trade and in accordance with the manufacturer’s instructions and industry standards. Maintain adequate supervision of the work by a person in charge at the site during any time that work under this division is in process or when necessary for coordination with other work.

C. Install components and equipment to provide the maximum possible headroom where mounting heights or other location criteria are not indicated. Mount enclosures for individual units at fifty-four inches above floors to centerline of controls.
D. Install items level, plumb, parallel and perpendicular to other building systems and components, except where otherwise indicated.

E. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

F. Give right of way to raceways and piping systems installed at a required slope.

G. Make all penetrations of electrical work through floors, walls and roofs water, rodent, insect and weather-tight.

3.2 ELECTRICAL SUPPORTING METHODS

A. Support electrical equipment, devices and materials from framing members or structure with sufficient clearance for maintaining and servicing.

1. Provide backing plates, and/or framing material to support equipment, devices and materials which are located between the framing members which are part of the building or facility structure.

2. Provide metal structure fabricated of structural shapes such as C-channel or square tubing (not strut channels, unistrut, b-line, etc.) for mounting cabinets, panelboards, disconnects, control enclosures, pull boxes, junction boxes, transformers, and other equipment and devices except where components are mounted directly to structural features of adequate strength.

B. Fastening and Supports: Unless otherwise indicated, securely fasten electrical items and their supporting hardware to the building/structure/support.

1. Use supports as detailed on the Plans and as specified:

   a. Where not detailed on the Plans or specified, use supports and anchoring devices rated for the equipment load and as recommended by the manufacturer.

2. Attach enclosures mounted on equipment with machine screws or clamps as required. Do not drill equipment frames or sheets without permission of the equipment supplier/manufacturer and the Owner. Do not mount safety switches or external equipment to other equipment enclosures, unless enclosure mounting surface is adequately reinforced structurally to accept mounting of external equipment.
3. Base rating and size of supports and anchoring devices on dimensions and weights verified from approved equipment submittals. Attach wall mounted enclosures with a minimum of three fasteners, and more if the manufacturer so recommends.

4. Stand off outdoor wall-mounted equipment and indoor equipment mounted on earth or water bearing walls a minimum of one-quarter inch where enclosures are mounted on walls in wet areas (outdoors, below grades, etc.). Use corrosion resistant spacers such as neoprene, or fiberglass or plastic shim washers to maintain ¼ IN separation between the equipment and the wall.

5. Do not cut, or weld to, building structural members without permission of the owner. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or any other items.

6. Select fasteners so the load applied to any fastener does not exceed 25 percent of the proof-test load.

C. Raceway Supports: Comply with NEC and the following requirements:

1. Conform to manufacturer's recommendations for selecting and installing supports.

2. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U bolts, clamps, attachments and other hardware necessary for hanger assembly and for securing hanger rods and conduits.

3. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

4. Spare Capacity: Size supports for multiple conduits so capacity can be increased by a 25 percent minimum in the future.

5. Support individual horizontal raceways with separate, malleable iron pipe hangers or clamps.

6. In vertical runs, arrange support so the load produced by the weight of the raceway and the enclosed conductors is carried entirely by the conduit supports, with no weight load on raceway terminals.

7. Use double nuts or jam nuts with regular nuts on threaded rods and bolts.

8. Trim rod ends to within ¼ inch after installation of last nut, clamp or similar hardware; smooth cut ends or install cap nut.

D. Provide concrete foundations or pads required for electrical equipment:

1. Floor-mounted equipment shall be mounted on a concrete base except the concrete base shall be shortened in height by the
thickness of the channel base when the equipment is provided with channel bases such as can be provided with control panels, motor control centers and switchboards. Pad shall be poured on top of the finished floor or slab.

2. Install concrete pads and bases according to requirements of Division 3 and per structural plans and specifications.

E. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.

F. Cable supports - provide cable ties and straps for clamping, tying, securing and banding wires and cables in all junction boxes, panelboards and terminal cabinets. Support each circuit independently; group phases of three phase circuits.

3.3 IDENTIFICATION

A. Install labels where indicated and at locations for best convenience of viewing without interference with operation and maintenance of equipment.

B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated on the Plans or required by codes and standards. Use consistent designations throughout the Project.

C. Self-Adhesive Identification Products: Clean surfaces of dust, loose material, and oily films before applying.

D. Tag or label power circuits in enclosures using tags or adhesive marking tape. Identify source and circuit numbers in each cabinet, pull box, pull hole, vault, maintenance hole, junction box, and outlet box. Color coding may be used for voltage and phase indication.

E. Identify Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above power and communication lines. Where multiple lines installed in a common trench or concrete envelope do not exceed an overall width of 16 inches, use a single line marker.

F. Provide engraved phenolic name plates (white with black background) on equipment enclosures giving the name and circuit identification (Panel/Enclosure served from and circuit location or ID) of the enclosed device/equipment in one-quarter inch letters.
G. For panelboards, provide framed, typed circuit schedules with explicit description and identification of items controlled by each individual breaker.

H. Provide electrical danger, caution, warning or safety instruction signs including arc flash signs in accordance with WAC/RCW, WISHA/OSHA and other applicable state/federal safety requirements.

3.4 DEMOLITION

A. Demolish all existing electrical devices and circuits which are noted for demolition. Demolition includes, but is not limited to:

   1. Remove all conduit, conductors, fittings, device boxes, hangers, panels, devices, etc., which are not concealed in the building structure or below grade/slab.

B. Do not remove or damage fireproofing materials. Repair or replace fireproofing removed or damaged.

C. Locate, identify, and protect electrical equipment and materials to remain. Where existing work to remain is damaged in the course of the work, remove damaged portions and install new products of equal capacity, quality, and functionality at no additional cost to the Owner.

D. Remove existing conductors from conduits or other enclosures, unless otherwise indicated, where existing work is to be abandoned in place. Cut and remove buried cable or raceway indicated to be abandoned in place at the point where it stubs up or emerges from burial 12 inches below the surface of adjacent grade or construction; cap and patch surface to match existing finish.

E. Remove demolished material from the Project site and legally dispose of demolished material by wastehaul to approved landfill or recycling facility.

F. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation and/or reconnection. Coordinate the process, mechanical, HVAC, and other equipment scheduled to be relocated and/or reused with other Divisions, and disconnect the equipment from and reconnect the equipment to the electrical systems.

3.5 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for electrical installations. Perform cutting by skilled mechanics of the trades involved.

B. Repair disturbed surfaces to match adjacent undisturbed surfaces.
3.6 CLEANING AND TOUCHUP PAINTING

A. Clean dirt and debris from all surfaces. Thoroughly vacuum the interior of enclosures to remove dirt and debris.

B. Replace nameplates damaged during installation.

C. Apply touch-up paint as required to repair scratches, etc. Field paint in accordance with Section 09900. Thoroughly clean damaged areas and provide primer, intermediate, and finish coats to suit the degree of damage at each location. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.

3.7 TESTING

A. Testing shall be performed by a person currently certified by the InterNational Electrical Testing Association.

B. Additional testing requirements specific to other sections are specified in those sections.

C. Test electrical equipment as described in individual specification sections after installation but before it is energized and placed in service. All equipment shall be tested as recommended by the manufacturer. Report all test results in writing. Where tests disclose a defect in the work, rework or repair equipment which performs unsatisfactorily during or as a result of system testing at no additional expense to the Owner and retest to confirm the rework or repair until retesting confirms that the defect has been corrected. Test in accordance with the manufacturer's installation and testing instructions and the applicable electrical standards (i.e., NEMA, IEEE, ISA, ANSI, or other) for the class of equipment. If equipment or system fails retest, replace it with products which conform with Contract Documents. Continue remedial measures and retests until satisfactory results are obtained. Remedial measures and retests will be done at no cost to the Owner.

D. Test motor driven equipment motors before energization. Insulation test shall consist of megohmeter check phase-to-ground, per IEEE Standard 43, and polarization index test per the manufacturer’s recommendations.

1. Perform load tests of each motor and prepare a written report of the findings showing the following:

   a. Nameplate Ratings (horsepower), (speed), (voltage), (phase), (ampere rating of motor at full load).
   b. Measured Load in amperes on each phase at full speed.

2. For load tests for each pump/blower/process equipment motor:
a. Note the operating conditions at the time of the test.
b. Note the suction and discharge conditions (pressure, water level, temperature, humidity, where such conditions affect load).

3.8 DEMONSTRATION

A. Demonstrate equipment in accordance with Section 16010.

END OF SECTION
SECTION 16060
GROUNDING

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes grounding of electrical systems and equipment and basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.
B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section 16120 for grounding conductor requirements.

1.3 SUBMITTALS
A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
B. Product Data: For each type of component specified.
   1. In addition to the requirements of 16010 and Division 1 Specification sections, submit only one manufacturer for each product type. Multiple manufacturers for the same product will be rejected.
C. Field Test Reports: Indicate and interpret test results for compliance with manufacturer’s published standards and performance requirements. (see Section 3.4 for further information)
D. Operation and Maintenance Manual: At the completion of the project, the operating and maintenance information shall be updated to reflect any changes during the course of construction. The Operation and Maintenance Manual shall include the following:
   1. Approved testing reports.
   2. Product Data
1.4 QUALITY ASSURANCE
   A. Refer to Section 16010 Basic Electrical Requirements 1.7 Quality Assurance
   B. Comply with UL 467, “Grounding and Bonding Equipment”.

PART 2 — PRODUCTS

2.1 GROUNDING AND BONDING PRODUCTS
   A. Governing Requirements: Where types, sizes, ratings, and quantities indicated are in excess of NEC requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

2.2 WIRE AND CABLE GROUNDING CONDUCTORS
   A. Comply with Section 16120 Conductors and Cables.” Conform to NEC Table 8 (Conductor Properties), except as otherwise indicated, for conductor properties, including stranding.
   B. Equipment Grounding Conductors: Insulated with green color insulation.
   C. Grounding-Electrode Conductors: Stranded cable, bare or varnish coated.
   D. Ground Rods: ¾ inch diameter, 10 foot long, copper clad steel.

2.3 CONNECTOR PRODUCTS
   A. Pressure Connectors: High-conductivity-plated units.
   B. Bolted Clamps: Heavy-duty type.
   C. Exothermic-Welded Connections: Provided in kit form and selected per manufacturer’s written instructions for specific types, sizes, and combinations of conductors and connected items. Burndy, Thermoweld, or Cadweld.

PART 3 — EXECUTION

3.1 APPLICATION
   A. Equipment Grounding Conductors: Comply with NEC Article 250 for types, sizes, and quantities of equipment grounding conductors, except where specific types, larger sizes, or more conductors than required by NEC are indicated.
      1. Install insulated equipment grounding conductor with circuit conductors for the items below.
         a. Service and Feeders.
1) Bond the conductor full size to the equipment to which the circuit connects and to any portion of the raceway where it is metallic. Provide boxes or fittings suitable for connecting equipment grounding conductors where metallic conduit transitions to non-metallic.

b. Single or three-phase motor or appliance branch circuits.

c. Flexible raceway runs.

2. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables. Bond the conductor at each end of non-metallic raceway to grounded metallic raceway or equipment.

3. Provide boxes or fittings suitable for connecting equipment grounding conductors where metallic conduit transitions to non-metallic.

B. Separately Derived Systems: Where NEC requires grounding, ground according to NEC Paragraph 250-30.

3.2 INSTALLATION

A. General: Ground electrical systems and equipment according to NEC requirements, except where Plans or Specifications exceed NEC requirements.

B. Ground the secondary electrical system to the building structure, metallic piping systems and supplemental grounding electrodes. Coordinate grounding connections made to the water system with the mechanical work and install bonding jumpers wherever deemed necessary.

3.3 CONNECTIONS

A. General: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.

1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.

2. Make connections with clean, bare metal at points of contact.

3. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
B. Exothermic-Welded Connections: Use for connections to structural steel and for underground connections, except those at test wells. Comply with manufacturer's written instructions. Clean all varnish, oxide, scale, concrete, etc. from conductors before firing joints. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding-Wire Terminations: Make the grounding conductor connections to motors or equipment ten horsepower and above, or twenty amperes and above, with conductor termination and a 5/16 inch minimum bolt tapped to the motor frame or equipment housing. Ground connection to smaller motors and equipment may be made by fastening the conductor termination to a connection box.

D. Noncontact Metal Raceway Terminations: Where metallic raceways terminate at metal electrical enclosures without mechanical and electrical connection to electrical enclosures, terminate each conduit with a metallic, insulating grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in electrical enclosures. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.

E. Connect discontinuous sections of metallic raceway using grounding (bonding) connections at each end of metallic raceway with equipment grounding conductor in the non-metallic portion of the raceway.

F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. Where these requirements are not available, use those specified in UL 486A and UL 486B.

G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by manufacturer of connectors. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

3.4 FIELD QUALITY CONTROL

A. Independent Testing Agency: Engage an independent electrical testing organization to perform acceptance tests described below.

B. Test installation of grounding electrodes and ground rods before electrical circuitry has been energized.

C. Acceptance Tests:
1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.13. Certify compliance with test parameters. Maximum grounding resistance value shall be 3 ohms.

2. Measure ground resistance not less than 2 full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.

3. Measure resistance of equipment grounding connections for service, feeder and motor circuits to ground at the load end with a Biddle ground ohmmeter.

D. Excessive Ground Resistance: Where resistance to ground exceeds specified values, notify Owner. Check connections of affected equipment and conductors. Replace, repair, or correct defective connections or conductors. Provide additional ground rods or larger grounding electrode where the grounding electrode resistance is higher than specified. Revise and retest until resistance is within specifications.

E. Report: Prepare test reports, certified by the testing organization, of ground resistance at each test location. Include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

END OF SECTION
SECTION 16120
CONDUCTORS AND CABLES

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
   B. Requirements for telephone cable, fiber optic cable, and twisted pair structured network cable are included in Section 16740.

1.2 SUMMARY
   A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.3 SUBMITTALS
   A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
   B. Product Data: For each type of conductor or cable specified.
      1. In addition to the requirements of 16010 and Division 1 Specification sections, submit only one manufacturer for each product type. Multiple manufacturers for the same product will be rejected.
   C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
      1. NETA Testing Reports. (See section 3.5 for further information)
      2. Communications Cable Testing Reports. (See section 3.5 for further information)

1.4 QUALITY ASSURANCE
   A. Refer to Section 16010 paragraph 1.7.

PART 2 — PRODUCTS

2.1 BUILDING WIRES AND CABLES
   A. UL-listed building wires and cables with conductor material, insulation type, cable construction, and rating as specified in Part 3 "Wire and Insulation Applications" Article.
B. Thermoplastic Insulation Material: Comply with NEMA WC 5.

C. Cross-Linked Polyethylene Insulation Material: Comply with NEMA WC 7.

D. Ethylene Propylene Rubber Insulation Material: Comply with NEMA WC 8.

E. Conductor Material: Copper.

F. Stranding:
   1. Class B for power applications.
   2. Class C for control applications.

G. Size and Type:
   1. Stranded conductor for No. 10 AWG and smaller gauge 120 VAC branch power circuits; except receptacle, lighting and switch leg circuits which shall be solid conductor.
   2. Stranded conductor for 277 or 480 VAC power circuits, and for any power circuit larger than No. 10 AWG.
   3. Stranded conductors for control circuits.
   4. Grounding conductors: solid conductor in sizes No. 6 AWG and smaller gauge; stranded in No. 4 AWG and larger gauge.

H. Cords: Type SO, size No. 14 AWG or larger.

2.2 INSTRUMENTATION AND SPECIALTY WIRE

A. Specialty wire: As specified in the section describing the system it serves.

2.3 CONNECTORS AND SPLICES

A. Provide UL-listed, factory-fabricated wiring connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

B. Conductor Connections, Splices or Taps:
   1. Solid Conductors size 18 through 10 AWG: Twist on insulated spring connectors.
   2. Stranded Conductors size 18 through 6 AWG: insulated, solid barrel, crimp type plated copper alloy connectors.
   3. Conductors size 4 AWG and larger: plated copper alloy compression splicing sleeves installed by high pressure compression tools and insulated with heat shrink Raychem sleeves.
   4. Outdoors or wet areas: wire splice kits, epoxy resin, hardener, and mold. 3M Scotchcast or equal.
C. Terminations: suitable for 75 degree Celsius rated copper conductor.
   1. Service and feeder circuits: compression indent barrel connectors with one or two hole spade lug ends.
   2. Conductor size 18 through 10 AWG: insulated, solid copper barrel, crimp type, plated copper alloy spade tongue terminal, made for the wire size and terminal on which they are installed and crimped with an approved plier or tool for the connector.
   3. Conductor size 8 AWG and larger: compression, indent, solid copper barrel, one or two hole lugs.

2.4 INSULATING MATERIALS
A. Fillers: Scotchfill, or equal.
B. Tape: 7 mil vinyl plastic tape, logo bearing, Scotch 33+, or equal.

PART 3 — EXECUTION

3.1 EXAMINATION
A. Examine raceways and building finishes to receive wires and cables for compliance with requirements for installation tolerances and other conditions affecting performance of wires and cables. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRE AND INSULATION APPLICATIONS
A. Service/Feeders: Type USE/RHW/RHH insulated, stranded conductors, in raceway.
B. Branch circuits: Type USE/RHW/RHH insulated, stranded conductors, in raceway except Type THHN/THWN insulated, solid conductors, may be used indoors, above grade only, for 120 volt lighting and receptacle branch circuits in sizes #12 AWG and #10 AWG.
C. Equipment Grounding Conductors: Same type insulation and conductor as the circuit conductors supplying the equipment to be grounded.
D. Grounding Conductors (other than equipment grounding conductors): bare copper with varnish coat.

3.3 INSTALLATION
A. Install wires and cables in raceway system, according to manufacturer's written instructions and NECA's "Standard of Installation", after raceway system is complete, and following "Examination" article of this section. Where existing conductors or cables are removed and later repulled through new or existing conduits, test the conductors after each pulling.
operation, and replace the conductors or cables with new conductors or cables if the test results are not acceptable per NETA standards.

B. Provide individual neutral conductors for each 120 volt circuit. Common neutral conductors for multi branch circuits are not permitted unless specifically noted and shown on the plans.

C. Install service, feeder, motor, control, instrumentation, communication and signaling circuits continuously without splices from equipment terminal to equipment terminal or motor lead. 120 volt single phase branch circuits may be spliced or connected at taps or connection for outlet devices. Do not splice circuits at other locations without written permission from the Owner.

D. Color code conductors as follows:
   2. 240/120, three phase systems:
      a. Phase A - black
      b. Phase B - red
      c. Neutral - white
   3. Use wire with insulation of required color for conductors of No. 8 AWG and smaller. For wire larger than No.8 AWG which is not available in specified colors, use self-adhesive, wrap-around cloth type markers of solid colors to code the conductors. When conductors are marked in this manner, mark each conductor at all accessible locations such as panelboards, junction boxes, pullboxes, pullholes, auxiliary gutters, outlets, switches, and control centers.
   4. Do not use white, gray, or green color for any power, lighting, or control conductor not intended for neutral or grounding purposes. Connect power circuit conductors of the same color to the same phase throughout the installation. Viewing all equipment from the front, make connections so phase color sequence is in the same order as that for panelboards, switchboards, motor control centers, etc. If the phase order of the wires must be reversed to accommodate motor rotation, the adjustment shall be made at the motor terminal box or for cord connected equipment only, at the load side of the safety disconnect switch. Reversing the phase order at the motor controller or disconnect switch is not acceptable.

E. Install wiring to equipment neutral and grounding blocks on the bottom or furthest back row first. Leave unconnected blocks accessible for future neutral or grounding connections.
F. Leave six inches or more of free conductor at each connected device or equipment terminal and nine inches of free conductors at each unconnected outlet. Tape free ends of conductors at unconnected outlets and coil neatly in outlet box.

G. Install wires neatly in enclosures. Bend or form wires in neat runs from conduits to terminals. Arrange wires so that they may be grouped by conduit or function in the enclosure. Install cable ties and straps to support and bundle wires in enclosures. Arrange wires to allow wire tags and numbers to be easily read without bending or flexing wiring.

H. Install grounding conductors according to Section 16060.

I. Pulling Conductors:
   1. Make all cable pulls by hand. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, or wrapping extra conductor into an eye, that will not damage cables or raceway.
   2. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values. Install pullboxes or pull fittings where necessary to prevent exceeding manufacturer's recommendations.
   3. Cut cable or conductor ends off after pulling and clean all lubricant and/or pulling compound from conductors before terminating.

J. Support cables according to Section 16050.

K. Identify wires and cables according to Section 16050 "Basic Electrical Materials and Methods" and as follows:
   1. For power circuits:
      a. At each connection, except at motors, tag for phase rotation and circuit number.
      b. At each motor tag for winding lead numbers. Make all phase rotation changes for motor direction changes at the motor to maintain correct color phase sequence in equipment.
      c. In each enclosure or box where more than one ungrounded power conductor is spliced or connected, tag for panelboard identification and pole number.
   2. Labels shall identify circuits and signals. In the description below, equipment tag ID refers to the motor driven device controlled by the motor controller such as a Neat Polymer Pump (16NPP01).
The device tag ID refers to a piece of ancillary equipment associated with the equipment reference by the tag ID, such as a disconnect switch (1DS) or solenoid valve (1SV). Labels shall be identified as follows unless otherwise noted in the specifications:

a. Wires from motor control centers to devices shall be labeled with the device tag (MCC terminal #)(device terminal number) – for example, 05SV01(8)(3) - would reference a wire to solenoid valve 05SV01 landed on terminal 8 in the motor control center and landed on terminal 3 at the solenoid valve (the device end may not have a terminal number, in that case the wire label would only have one terminal label 05 SV01 (8) in the above example).

b. Wires from control panels to devices shall be labeled with the device tag (CP terminal #)(device terminal number) – for example, 05MFM01(0501)(1) - would reference a wire to magnetic flow meter 05MFM01 landed on terminal 0501 in the control panel and terminal 1 at the flowmeter.

c. Wires from motor control centers to control panel/MCC Remote I/O Sections shall be labeled with Equipment tag ID (MCC terminal #) (CP terminal #) – for example, 16NPP01(8) (0301) - would reference a wire for pump 16NPP01 landed on terminal 8 in the motor control center and continued to terminal 0301 in the control panel.

d. Wires from device to device (i.e. disconnect switches to control stations) shall be labelled with Device #1 tag (device #1 terminal number)-device #2 tag (device #2 terminal number) – for example, 1DS(1)-1CS(4) would reference a wire landed on terminal 1 on a disconnect switch and continued to terminal 4 in a control station.

e. 2-conductor and 3-conductors cables to devices shall be labeled with the device tag located on a label on the outer insulation. The individual conductors will have only the motor control center/control panel terminal and the device terminal. As an example for a flowmeter circuit, “05MFM01” would be located on the outer insulation of the 2-conductor cable to flowmeter 05MFM01 and (S140)(1) would be located on one of the conductors, which would represent terminal S140 in the control panel and terminal 1 at the flowmeter.
3.4 CONNECTIONS

A. Use the proper high pressure compression tool for terminating indent type compression connectors or terminations on conductors of size #8 AWG or larger gauge. Use an approved pliers or tool for crimping connectors for conductors of size #10 AWG or smaller gauge.

B. Make splices or tap connections with filler, and tape that possess equivalent or better mechanical strength and insulation ratings than conductors being connected. Insulate to same thickness as connectors being spliced or connected.

C. Connect outlets and components to wiring and to ground as indicated and instructed by manufacturer, and in compliance with other Sections of Division 16.

D. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform field quality-control testing.

B. Test installation of wires and cables before electrical circuitry has been energized.
   1. Test wire and cable installation, when complete and seventy-two hours prior to energization of the system.
   2. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.3.2. Certify compliance with test parameters.
   3. Remove and replace conductors with visible damage on conductor insulation ends due to installation in an incomplete or damaged conduit system such as, but not limited to, missing bushings or burrs on conduit ends.
   4. terminated on a patch panel.

C. Correct malfunctioning conductors, cables, and connections at Project site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new materials and retest.

END OF SECTION
SECTION 16130
RACEWAYS AND BOXES

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

   1. Raceways include the following:
      a. RMC.
      b. PRMC.
      c. FMC.
      d. LFMC.
      e. PVC.
      f. RTRC.

   2. Boxes, enclosures, and cabinets include the following:
      a. Device boxes.
      b. Outlet boxes.
      c. Pull and junction boxes.
      d. Cabinets and hinged-cover enclosures.

   B. Related Sections include the following:
      1. Section 16050 for raceway and box supports.
      2. Section 16120 for conductors installed in raceways and boxes.
      3. Section 16140 for devices installed in boxes.

1.3 DEFINITIONS
   A. FMC: Flexible metal conduit.
   B. LFMC: Liquidtight flexible metal conduit.
   C. RMC: Rigid metal conduit.
   D. PRMC: PVC coated rigid metal conduit.
   E. PVC: Rigid polyvinyl chloride conduit.
   F. RTRC: Reinforced thermosetting Resin Conduit (Fiberglass).
G. NPT: National Pipe Thread
H. NEMA: National Electrical Manufacturers Association
I. ANSI: American National Standards Institute

1.4 SUBMITTALS
A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
B. Product Data: For each type raceway and box specified.
   1. In addition to the requirements of 16010 and Division 1 Specification sections, submit only one manufacturer for each product type. Multiple manufacturers for the same product will be rejected.

1.5 QUALITY ASSURANCE
A. Refer to Section 16010 Paragraph 1.7.

1.6 COORDINATION
A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.
B. Coordinate conduit stub up locations with approved equipment shop drawing submittals prior to locating conduit stub ups in the slab. Locate conduit stub ups per equipment manufacturer’s recommendations and the requirements of the Plans and Specifications.

PART 2 — PRODUCTS

2.1 METAL CONDUIT AND TUBING
A. RMC:
   1. Conduit: Hot dipped galvanized steel with threaded ends meeting ANSI C80.1.
   2. Couplings: unsplit, NPT threaded steel cylinders with galvanizing equal to the conduit.
   3. Nipples: same as conduit, factory made through eight inches, no running threads.
B. PRMC (PVC-Coated Rigid Steel Conduit and Fittings): NEMA RN 1.
   1. Minimum 40 mil exterior PVC coating, and 2 mil interior urethane coating.
   2. Manufacturers:
a. RobRoy Industries  
b. Thomas & Betts Ocal  
c. KorKap  

C. FMC:  
2. Connectors: galvanized steel, screw in or clamp style, approved for grounding.  

D. LFMC:  
1. Conduit: flexible, galvanized steel convolutions forming a continuous raceway, covered by a liquid tight PVC layer. Electri-Flex Type LA or American Sealtite, Type UA. The use of thinwall conduit is not permitted.  
2. Connectors: Hot-Dip galvanized steel or hot-dip galvanized malleable iron, screw in ferrule which covers the end of the conduit inside and out, insulated throat, approved for grounding. Provide with gland nut with integral ground lug for connectors to motors rated 10 horsepower and larger. O-Z/Gedney Type 4Q series, or approved equal.  

2.2 RIGID NONMETALLIC CONDUIT (RNC)  
A. Rigid nonmetallic conduit (RNC) includes PVC and RTRC per NEC Article 352 (Rigid Polyvinyl Chloride Conduit: Type PVC) and NEC Article 355 (Reinforced thermosetting Resin Conduit: Type RTRC) and as follows:  
1. PVC:  
   a. NEMA TC 2, Schedule 40 or 80 PVC.  
   b. Fittings: NEMA TC 3; match to conduit or conduit/tubing type and material.  
2. RTRC:  
   a. NEMA TC 14  
   b. UL 1684  

2.3 OUTLET AND DEVICE BOXES  
A. Exposed outdoors, below grade, wet locations, or exposed in indoor locations in process areas which are not hazardous: galvanized, cast iron alloy box, one piece, with threaded holes or hubs, integral mounting lugs and with neoprene gaskets and galvanized cast iron alloy cover (covers shall be of the same material and finish as the device box).
B. Exposed corrosive locations: PVC coated cast iron or stainless steel boxes with threaded hubs, integral mounting lugs and PVC coated covers. Covers shall be of the same material and finish as the device box.

C. Exposed hazardous locations (whether dry, wet, or corrosive): explosion proof, galvanized, cast iron alloy box, one piece, with threaded holes or hubs, integral mounting lugs and with neoprene gaskets and galvanized cast iron alloy cover. Covers shall be of the same material and finish as the device box.

2.4 PULL AND JUNCTION BOXES

A. Exposed outdoors, below grade, wet locations, or exposed in indoor locations in process areas which are not hazardous: Cast-Metal Boxes meeting NEMA FB 1, with gasketed screw down cover. Boxes 6”x6”x4” or larger may be code gauge fabricated stainless steel continuously welded at seams and with rubber gasketed covers. Hoffman or equal. Covers shall be of the same material and finish as the device box. Device boxes associated with control stations shall be the same material as the disconnect and control station enclosure.

B. Exposed corrosive locations: PVC coated cast iron or stainless steel boxes with threaded hubs, integral mounting lugs and PVC coated covers.

C. Exposed hazardous Locations: locations (whether dry, wet, or corrosive): explosion proof, galvanized, cast iron alloy box, one piece, with threaded holes or hubs, integral mounting lugs and with neoprene gaskets and galvanized cast iron alloy cover. Covers shall be of the same material and finish as the device box.

2.5 MISCELLANEOUS FITTINGS

1. NEMA FB 1; compatible with conduit/tubing materials.
2. Deep socket PVC coupling for connecting RTRC to PVC conduit runs.
3. Conduit bodies shall be cast or malleable iron, hot dipped galvanized. Covers shall be of the same material and finish as the fitting. Appleton, Crouse Hinds, OZ Gedney, or equal.
4. Conduit bushings shall be malleable iron. Locknuts and sealing locknuts in sizes smaller than 2 ½” shall be steel. Locknuts and sealing locknuts in sizes 2 ½” and larger shall be malleable iron. Appleton, Cooper Crouse Hinds, OZ Gedney, Thomas Betts or equal.
5. Conduit sealing bushings shall be OZ Gedney Type CSM series. Cabinet sealing bushing shall be OZ Gedney Type GRK.
6. Conduit sealing fittings, drains and breathers shall be OZ Gedney Type EY and DB, or equal Appleton or Crouse Hinds.
7. Cord grip connectors shall be OZ Gedney CGA, or equal Appleton or Crouse Hinds.
8. Conduit spacers for direct buried or encased in concrete raceways shall be Underground Devices, Inc. “Wunpeece Spacers” or equal.

PART 3 — EXECUTION

3.1 EXAMINATION

A. Examine surfaces and spaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 WIRING METHODS

A. Install RMC or PRMC unless other raceways are shown on the Contract Documents, are required by Code, or are permitted under these specifications.

B. Where the manufacturer of equipment provided by the Contractor recommends or requires RMC for circuits associated with the equipment, provide RMC or PRMC for the entire circuit, even if other conduit types would otherwise be permitted under these specifications.

C. Outdoors: Use the following wiring methods:

1. Exposed: RMC or PRMC.
2. Exposed in corrosive locations: PRMC
3. Concealed in concrete slab: RNC or PRMC
4. Below slab-on-grade, or in earth (backfill): RNC or PRMC.
   a. Use PRMC where metal conduit is indicated on the Plans for underground circuits. It is not permissible to use RMC in outdoor, below grade locations.
   b. At stub up locations and at entrances to buildings or other locations where the raceway changes from buried to exposed conditions, transition conduit as described in paragraph 3.3:

5. Connection to Vibrating Equipment: LFMC. Do not use flexible conduit in place of elbows, offsets, or fittings to attach to equipment. See below for further requirements for the installation of raceway terminations and connections using flexible connections.
3.3 INSTALLATION

A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions. Provide a raceway for each circuit indicated. Do not gang raceway into wireways, pullboxes, junction boxes, etc., without specific approval. Do not group home runs or circuits without approval of the Owner.

B. Minimum Raceway Size: 1 inch trade size for underground or imbedded circuits, 1 inch trade size for communications circuits, 3/4 inch trade size for other circuits.

C. Provide PRMC or RTRC elbows for all RNC runs where conduit transitions horizontally or vertically. Where RTRC is used in PVC runs, provide elbows with factory attached socket PVC couplings. Coordinate the radius of all conduit bends, whether factory elbows or bends, or field bends, with the manufacturer’s minimum bend radius for the installed cable or conductor.

D. Install conduit as a complete, continuous system without wires, mechanically secure and electrically connected to all metal boxes, fittings and equipment. Blank off all unused openings using factory made knockout seals.

E. Install conduit exposed unless shown otherwise on the Plans.

F. Do not install raceway in the slab or below grade/slab unless specifically shown on the Plans as being installed in the slab or below grade/slab.

G. Run parallel or banked raceways together, on common supports where practical. Use factory elbows where elbows can be installed parallel; otherwise, provide field bends for banked raceways. Make bends in parallel or banked runs from same centerline to make bends parallel.

H. Wherever practical, route conduit with adjacent ductwork or piping and support on common racks. Base required strength of racks, hangers, and anchors on combined weights of conduit and piping.

I. Exposed Conduit Installation:
   1. Install exposed raceways in lines parallel or perpendicular to the building or structural members or the structure lines except where the structure is not level. Follow the surface contours as much as practical. Do not install crossovers or offsets that can be avoided by installing the raceway in a different sequence or a uniform line. Provide adequate headroom.
   2. Support exposed raceways as specified in Section 16050.
a. Provide anchors, hangers, supports, clamps, etc. to support the raceways from the structures in or on which they are installed. Do not space supports further apart than ten feet.

b. Provide sufficient clearance to allow conduit to be added to racks, hangers etc. in the future.

c. Support raceway within three feet of every outlet box, junction box, gutter, panel, fitting, etc.

d. Raceway in "wet" areas shall have clamp backs (spacers) or other appropriate spacers to hold them a minimum of ½ inch off the surface. Horizontal runs on the roof surface shall be blocked at every 5 feet to hold them a minimum of 2 inches above roof surface.

J. Raceway concealed above ceilings, in furred spaces, under slab, embedded in slab etc., which are normally inaccessible may be run at angles not parallel to the building lines.

K. Install concealed raceway below the slab in a shallow trench. Do not install conduit in slab unless shown to be installed in slab on Contract Document drawings. The top of conduits installed in the shallow trench shall be at least 3 inches below the bottom of the slab. Do not run conduit just below the slab or at the edge of the slab.

L. Underground raceway runs

1. Run as straight as practicable. Make changes in direction and/or grade of sufficient length to allow a gradual change (three foot radius minimum). Make slight offsets with five degree couplings.

2. Run trench true, and clear of stones or soft spots. Place three inches of fine sand in the trench bottom and tamp into place. Provide preformed plastic spacers on top of sand spaced five feet on center where more than one conduit is placed in a trench. After the raceway is placed in the trench, backfill to six inches above top of conduits with sand, then with native earth backfill passing a No. 8 sieve, free of stones. Do not tamp on top of the conduit until the final backfill is placed. Tamp or water settle the final backfill to finish grade. Compact the backfill as specified under Division 2.

3. Mark direct buried conduit by an underground line warning tape as described in Section 16050.

4. Clean underground and embedded conduit two-inch size and above with a wire brush or swab, followed by a mandrel not less than twelve inches long and approximately one-quarter inch smaller in diameter than the conduit internal diameter.
5. Where raceway exits from grade or concrete, provide the following:
   a. For runs exiting from grade, slabs or encasement, transition to one of the following for a minimum of 24" inches of raceway (including elbows) before exiting and for vertical runs, a minimum of 3" beyond the exiting point:
      1) PRMC
      2) RMC taped with a half lapped wrap of Scotchrap No. 51 plastic tape (40 mil total thickness). The conduit shall be wrapped a minimum of 3" above the exiting point and at least 24” of raceway below the exiting point (at a minimum, the rigid steel elbow and conduit located at/above the exiting point shall be fully wrapped).
      3) RMC coated with Kopper’s Bitumastic No. 505.
      4) RTRC (use for elbow only for PVC conduit runs)
   b. Do not extend plastic conduit (PVC or RTRC) into the slab, above grade, into buildings or into equipment.
   c. For equipment to be moved into place at a later date, install a coupling flush with the floor slab and a threaded flush plug.

M. Under slab raceway runs
   1. Install conduits under the slab in a trench. Place three inches of fine sand in the trench bottom and tamp into place. After the raceway is placed in the trench, backfill to three inches above top of conduits with sand, then with compacted backfill up to the compacted top course. Provide compacted top course per structural requirements. Do not tamp on top of the conduit until the final backfill is placed. Compact the backfill as specified under Division 2.
   2. Where raceway exits from under slab runs, provide the following:
      a. For runs exiting from under slab, transition to one of the following (including elbows) before exiting and for vertical runs, up to a minimum of 3" beyond the top of the exiting point:
         1) PRMC
         2) RMC taped with a half lapped wrap of Scotchrap No. 51 plastic tape (40 mil total thickness). The conduit shall be wrapped to a minimum of 3" above the exiting point and at a minimum, the rigid steel elbow and vertical conduit located below/above the exiting point shall be fully wrapped.
         3) RMC coated with Kopper’s Bitumastic No. 505.
4) RTRC (use for elbow only for PVC conduit runs)

b. Do not extend plastic conduit (PVC or RTRC) into the slab, above grade, into buildings or into equipment.

c. Arrange conduit so that no curved portion of conduit bends are installed in the slab. All conduit bends including elbows shall be installed below the slab.

d. For equipment to be moved into place at a later date, install a coupling flush with the floor slab and a threaded flush plug.

N. Bend and offset metal conduit with hickey or power bender, standard elbows, conduit fittings or pull boxes. Bending of PVC shall be by hot box bender and, for PVC two inches in diameter and larger, expanding plugs. Make elbows, offsets and bends uniform and symmetrical. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.

O. Support conduit connections to motors or other equipment independently of the motor or equipment. Rise or drop vertically to the nearest practicable point of connection to the unit. Run vertical drops to the floor and fasten with a floor flange. Unsupported drops are not permitted. Horizontal runs on the floor or on equipment are not permitted. Drop or rise at the appropriate closest location. Run conduit on equipment frames or supports to closely follow the contours of the equipment. Locate conduit to maintain access to all equipment services and adjustment points and so as not to interfere with operation of the equipment.

P. Connect conduit to hubless enclosures, cabinets and boxes with double locknuts and with insulating type bushings. Use grounding type bushings where connecting to concentric or eccentric knockouts. Connect to enclosures, boxes and devices from below in wet areas. Make conduit connections to enclosures at the nearest practicable point of entry to the enclosure area where the devices are located to which the circuits contained in the conduit will connect.

Q. Penetrations for raceways:

1. Do not bore holes in floor and ceiling joists outside center third of member depth or within two feet of bearing points. Holes shall be one inch diameter maximum.

2. Penetrate through building or structure wall or surfaces with a PVC or sheet metal sleeve with at least ¼" greater interior diameter (ID) than conduit exterior diameter (OD), set flush with walls, pack with fiberglass and seal with silicone sealant and cover with escutcheon plate.
3. Penetrate through poured-in-place or below grade walls and free slabs, with a sleeve. Set sleeves flush with forms or edges of slab/wall. Pack around conduit with fiberglass and seal with silicone sealant. For penetrations below exterior grade, provide a floor or wall sealing fitting on the interior of the building wall.

4. Penetrate through roofs with core drill hole ½ inch to 1 inch larger than conduit, flash with neoprene, caulk conduit in place and seal with silicone sealant under flashing. Sleeve roof opening where non-concrete roof construction occurs.

R. Raceway terminations and connections:

1. Join raceways with fittings designed and approved for the purpose and make joints tight.

2. Make threaded connections waterproof and rustproof by application of a watertight, conductive thread compound. Clean threads of cutting oil before applying thread compound.

3. PRMC: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating after installing conduits.

4. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.

5. Cut ends of conduit square with hand or power saw or pipe cutter. Ream cut ends to remove burrs and sharp ends. Make conduit threads which are cut in the field to have same effective length and same thread dimensions and taper as specified for factory-cut threads.

6. Flexible Connections: Use maximum of 18 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement, such as motors, transformers, generators or similar equipment or equipment such as instruments which must be removed for service. Install flexible conduit in a straight length. Do not use flexible conduit in place of elbows, offsets, or fittings to attach to fixed equipment such as panels, enclosures or switches. With the Owner’s approval, longer lengths of flexible conduit may be used for connection to items of equipment which require longer lengths for installation (i.e. 2” conduits and larger) and removal of the equipment for maintenance or replacement purposes. Recessed and semi-recessed lighting fixtures may use up to 6 feet of flexible conduit, or 11 feet of pre-manufactured lighting “whips”. Use liquid-tight flexible metal conduit in wet or damp locations. Do not strap flexible conduit to structures or other equipment.
7. Provide double locknuts and insulating bushings at conduit connections to boxes and cabinets. Align raceways to enter squarely and install locknuts with dished part against the box. Use grounding type bushings where connecting to concentric or eccentric knockouts. In “wet” areas, use locknuts of the sealing type, use Myers hubs or O-Z/Gedney rain tight conduit hubs.

8. Connect conduits to enclosures at the location of the gutter or device to which the contained conductors will be routed. Route or stub conduits to motors and/or mechanical equipment directly to the connection and locate as close as possible to equipment terminals.

9. Where a device manufacturer requires a device or junction box to permit multiple conduit entries into the device from a single conduit, provide the device or junction box at no additional cost to the Owner.

10. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.

11. Place conduits at panelboards in the rear line of knockouts where possible. Install spare conduits from flush-mounted panels up to accessible spaces. Install a minimum of one spare three-quarter inch conduit for every three single-pole spare breakers or spaces, or fraction thereof (three conduits minimum).

S. Keep conduits clean and dry and close each end left exposed. When blowing through conduits, cover electrical components installed in enclosures to avoid blowing dirt or water into equipment. Use temporary closures to prevent foreign matter from entering raceways.

T. Install pull wires in empty raceways and in empty innerduct. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 8 inches of slack at each end of the pull wire.

U. Seal interior of raceways around conductors at (1) hazardous locations, (2) where conduits pass from warm to cold locations, such as the boundaries of air conditioned, heated or refrigerated spaces and where conduits enter or exit buildings from outdoor areas, including underground ducts or conduit runs or (3) where otherwise required by NFPA 70.

1. Methods used to seal interior of raceways around conductors shall be as follows:
a. Install raceway sealing fittings according to manufacturer’s written instructions. Locate fittings at suitable, approved, and accessible locations. For hazardous locations, fill them with UL-listed sealing compound. For non-hazardous areas, fill with expansive foam or Ducseal. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Boxes that have electrical devices installed (switches, receptacles etc.) shall not be used in place of a dedicated steel box for installation of the fitting that will house the sealing material.

b. Seal conduits using expansive foam or Ducseal where conduits enter through the bottom of motor control centers, switchboards, panelboards and control panels.

c. Seal conduits using expansive foam or Ducseal for individual items of equipment where it is not practical to install raceway seal fittings such as building mounted lighting fixtures and convenience receptacles.

d. As otherwise required by NFPA 70.

V. Device and Outlet Boxes

1. Boxes in wet areas shall be surface mounted on channel iron stanchions or set with spacers on walls and shall be attached with clamps or feet (drilling or punching enclosure to mount through side of box or enclosure is not permitted), and they shall have all conduit connections from below arranged to drain moisture away with suitable EYD drains installed at the bottom. It is not permissible to install conduits into the top and side of the boxes at exterior locations unless otherwise noted on Plans.

2. Attach exposed (surface mounted) boxes to building structure with a minimum of two fasteners. Provide attachments to withstand a force of one-hundred pounds applied vertically or horizontally.

3. Arrange boxes used in wet areas to drain moisture away from devices or enclosures for equipment and make conduit connections from below.

4. Set floor boxes level and adjust to finished floor surface.

W. Install wall or surface mounted enclosures and cabinets plumb. Support at each corner.
3.4 PROTECTION

A. Provide protection and maintain ambient conditions (in a manner acceptable to manufacturer and Owner) that ensure coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.5 CLEANING

A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.
SECTION 16140
WIRING DEVICES

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes various types of receptacles, connectors, switches, and finish plates.

1.3 SUBMITTALS
   A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
   B. Product Data: For each type of wiring device specified.
      1. Specification sheets (cut sheets) of all proposed equipment (indicate the exact devices that are to be supplied).
      2. In addition to the requirements of 16010 and Division 1 Specification sections, submit only one manufacturer for each product type. Multiple manufacturers for the same product will be rejected.
   C. Operation and Maintenance Manual: At the completion of the project, the operating and maintenance information shall be updated to reflect any changes during the course of construction. The Operation and Maintenance Manual shall include the following:
      1. Maintenance and Repair Manuals (specified in Division 1).
      2. Product Data

1.4 QUALITY ASSURANCE
   A. Refer to Section 16010 Basic Electrical Requirements 1.7 Quality Assurance.
PART 2 — MATERIALS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include the following:

1. Wiring Devices:
   a. Cooper Wiring Devices.
   b. Bryant Electric, Inc.
   c. Hubbell Inc.
   e. Leviton Mfg. Co., Inc.
   f. Pass & Seymour/Legrand.
   g. Crouse-Hinds
   h. Paragon
   i. Mulberry
   j. Square-D

2. Multi-Outlet Assemblies:
   a. Wiremold Co.

2.2 WIRING DEVICES

A. Comply with NEMA Standard WD 1 “General Color Requirements for Wiring Devices” and NEMA Standard WD 6, "Wiring Devices – Dimensional Specifications"

B. Enclosures: NEMA 1 equivalent, except as otherwise indicated.

C. Color: Ivory except as otherwise indicated or required by Code.

D. Receptacles, Straight-Blade and Locking Type: Except as otherwise indicated, comply with Federal Specification W-C-596, UL Standard 498, "Electrical Attachment Plugs and Receptacles". Receptacles shall be heavy duty specification grade. Provide NRTL labeling of devices to verify compliance.

1. General purpose Convenience Outlets
   a. Duplex receptacle configuration
   b. Nylon face
   c. Staked screw terminals for line, neutral, and ground connections.
   d. Provisions for split bus
   e. NEMA 5–15R or 5–20R
f. Hubbell HBL 5262 or equal

2. Special Purpose Receptacles
   a. Staked screw terminals for line, neutral, and ground connections.
   b. NEMA configuration as indicated.

E. Receptacles, Straight–Blade, Special Features: Comply with the basic requirements specified above for straight-blade receptacles of the class and type indicated, and with the following additional requirements:
   1. Ground-Fault Circuit Interrupter (GFCI) Receptacles: UL Standard 943, "Ground Fault Circuit Interrupters," with integral NEMA 5-20R duplex receptacle arranged to protect only the connected receptacle and no other receptacles connected on the same circuit.

F. Cord and Plug Sets: Match voltage and current ratings and number of conductors to requirements of the equipment being connected.
   1. Cord: Rubber-insulated, stranded copper conductors, with type SOW-A jacket. Grounding conductor has green insulation. Ampacity is equipment rating plus 30 percent minimum.
   2. Plug: Male configuration with nylon body and integral cable-clamping jaws. Match to cord and to receptacle type intended for connection.

G. Wall Plates: Single and combination types that mate and match with corresponding wiring devices. Features include the following:
   1. Color: Matches wiring device except as otherwise indicated.
   2. Plate–Securing Screws: Metal with heads colored to match plate finish.
   3. For non-Architecturally finished areas, in process equipment areas, or electrical rooms: Stainless steel.

H. Weatherproof exterior receptacle device covers shall be constructed entirely of cast aluminum material. The cover which encloses the cord set shall be opaque gray. Product shall be INTERMATIC Model WP1010MC or equal.

I. Device Box Covers: Cast iron to match box to which installed.
PART 3 — EXECUTION

3.1 INSTALLATION

A. Except as otherwise indicated on Plans, surface mount, with long dimension vertical. Mount with grounding terminal of receptacles on bottom.

B. Arrangement of Devices:

1. Group adjacent switches in common boxes under single, multigang cover plates.
2. See Section 16130 for mounting height of devices.
3. Verify locations of outlets and switches in cabinetry with cabinet supplier and cabinetry shop drawings prior to installation.

C. Install switches with the “Off” position down. Install three and four way switches so the load is de-energized when all switch handles are down.

D. Connect phase, neutral, and grounding wires to devices with full loops around screws installed to tighten with tightening of the screw. The use of push-in terminals are not acceptable. Trim insulation to within one-eighth inch of screw terminal.

E. Surface mounted devices and wall plates: Install devices and assemblies plumb, level and secure.

F. Use corrosion resistant devices outdoors.

3.2 GROUNDING

A. Connect receptacle or switch ground lug to device box.

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing:

1. Test wiring devices for proper connections, polarity and ground continuity. Perform this testing with testing equipment designed for testing polarity and connections.
2. Operate each operable device at least 6 times.
3. Test ground-fault circuit interrupter operation with local fault simulations, using a tester designed for such testing, and according to manufacturer recommendations. Testing with integral test switches on the receptacle is not sufficient for this testing.

B. Replace damaged or defective components, and retest.
3.4 CLEANING

A. General: Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION
SECTION 16410
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
   A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
   A. This Section includes switches and circuit breakers, whether individually mounted or group mounted in switchboards, motor control centers, panelboards, and similar equipment.
   B. Related Sections: The following Sections contain requirements that relate to this Section:
      1. Section 16140 for attachment plugs and receptacles, and snap switches used for disconnect switches.
      2. Section 16440 for panelboards containing circuit breakers.

1.3 SUBMITTALS
   A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
   B. Submit circuit breaker information with or after the Electrical System Study Report (ESSR) as specified under Section 16010. Equipment submitted prior to submission of the ESSR will be returned as “Not Reviewed”. Circuit breaker equipment shall not be approved or ordered until the ESSR has been reviewed and approved.
   C. Product Data: For disconnect switches, circuit breakers and accessories specified in this Section. This includes, but is not limited to:
      1. Specification sheets (cut sheets) of all proposed equipment (indicate the exact devices that are to be supplied).
      2. nameplate ratings
      3. mounting methods
      4. For units which are stand-alone mounted include dimensioned plans (showing available conduit entry locations), sections, and elevations.
      5. Enclosures which will not accept the quantities and sizes of conduits as shown on the Contract Plans will be rejected.
6. Lug configuration showing quantities and sizes of conductors equipment can accept. Lugs or connections for switches and circuit breakers which are not able to accept the quantities and sizes of conductors as shown on the Contract Plans will be rejected.

D. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. (See Section 3.2 for further information)

E. Operation and Maintenance Manual: Shall include the following:
   1. Maintenance Manuals (specified in Division 1).
   2. Electrical System Study Report
   3. Field Test Reports (see Section 3.2 for further information)
   4. Product Data

1.4 QUALITY ASSURANCE

A. Refer to Section 16010 paragraph 1.7.

B. Source Limitations: Obtain disconnect switches and circuit breakers from one source and by a single manufacturer.

C. Comply with NEC for components and installation.

D. Comply with UL 98, “Enclosed and Dead-Front Switches” for safety switches.

E. Comply with UL 1066 “Standard for Low-Voltage AC and DC Power Circuit Breakers Used in Enclosures” for low voltage power circuit breakers.


G. Product Selection for Restricted Space: Space for installation of switches and circuit breakers is limited. The Plans indicate typical physical sizes or dimensions for switches and circuit breakers, including clearances between switches and circuit breakers and adjacent surfaces and items. Switches and circuit breakers with larger dimensions may be acceptable, but it is the responsibility of the Contractor to submit detailed drawings showing the required revisions to the structural, process, mechanical, electrical, and other plans to accommodate centers with larger dimensions in order to obtain approval before a change is accepted. The Supplier/Contractor shall coordinate the size of the switches and circuit breakers with the available space and shall verify that the proposed switches and circuit breakers are capable of being installed in the available space prior to making a submittal. Switches and circuit breakers of
dimensions larger than the available space shall not be submitted, and if is submitted, shall be rejected. The decision of the Owner as to the acceptability of switches and circuit breakers with larger dimensions than as shown on the Plans will be final. If the larger equipment is deemed acceptable, it is the Contractor’s responsibility to provide any required revisions to the structural, process, mechanical, electrical, and other designs without additional cost to the Owner.

H. Submit and obtain approval of shop drawings and make approved shop drawings available prior to placement of conduits in slabs to ensure placement is coordinated with switch and circuit breaker access locations from approved shop drawings. Do not place conduits in slabs prior to the receipt of approved shop drawings. Any relocation of conduits that are required because of incorrectly placed conduits prior to receipt of approved shop drawings shall be completed at the Contractor’s expense.

PART 2 — PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering switches and circuit breakers that may be incorporated into the Work include, but are not limited to, the following:

1. Disconnect switches, safety switches and circuit breakers:
   b. General Electric Co.; Electrical Distribution and Control Division.
   c. Siemens Energy & Automation, Inc.
   d. Square D Co.

2.2 ENCLOSED CIRCUIT BREAKERS

A. Molded-Case Circuit Breaker: NEMA AB 1, with lockable handle.

B. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated with interrupting rating to meet available fault current.

1. Feeder circuit breakers and main circuit breakers under 200 amps shall be molded case breakers with thermal magnetic trip unless otherwise noted.

2. Branch circuit breakers shall be molded case, thermal-magnetic trip, trip-free with non-interchangeable, non-adjustable trip unless otherwise noted.
C. Application Listing: Appropriate for application, including switching lighting loads (SWD) or heating, air-conditioning, and refrigerating equipment (HACR).

D. Coordinate circuit breaker trip sizes with equipment submittals for process, HVAC etc. equipment specified under Divisions 11 through 15 and adjust the rating/trip size as needed to conform with the manufacturer’s requirements for the trip rating. Revise the Electrical System Study Report as required to coordinate with circuit breaker requirements for equipment submittals for process, HVAC etc. equipment.

E. Molded-Case Switch: Where indicated, molded-case circuit breaker without trip units.

F. Enclosure: per application, as described in Section 16050, unless otherwise specified or required to meet environmental conditions of installed location. Enclosure conduit entry locations shall be able to accept the quantities and sizes of conduits as shown on the Contract Plans.

G. Lugs: Compression lugs, mechanical lugs and power-distribution connectors suitable for conductors of the material, number and size provided. Lugs or connectors shall be able to accept the quantities and sizes of conductors as shown on the Contract Plans.

PART 3 — EXECUTION

3.1 INSTALLATION

A. Install equipment enclosures level and plumb in locations as indicated, according to manufacturer's written instructions.

B. For wall mounted equipment enclosures located at walls, bolt units to wall or mount on structural–steel channels bolted to wall. For enclosures not located at walls, provide structural stanchion supports conforming to Section 16050.

C. Install wiring between switches, circuit breakers, control, and indication devices.

D. Connect switches and circuit breakers and components to wiring system and to ground as indicated and as instructed by manufacturer.

1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
E. Identify each switch and circuit breaker according to requirements specified in Section 16050.

3.2 FIELD QUALITY CONTROL

A. Acceptance Testing: After installing switches and circuit breakers and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Provide services of a qualified independent testing agency as described in Section 16010 to perform specified testing for circuit breakers.

2. Third party testing shall not commence until the Electrical System Study Report has been reviewed and approved.

3. Procedures:
   a. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5.1.1 for switches. Certify compliance with test parameters.
   b. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.6.1.1 for molded-case circuit breakers. Certify compliance with test parameters.

4. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

3.3 CLEANING

A. After completing system installation, including fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION
SECTION 16440
PANELBOARDS

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes lighting and power panelboards and associated auxiliary equipment rated 600 V and less.
B. Section Includes:
   1. Panelboards specified under this Section include:
      a. Panel “LA”
C. Related Sections include the following:
   1. Section 16050 for additional materials and installation information.
   2. Section 16410 for circuit breakers installed in panelboards.

1.3 SUBMITTALS
A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
B. Submit panelboard information with or after the Electrical System Study Report (ESSR) as specified under Section 16010. Equipment submitted prior to submission of the ESSR will be returned as “Not Reviewed”. Panelboard equipment shall not be ordered until the ESSR has been reviewed and approved.
C. Product Data: For each type of panelboard, accessory item, and component specified in this Section.
D. Shop Drawings:
   1. Shop Drawings shall include, but not be limited to, the following:
      a. Enclosure (including front, door, etc.) type and mounting.
      b. Bus configuration, voltage and current ratings.
      c. Short-circuit current rating.
      d. Circuit breaker quantities, types and layout.
e. Dimensioned plans (showing available conduit entry locations), sections, and elevations. Enclosures which will not accept the quantities of conduits as shown on the Contract Plans will be rejected.

f. Lug configuration showing quantities and sizes of conductors the panelboard can accept. Lugs or connections panelboards which are not able to accept the quantities and sizes of conductors as shown on the Contract Plans will be rejected.

E. Panelboard Schedules: Submit circuit breaker layout as scheduled on the "Panelboard Circuit Schedule" located on the drawings.

F. Operations and Maintenance Manual: Shall include the following:
   1. Testing Results (must be approved prior to energization of the system) (see Section 3.4 for further information).
   2. Maintenance Data: Include manufacturer's written instructions for testing circuit breakers.
   3. Panelboard Schedules: Include approved final versions of panel schedules only.
   4. Electrical System Study Report
   5. Shop Drawings
   6. Product Data

1.4 QUALITY ASSURANCE

A. Refer to Section 16010 paragraph 1.7.

B. Comply with NEMA PB 1.

C. Comply with UL 67, “Standard for Panelboards”.

D. Submit and obtain approval of shop drawings and make approved shop drawings available prior to placement of conduits in slabs to ensure placement is coordinated with panelboard access locations from approved shop drawings. Do not place conduits in slabs prior to the receipt of approved shop drawings. Any relocation of conduits that are required because of incorrectly placed conduits prior to receipt of approved shop drawings shall be completed at the Contractor’s expense.

E. Product Selection for Electrical System Selective Coordination: In accordance with the Electrical System Study Report 16010, equipment that better meets the requirements of the selective coordination requirements will be acceptable provided the interrupting capacity, normal current capacity, and voltage rating as shown on the contract drawings are also satisfied. This substituted equipment for selective coordination must
also meet all the requirements above, including 1.4.D 'Product Selection for Restricted Space'.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store equipment per requirements of Section 16010 paragraph 1.11.

B. Remove equipment protection only after equipment is safe from hazards such as dirt and moisture and damage from construction operations. Field repair of material or equipment made defective by improper storage or site construction damage by other trades is not acceptable.

1.6 EXTRA MATERIALS

A. Keys: Provide 3 spares of each type for panelboard cabinet lock.

B. Extra materials including spare parts shall be provided with the equipment or like materials at the time the equipment or materials arrive on site. It is not acceptable to provide extra materials after the equipment or materials are delivered to the site.

PART 2 — PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

4. Square D Co.

2.2 PANELBOARD FABRICATION

A. Enclosures: Flush- or surface-mounted enclosures as indicated on the Plans. NEMA PB 1, 20" minimum width, of NEMA type complying with Section 16050 for the location installed.

B. Front: Secured to enclosure with concealed trim clamps or screws. Front for surface-mounted panelboards shall be same dimensions as enclosure. Fronts for flush panelboards shall overlap enclosure, unless otherwise indicated. Enclosure conduit entry locations shall be able to accept the quantities and sizes of conduits as shown on the Contract Plans.

C. Directory Frame: Metal, mounted inside each panelboard door.

D. Bus: Hard drawn copper of 98 percent conductivity. Insulated, bondable, full size neutral bus unless otherwise indicated.
E. Main and Neutral Lugs: Compression type. Lugs or connections for panelboard equipment shall be able to accept the quantities and sizes of conductors as shown on the Contract Plans.

F. Main Breaker: Vertically mounted.


H. Doors: In panelboard front, with concealed hinges. Secure with flush catch and tumbler lock, all keyed alike.

I. Special Features: Include the following features for panelboards:
   1. Provide same size enclosures for multi-section panelboards.
   2. Feed-through Lugs: Sized to accommodate feeders indicated.
   3. For panelboards with NEMA 1 enclosures, panel fronts shall be stretcher leveled steel with piano hinged door-to-box construction. The entire panel front shall be hinged to allow access to the interior of the panelboard enclosure when opened (the second door allows access to the circuit breakers only). Door-to-box construction shall not increase the width of the panelboard to a dimension greater than what is shown on the Contract Drawings.
   4. Provide skirts for surface mounted panelboards located in building or structures.

J. Future Devices and Circuit Breakers: Equip for future installation of devices and circuit breakers with mounting brackets, bus connections, and necessary appurtenances, for the overcurrent protective device ampere ratings indicated.

2.3 OVERCURRENT PROTECTIVE DEVICES

A. In accordance with Section 16410, except as modified herein. Coordinate circuit breaker trip sizes with equipment submittals for process equipment specified under Division 11 as described in Section 16410.

B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

PART 3 — EXECUTION

3.1 INSTALLATION

A. Install panelboards and accessory items according to NEMA PB 1.1.
   1. Setup, adjust and fasten in place flush trim and interiors.
2. Install circuit breakers as shown on the "Circuit Schedule" for each panelboard except where deviations are necessary to accommodate changes in loads or equipment served.

B. Mounting Heights: Top of trim 74 inches above finished floor, unless otherwise indicated.

C. Mounting: Plumb and rigid without distortion of box. Mount flush panelboards uniformly flush with wall finish. Mount surface panelboards with spacers of neoprene or fiberglass to shim out from irregular surfaces or from damp surfaces.

D. Circuit Directory: Prepare panelboards directories neatly typewritten in the same pole sequence as the panelboard stamping. Send a copy to the Owner for his records. Prior to typing the final directories, verify room and equipment names and numbers with the Owner and modify circuit descriptions of areas/spaces to conform with the Owner's desires. Obtain approval before installing. Record all circuit breaker installation deviations from the "Circuit Schedule" and show on the Record Drawings the actual size and pole position of all circuit breakers installed.

E. Do not remove knockouts for breaker positions unless a breaker is to be installed. Where twistouts or knockouts are removed in error, provide a circuit breaker (one pole, twenty ampere) to fill each position removed.

F. Provision for Future Circuits: Install panelboards in such a manner as to leave access to the box, building chases, knockouts, etc. for future circuit additions.

3.2 IDENTIFICATION
A. Panelboard Nameplates: Label each panelboard with engraved nameplates per the requirements of Section 16050 paragraph 3.3.

3.3 CONNECTIONS
A. Tighten electrical connectors and terminals, including grounding connections, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL
A. Prepare for acceptance tests as follows:

1. Test panelboards and electrical circuits for proper connection, continuity, and absence of undesirable shorts and grounds. Test wire and cable installation, when complete and seventy-two hours prior to energization of the system. Check for continuity, visual
damage, marking, and proper phase sequence before performing insulation testing.

2. Make insulation-resistance tests of each panelboard bus, component, and connecting supply or feeder circuit. Megger bus work, breakers and circuits phase-to-phase and phase-to-ground disconnecting and reconnecting equipment which cannot be meggered as required. The minimum acceptable steady-state value is 50 megohms. Record ambient temperature and humidity during testing.

B. Acceptance Testing: After installing panelboards and before electrical circuitry has been energized, demonstrate product capability and compliance with requirements:

1. Provide services of a qualified independent testing agency as described in Section 16010 to perform specified testing for circuit breakers.
2. Testing shall not commence until the short circuit and coordination study has been reviewed and approved.
3. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.6.1.1 for molded-case circuit breakers. Testing of circuit breakers shall only be required for circuit breakers 200 amperes and larger. Certify compliance with test parameters.
4. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units, and retest.

C. Take load readings on each panelboard after loads are connected and panel has been energized. Record these measurements to give the maximum reading for each phase and neutral obtained with lighting, appliances, motors, and other loads, connected to the panels in service.

3.5 ADJUSTING

A. Set field-adjustable circuit-breaker trip ranges as indicated, or requested by the Owner.

3.6 CLEANING

A. On completion of installation, inspect interior and exterior of panelboards. Vacuum interior and wipe clean all interior surfaces. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish.

END OF SECTION
SECTION 16671
SURGE PROTECTIVE DEVICES

PART 1 — GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This section includes Surge Protective Device (SPD) equipment having the electrical characteristics, ratings and modifications as specified herein and as shown on the Contract Plans. To maximize performance and reliability, the AC surge protection shall be integrated into electrical distribution equipment such as switchboards, panelboards and/or motor control centers.
B. Related Sections include the following:
   1. Section 16050 for materials and installation.
   2. Section 16440.

1.3 REFERENCES
A. SPD units and all components shall be designed, manufactured and tested in accordance with the latest applicable UL Listed standards (UL 1449, 3rd Edition), UL 1283.

1.4 SUBMITTALS
A. General: Submit each item in this Article as described in Section 16010 and Division 1 Specification Sections.
B. Product Data: For surge protective devices and accessories specified in this Section. This includes, but is not limited to:
   1. Specification sheets (cut sheets) of all proposed equipment (indicate the exact devices that are to be supplied).
   2. Verification that the SPD complies with the required UL 1449 3rd Edition.
   3. Actual let through voltage test data in the form of oscillograph results for the ANSI/IEEE C62.41 Category C3 & C1 (combination wave) and B3 (ring wave) tested in accordance with ANSI/IEEE C62.45.
4. Spectrum analysis of each unit based on MIL-STD-220A test procedures between 50 kHz and 200 kHz verifying the devices noise attenuation equals or exceeds 50 dB at 100 kHz.

5. Test report in compliance with NEMA LS1 from a recognized independent testing laboratory verifying the suppressor components can survive published surge current rating on both a per mode and per phase basis using the IEEE C62.41, 8 x 20 microsecond current wave. Note that test data on individual module is not accepted.

C. Interconnecting and wiring diagrams specific to this project.

D. Operations and Maintenance Manual: Shall include the following:
   1. Maintenance Data (as specified in Division 1)
   2. Interconnecting and Wiring Diagrams
   3. Initial settings and parameters
   4. Product Data

1.5 QUALITY ASSURANCE

A. Refer to Section 16010 Basic Electrical Requirements 1.7 Quality Assurance.


1.6 QUALIFICATIONS

A. The manufacturer must have a 24-hour response capability with nationwide field engineering personnel. The field service organization must have fully accredited, Power System Engineers located across the North America who are capable of performing complete grounding, Power Quality analysis, and coordination studies. Factory trained SPD sales personnel do not qualify as Power System Engineers.

B. The manufacturer of the surge protective equipment shall be the same manufacturer as the manufacturer of the low voltage distribution equipment in which the SPD units are installed.

C. The following minimum mounting and installation guidelines shall be met, unless specifically modified by the above referenced standards.
   1. The equipment manufacturer shall certify that the equipment can withstand, that is, function following the seismic event, including both vertical and lateral required response spectra as specified in above codes.
   2. The equipment manufacturer shall document the requirements necessary for proper seismic mounting of the equipment. Seismic
qualification shall be considered achieved when the capability of
the equipment, meets or exceeds the specified response spectra.

3. If integrated into a switchboard, panelboard or MCC, the seismic
qualification of the enclosing equipment shall not be reduced
because of the integration.

1.7 DELIVERY, STORAGE AND HANDLING
A. Equipment shall be handled and stored in accordance with manufacturer’s
instructions. One (1) copy of manufacturer’s instructions shall be
included with the equipment at time of shipment.

1.8 OPERATION AND MAINTENANCE MANUALS
A. Equipment operation and maintenance manuals shall be provided with
each assembly shipped, and shall include instruction leaflets and
instruction bulletins for the complete assembly and each major
component.

PART 2 — PRODUCTS

2.1 MANUFACTURERS
A. General Electric Co., Electrical Distribution & Control Div.
B. Siemens Energy & Automation
C. Square D / Schneider Electric
D. Cutler Hammer/Eaton

2.2 VOLTAGE SURGE SUPPRESSION – GENERAL
A. Electrical Requirements
1. Unit Operating Voltage – Refer to the Plans for operating voltage
and unit configuration.
2. Maximum Continuous Operating Voltage (MCOV) – The MCOV
shall be greater than 115% of the nominal system operating
voltage.
3. The suppression system Surge Protection shall incorporate a hybrid
designed Metal-Oxide Varistors (MOV) surge suppressor for the
service entrance and other distribution level. The system shall not
utilize silicon avalanche diodes, selenium cell, air gaps or other
components that may crowbar the system voltage leading to
system upset or create any environmental hazards.
4. Protection Modes – For a wye configured system, the device must
have directly connected suppression elements between line-neutral
(L-N), line-ground (L-G), and neutral-ground (N-G). For a delta-configured system, the device must have suppression elements between line to line (L-L) and line to ground (L-G).

5. UL 1449 3rd Edition Suppressed Voltage Rating (SVR) – The maximum UL 1449 3rd Edition SVR for the device must not exceed the following:

<table>
<thead>
<tr>
<th>Modes</th>
<th>208Y/120</th>
<th>480Y/277</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-N; L-G; N-G</td>
<td>400V</td>
<td>800V</td>
</tr>
<tr>
<td>L-L</td>
<td>800V</td>
<td>1800V</td>
</tr>
</tbody>
</table>

6. ANSI/IEEE Cat. C3 Let Through Voltage – The let through voltage based on IEEE C62.41 and C62.45 recommended procedures for Category C3 surges (20 kV, 10 kA) shall be less than:

<table>
<thead>
<tr>
<th>Mode</th>
<th>208Y/120</th>
<th>480Y/277</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-N</td>
<td>560V</td>
<td>960V</td>
</tr>
</tbody>
</table>

7. ANSI/IEEE Cat. B3 Let Through Voltage – Let through voltage based on IEEE C62.41 and C62.45 recommended procedures for the ANSI/IEEE Cat. B3 ringwave (6 kV, 500 amps) shall be less than:

<table>
<thead>
<tr>
<th>Mode</th>
<th>208Y/120</th>
<th>480Y/277</th>
</tr>
</thead>
<tbody>
<tr>
<td>L-N</td>
<td>160V</td>
<td>165V</td>
</tr>
</tbody>
</table>

B. SPD Design

1. Electrical Noise Filter – Each unit shall include a high-performance EMI/RFI noise rejection filter. Noise attenuation for electric line noise shall be 50 dB at 100 kHz using the MIL-STD-220A insertion loss test method. Products not able to demonstrate noise attenuation of 50 dB at 100 kHz shall be rejected.

2. Extended Range Filter – The Surge Protective Device shall have a High Frequency Extended Range Tracking filter in each Line to Neutral mode with compliance to UL 1283 and NEMA LS1. The filter shall have published high frequency attenuation rating in the attenuation frequencies.
<table>
<thead>
<tr>
<th>Attenuation Frequency</th>
<th>50k Hz</th>
<th>100 kHz</th>
<th>500 kHz</th>
<th>1 MHz</th>
<th>10 MHz</th>
<th>100 MHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insertion Loss (ratio)</td>
<td>40</td>
<td>316</td>
<td>316</td>
<td>89</td>
<td>200</td>
<td>79</td>
</tr>
<tr>
<td>Insertion Loss (dB)</td>
<td>32</td>
<td>50</td>
<td>50</td>
<td>39</td>
<td>46</td>
<td>38</td>
</tr>
</tbody>
</table>

3. Internal Connections – No plug-in component modules or printed circuit boards shall be used as surge current conductors. All internal components shall be hardwired with connections utilizing low impedance conductors and compression fittings.

4. Standard Monitoring Diagnostics – Each SPD shall provide integral monitoring options:

   a. Each unit shall provide a solid state indicator light for each phase. The indicator light shall indicate which phase(s) have been damaged.

   b. Remote Status Monitor – The SPD must include form C dry contacts (one NO and one NC) for remote annunciation of unit status. The remote alarm shall change state if any of the three phases detect a fault condition.

   c. Event Counter – The SPD shall be equipped with an LCD display system designed to indicate to the user how many surges, sags, swells and outages have occurred at the location. The event counter triggers each time under each respective categories after significant event occurs. A reset pushbutton shall also be standard allowing all counters to be zeroed.

   d. Push to Test – The SPD shall be equipped with push-to-test feature is designed to provide users with real time testing of the suppressor’s monitoring and diagnostic system. By depressing the test button, the diagnostic system initiates a self test procedure. If the system is fully operational, the self test will activate all indicator lights.

5. Overcurrent Protection Fusing: In order to isolate the SPD under any fault condition, the manufacturer shall provide:

   a. Individual Fusing: MOV’s shall be individually fused via Copper Fuse Trace. The Copper Fuse shall allow protection during high surge (kA) events.

   b. Thermal Protection: MOV’s shall be equipped with Thermal Fuse Spring (TFS) Technology which allows disconnection of the suppression component at the overheated stage.
common during temporary over voltage condition. For small fault currents between 100mA to 30Amp, or if the occurrence is over a longer period of time, the TFS will disconnect first.

c. All overcurrent protection components shall be tested in compliance with UL 1449-Limited Current Test and AIC rating test.


1. The suppression filter system shall be repetitive surge tested in every mode utilizing a 1.2 x 50μsec, 20kV open circuit voltage. 8 x 20μsec, 10kA short circuit current Category C3 bi-wave at one minute intervals without suffering either performance degradation or more than 10% deviation of clamping voltage at a specified surge current. The minimum repetitive surge current capability as per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 – 1992 shall be:

a. Service Entrance: 12000 impulse per mode.
b. Distribution Panelboard: 10000 impulse per mode.
c. Branch Location Panelboard: 9000 impulse per mode.

2.3 SYSTEM APPLICATION

A. Surge Current Capacity – The minimum total surge current 8 x 20 microsecond waveform that the device is capable of withstanding shall be as shown in the following table:

<table>
<thead>
<tr>
<th>Application</th>
<th>Per Phase</th>
<th>Per Mode</th>
<th>Surge Withstand Capabilities ANSI/IEEE C3 Wave (10 kA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Service Entrance Locations (Switchboards, Switchgear, MCC Main Entrance)</td>
<td>200 kA</td>
<td>100 kA</td>
<td>12000</td>
</tr>
<tr>
<td>High Exposure Roof Top Locations (Distribution Panelboards)</td>
<td>160 kA</td>
<td>80 kA</td>
<td>10000</td>
</tr>
<tr>
<td>Branch Locations (Panelboards, MCCs, Busway)</td>
<td>120 kA</td>
<td>60 kA</td>
<td>9000</td>
</tr>
</tbody>
</table>

B. Switchgear, Switchboard, MCC and Panelboard Requirements
1. The SPD application covered under this section is for switchgear, switchboard, MCC and panelboard locations. Service entrance located SPD shall be tested and suitable for ANSI/IEEE C62.41 Category C3 environments.

2. The SPD shall be of the same manufacturer as the switchboard, MCC or panelboard.

3. The SPD shall be factory installed inside the switchboard, MCC and panelboard at the assembly point by the original equipment manufacturer.

4. Locate Type II SPD on load side of main disconnect device, as close as possible to the phase conductors and ground/neutral bar.

5. Provide a disconnect for type II SPDs. The disconnect shall be directly integrated to the SPD and assembly bus using bolted bus bar connections.

6. The SPD shall be integral to switchboard, MCC and panelboards as factory standardized design.

7. All monitoring diagnostics features shall be visible from the front of the equipment.

2.4 ENCLOSURES

A. All enclosed equipment shall have NEMA 1 general purpose enclosures, unless otherwise noted on the Plans or in Section 16050.

PART 3 — EXECUTION

3.1 FACTORY TESTING

A. Standard factory tests shall be performed on the equipment under this section. All tests shall be in accordance with the latest version of NEMA and UL standards.

3.2 INSTALLATION

A. The Contractors shall install all equipment per the manufacturer's recommendations and the Plans.

3.3 WARRANTY

A. The manufacturer shall provide a full five (5) year warranty from the date of shipment against any SPD part failure when installed in compliance with manufacturer's written instructions and any applicable national or local code.

END OF SECTION
PART 5

WAGE RATES
The PREVAILING WAGES listed here include both the hourly wage rate and the hourly rate of fringe benefits. On public works projects, worker's wage and benefit rates must add to not less than this total. A brief description of overtime calculation requirements are provided on the Benefit Code Key.

### Journey Level Prevailing Wage Rates for the Effective Date: 1/8/2020

<table>
<thead>
<tr>
<th>County</th>
<th>Trade</th>
<th>Job Classification</th>
<th>Wage</th>
<th>Holiday</th>
<th>Overtime</th>
<th>Note</th>
<th>Risk Clas</th>
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</thead>
<tbody>
<tr>
<td>Kittitas</td>
<td>Asbestos Abatement Workers</td>
<td>Journey Level</td>
<td>$41.09</td>
<td>5D</td>
<td>1H</td>
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<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Boilermakers</td>
<td>Journey Level</td>
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<td>5N</td>
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<tr>
<td>Kittitas</td>
<td>Brick Mason</td>
<td>Journey Level</td>
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<td>5A</td>
<td>1M</td>
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<tr>
<td>Kittitas</td>
<td>Building Service Employees</td>
<td>Janitor</td>
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<td></td>
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<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Building Service Employees</td>
<td>Shampooer</td>
<td>$13.50</td>
<td></td>
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<td>Kittitas</td>
<td>Cabinet Makers (In Shop)</td>
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<td>4X</td>
<td>8N</td>
<td>View</td>
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<td>Kittitas</td>
<td>Carpenters</td>
<td>Bridge, Dock And Wharf Carpenters</td>
<td>$62.44</td>
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<td>4C</td>
<td></td>
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<td>Carpenters</td>
<td>Floor Layer &amp; Floor Finisher</td>
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<td>4X</td>
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<td>7E</td>
<td>4X</td>
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<td>7E</td>
<td>4X</td>
<td>8N</td>
<td>View</td>
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<td>Journey Level</td>
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<td>Bell/Vehicle or Submersible Operator (Not Under Pressure)</td>
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<td>4C</td>
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<td>Manifold Operator Mixed Gas</td>
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<td>Divers &amp; Tenders</td>
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<td>Dredge Workers</td>
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<td>Assistant Mate (Deckhand)</td>
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<td>5A</td>
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<td>Electricians - Powerline Construction</td>
<td>Groundperson</td>
<td>$47.94</td>
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<td>Electricians - Powerline Construction</td>
<td>Heavy Line Equipment Operator</td>
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<td>Fabricated Precast Concrete Products</td>
<td>Journey Level - In-Factory Work Only</td>
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<td>Kittitas</td>
<td>Fence Erectors</td>
<td>Fence Erector</td>
<td>$38.59</td>
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<td>letter2</td>
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<td>Heating Equipment Mechanics</td>
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<td>4V</td>
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<td>Kittitas</td>
<td>Hod Carriers &amp; Mason Tenders</td>
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<td>Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</td>
<td>Grout Truck Operator</td>
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<td>Head Operator</td>
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<td>Inspection/Cleaning/Sealing Of Sewer &amp; Water Systems By Remote Control</td>
<td>Technician</td>
<td>$13.50</td>
<td>1</td>
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<td>Tv Truck Operator</td>
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<td>4X</td>
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<td>4V</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Air, Gas Or Electric Vibrating Screed</td>
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<td>7A</td>
<td>4V</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Brick Pavers</td>
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<td>7A</td>
<td>4V</td>
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<td>Caisson Worker</td>
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<td>Carpenter Tender</td>
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<td>Laborers</td>
<td>Cement Dumper-paving</td>
<td>$41.09</td>
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<td>4V</td>
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<td>Cement Finisher Tender</td>
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<td>4V</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Change House Or Dry Shack</td>
<td>$41.09</td>
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<td>4V</td>
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<td>4V</td>
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<td>Chipping Gun (Under 30 Lbs.)</td>
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<td>4V</td>
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<td>Choker Setter</td>
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<td>Laborers</td>
<td>Chuck Tender</td>
<td>$41.09</td>
<td>7A</td>
<td>4V</td>
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<td>Clary Power Spreader</td>
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<td>4V</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Clean-up Laborer</td>
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<td>4V</td>
<td>8Y</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Concrete Dumper/Chute Operator</td>
<td>$41.79</td>
<td>7A</td>
<td>4V</td>
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<td>Concrete Form Stripper</td>
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<td>7A</td>
<td>4V</td>
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<tr>
<td>Kittitas</td>
<td>Concrete Saw Operator/Core Driller</td>
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<td>7A</td>
<td>4V</td>
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<td>Curing Laborer</td>
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<td>7A</td>
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<td>4V</td>
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<td>Kittitas</td>
<td>Ditch Digger</td>
<td>$41.09</td>
<td>7A</td>
<td>4V</td>
<td>8Y</td>
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<td>Drill Operator (Hydraulic, Diamond)</td>
<td>$41.79</td>
<td>7A</td>
<td>4V</td>
<td>8Y</td>
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<td>Kittitas</td>
<td>Dry Stack Walls</td>
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<td>Dump Person</td>
<td>$41.09</td>
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<td>Epoxy Technician</td>
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<td>7A</td>
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<td>8Y</td>
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<td>Faller &amp; Bucker Chain Saw</td>
<td>$41.79</td>
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<td>4V</td>
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<td>Grade Checker &amp; Transit Person</td>
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<td>Groutmen (Pressure) Including Post Tension Beams</td>
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<td>Hazardous Waste Worker (Level A)</td>
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<td>Manhole Builder-Mudman</td>
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<td>Motorman-Dinky Locomotive</td>
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<td>Nozzleman (Concrete Pump, Green Cutter When Using Combination Of High Pressure Air &amp; Water On Concrete &amp; Rock, Sandblast, Gunite,</td>
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<td>Pavement Breaker</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Pipe Layer/Tailor</td>
<td>$41.79</td>
<td>7A</td>
<td>4V</td>
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<td>Pipe Pot Tender</td>
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<td>Pipe Wrapper</td>
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<td>Pot Tender</td>
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<td>Laborers</td>
<td>Powderman</td>
<td>$42.30</td>
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<td>Laborers</td>
<td>Powderman's Helper</td>
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<td>Re-timberman</td>
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<td>Rigger/Signal Person</td>
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<td>Rip Rap Person</td>
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<td>Rivet Buster</td>
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<td>4V</td>
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<td>4V</td>
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<td>Scaffold Erector</td>
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<td>4V</td>
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<td>Laborers</td>
<td>Sloper (Over 20&quot;)</td>
<td>$41.79</td>
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<td>Stake Hopper</td>
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<td>4V</td>
<td>8Y</td>
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<td>Laborers</td>
<td>Tamper &amp; Similar Electric, Air &amp; Gas Operated Tools</td>
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<td>7A</td>
<td>4V</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Tamper (Multiple &amp; Self-propelled)</td>
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<td>7A</td>
<td>4V</td>
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<td>Timber Person - Sewer (Lagger, Shorer &amp; Cribber)</td>
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<td>7A</td>
<td>4V</td>
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<td>Laborers</td>
<td>Toolroom Person (at Jobsite)</td>
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<td>7A</td>
<td>4V</td>
<td>8Y</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Topper</td>
<td>$41.09</td>
<td>7A</td>
<td>4V</td>
<td>8Y</td>
<td>View</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Track Laborer</td>
<td>$41.09</td>
<td>7A</td>
<td>4V</td>
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<td>Laborers</td>
<td>Track Liner (Power)</td>
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<td>Traffic Control Laborer</td>
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<td>4V</td>
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<td>4V</td>
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<td>Laborers</td>
<td>Truck Spotter</td>
<td>$41.09</td>
<td>7A</td>
<td>4V</td>
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<td>Laborers</td>
<td>Tugger Operator</td>
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<td>7A</td>
<td>4V</td>
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<td>Laborers</td>
<td>Tunnel Work-Guage and Lock Tender</td>
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<td>4V</td>
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<td>7A</td>
<td>4V</td>
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<td>Laborers</td>
<td>Tunnel Work-Gauge and Lock Tender</td>
<td>$41.79</td>
<td>7A</td>
<td>4V</td>
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<td>Kittitas</td>
<td>Laborers</td>
<td>Welder</td>
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<td>Window Washer/Cleaner</td>
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<td>Laborers - Underground Sewer &amp; Water</td>
<td>General Laborer &amp; Topman</td>
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<td>4V</td>
<td>8Y</td>
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<td>Kittitas</td>
<td>Laborers - Underground Sewer &amp; Water</td>
<td>Pipe Layer</td>
<td>$41.79</td>
<td>7A</td>
<td>4V</td>
<td>8Y</td>
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<td>Kittitas</td>
<td>Landscape Construction</td>
<td>Landscape Construction/landscaping Or Planting Laborers</td>
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<td>7A</td>
<td>4V</td>
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<td>Lathers</td>
<td>Journey Level</td>
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<td>Laborer</td>
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<td>Kittitas</td>
<td>Metal Fabrication (In Shop)</td>
<td>Painter</td>
<td>$13.50</td>
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<td>Kittitas</td>
<td>Metal Fabrication (In Shop)</td>
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<td>Journey Level</td>
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<td>7E</td>
<td>4X</td>
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<td>Commercial Painter</td>
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<td>Industrial Painter</td>
<td>$40.27</td>
<td>6Z</td>
<td>1W</td>
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<td>Plasterers</td>
<td>Journey Level</td>
<td>$59.42</td>
<td>7Q</td>
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<td>Kittitas</td>
<td>Playground &amp; Park Equipment Installers</td>
<td>Journey Level</td>
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<td>View</td>
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<td>Kittitas</td>
<td>Plumbers &amp; Pipefitters</td>
<td>Journey Level</td>
<td>$82.94</td>
<td>6Z</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Asphalt Plant Operators</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
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<td>Assistant Engineer</td>
<td>$63.17</td>
<td>7A</td>
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<td>Barrier Machine (zipper)</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Power Equipment Operators</td>
<td>Batch Plant Operator: concrete</td>
<td>$66.57</td>
<td>7A</td>
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<td>$63.17</td>
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<td>Brokk - Remote Demolition Equipment</td>
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<td>Concrete Finish Machine - Laser Screed</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Concrete Pump - Mounted Or Trailer High</td>
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<td>7A</td>
<td>3K</td>
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<td><strong>Power Equipment Operators</strong></td>
<td>Pressure Line Pump, Pump High Pressure</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Concrete Pump: Truck Mount With Boom Attachment Over 42 M</td>
<td>$66.57</td>
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<td><strong>Power Equipment Operators</strong></td>
<td>Concrete Pump: Truck Mount With Boom Attachment Up To 42m</td>
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<td><strong>Power Equipment Operators</strong></td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes friction: 200 tons and over</td>
<td>$69.20</td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: 100 tons through 199 tons, or 150' of boom (including jib with attachments)</td>
<td>$67.84</td>
<td></td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: 20 Tons Through 44 Tons With Attachments</td>
<td>$66.57</td>
<td></td>
<td></td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: 200 tons- 299 tons, or 250' of boom including jib with attachments</td>
<td>$68.53</td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: 300 tons and over or 300' of boom including jib with attachments</td>
<td>$69.20</td>
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<td></td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: 45 Tons Through 99 Tons, Under 150' Of Boom (including Jib With Attachments)</td>
<td>$67.16</td>
<td></td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: A-frame - 10 Tons And Under</td>
<td>$63.17</td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: Friction cranes through 199 tons</td>
<td>$68.53</td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Cranes: through 19 tons with attachments, A-frame over 10 tons</td>
<td>$66.05</td>
<td></td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Crusher</td>
<td>$66.57</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Deck Engineer/Deck Winches (power)</td>
<td>$66.57</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Derricks, On Building Work</td>
<td>$67.16</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Dozers D-9 &amp; Under</td>
<td>$66.05</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Drill Oilers: Auger Type, Truck Or Crane Mount</td>
<td>$66.05</td>
<td></td>
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<tr>
<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Drilling Machine</td>
<td>$67.84</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Elevator And Man-lift: Permanent And Shaft Type</td>
<td>$63.17</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Finishing Machine, Bidwell And Gamaco &amp; Similar Equipment</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Forklift: 3000 Lbs And Over With Attachments</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators</strong></td>
<td>Forklifts: Under 3000 Lbs. With Attachments</td>
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<td>Location</td>
<td>Skill/Equipment</td>
<td>Description</td>
<td>Rate</td>
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<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Grade Engineer: Using Blue Prints, Cut Sheets, Etc</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>$66.57</td>
<td>View</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Gradechecker/Stakeman</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>$63.17</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Guardrail Punch</td>
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<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Hard Tail End Dump Articulating Off-Road Equipment 45 Yards &amp; Over</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
<td>$67.16</td>
<td>View</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>$66.57</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Horizontal/Directional Drill Locator</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
<td>$66.05</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Horizontal/Directional Drill Operator</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>$66.57</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Hydralifts/Boom Trucks Over 10 Tons</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
<td>$66.05</td>
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<tr>
<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Hydralifts/Boom Trucks, 10 Tons And Under</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>$63.17</td>
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<tr>
<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Loader, Overhead 8 Yards. &amp; Over</td>
<td>$67.84</td>
<td>7A</td>
<td>3K</td>
<td>$67.84</td>
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<td>Power Equipment Operators</td>
<td>Loader, Overhead, 6 Yards. But Not Including 8 Yards</td>
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<td>7A</td>
<td>3K</td>
<td>$67.16</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Loaders, Overhead Under 6 Yards</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>$66.57</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Loaders, Plant Feed</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Loaders: Elevating Type Belt</td>
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<td>7A</td>
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<td>$66.05</td>
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<td>Power Equipment Operators</td>
<td>Locomotives, All</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>$66.57</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Mechanics, All (leadmen - $0.50 Per Hour Over Mechanic)</td>
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<td>3K</td>
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<td>Power Equipment Operators</td>
<td>Motor Patrol Graders</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
<td>$67.16</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
<td>$67.16</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Oil Distributors, Blower Distribution &amp; Mulch Seeding Operator</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>$63.17</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Outside Hoists (Elevators And Manlifits), Air Tuggers, Strato</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Overhead, Bridge Type Crane: 20 Tons Through 44 Tons</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>$66.57</td>
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<td>Power Equipment Operators</td>
<td>Overhead, Bridge Type: 100 Tons And Over</td>
<td>$67.84</td>
<td>7A</td>
<td>3K</td>
<td>$67.84</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Overhead, Bridge Type: 45 Tons Through 99 Tons</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
<td>$67.16</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Pavement Breaker</td>
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<td>7A</td>
<td>3K</td>
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<td>Type</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Pile Driver (other Than Crane Mount)</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Plant Oiler - Asphalt, Crusher</td>
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<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Posthole Digger, Mechanical</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
<td>View</td>
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<td>Power Equipment Operators</td>
<td>Power Plant</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Pumps - Water</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Quad 9, Hd 41, D10 And Over</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<tr>
<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Quick Tower - No Cab, Under 100 Feet In Height Based To Boom</td>
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<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Remote Control Operator On Rubber Tired Earth Moving Equipment</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
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<tr>
<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Rigger and Bellman</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Rigger/Signal Person, Bellman (Certified)</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Rollagon</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Roller, Other Than Plant Mix</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Roller, Plant Mix Or Multi-lift Materials</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Roto-mill, Roto-grinder</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Saws - Concrete</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Scraper, Self Propelled Under 45 Yards</td>
<td>$66.57</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Scrapers - Concrete &amp; Carry All</td>
<td>$66.05</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Power Equipment Operators</td>
<td>Scrapers, Self-propelled: 45 Yards And Over</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Service Engineers - Equipment</td>
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<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Power Equipment Operators</td>
<td>Shotcrete/Gunite Equipment</td>
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<td>Shovel, Excavator, Backhoe, Tractors Under 15 Metric Tons</td>
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<td>Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons</td>
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<td>Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons</td>
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<td>Truck Crane Oiler/driver - 100 Tons And Over</td>
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<td>Power Equipment Operators</td>
<td>Truck Crane Oiler/Driver Under 100 Tons</td>
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<td>Truck Mount Portable Conveyor</td>
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<td>Asphalt Plant Operators</td>
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<td>Barrier Machine (zipper)</td>
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<td>Batch Plant Operator, Concrete</td>
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<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Bobcat</td>
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<td>Chipper</td>
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<td>Concrete Pump - Mounted Or Trailer High Pressure Line Pump, Pump High Pressure</td>
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<td>Kittitas</td>
<td>Concrete Pump: Truck Mount With Boom Attachment Over 42 M</td>
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<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Concrete Pump: Truck Mount With Boom Attachment Up To 42m</td>
<td>$66.57</td>
<td>7A</td>
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<td>Kittitas</td>
<td>Cranes friction: 200 tons and over</td>
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<tr>
<td>Kittitas</td>
<td>Cranes: 100 tons through 199 tons, or 150’ of boom (including jib with attachments)</td>
<td>$67.84</td>
<td>7A</td>
<td>3K</td>
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<tr>
<td>Kittitas</td>
<td>Cranes: 20 Tons Through 44 Tons With Attachments</td>
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<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Cranes: 200 tons- 299 tons, or 250’ of boom including jib with attachments</td>
<td>$68.53</td>
<td>7A</td>
<td>3K</td>
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<tr>
<td>Kittitas</td>
<td>Cranes: 300 tons and over or 300’ of boom including jib with attachments</td>
<td>$69.20</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Cranes: 45 Tons Through 99 Tons, Under 150’ Of Boom (including Jib With Attachments)</td>
<td>$67.16</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Cranes: A-frame - 10 Tons And Under</td>
<td>$63.17</td>
<td>7A</td>
<td>3K</td>
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<td>Kittitas</td>
<td>Cranes: Friction cranes through 199 tons</td>
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<td>7A</td>
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<td>Kittitas</td>
<td>Cranes: through 19 tons with attachments, A-frame over 10 tons</td>
<td>$66.05</td>
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<td>Drill Oilers: Auger Type, Truck Or Crane Mount</td>
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<td>Elevator And Man-lift: Permanent And Shaft Type</td>
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<td>Finishing Machine, Bidwell And Gamaco &amp; Similar Equipment</td>
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<td>Forklift: 3000 Lbs And Over With Attachments</td>
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<td>Forklifts: Under 3000 Lbs. With Attachments</td>
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<td>Grade Engineer: Using Blue Prints, Cut Sheets, Etc</td>
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<td>Hard Tail End Dump Articulating Off- Road Equipment 45 Yards. &amp; Over</td>
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<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Hard Tail End Dump Articulating Off-road Equipment Under 45 Yards</td>
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<td>Horizontal/Directional Drill Locator</td>
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<td>Horizontal/Directional Drill Operator</td>
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<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Hydralifts/Boom Trucks Over 10 Tons</td>
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<td>Hydralifts/Boom Trucks, 10 Tons And Under</td>
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<td>Loader, Overhead 8 Yards. &amp; Over</td>
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<td>Loader, Overhead, 6 Yards. But Not Including 8 Yards</td>
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<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
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<td>Mechanics, All (leadmen - $0.50 Per Hour Over Mechanic)</td>
<td>$67.84</td>
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<td>Mucking Machine, Mole, Tunnel Drill, Boring, Road Header And/or Shield</td>
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<td>Power Equipment Operators- Underground Sewer &amp; Water</td>
<td>Oil Distributors, Blower Distribution &amp; Mulch Seeding Operator</td>
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<td>Outside Hoists (Elevators And Manlifts), Air Tuggers, Strato</td>
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<td>Overhead, Bridge Type Crane: 20 Tons Through 44 Tons</td>
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<td>Overhead, Bridge Type: 100 Tons And Over</td>
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<td>Overhead, Bridge Type: 45 Tons Through 99 Tons</td>
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<td>Pile Driver (other Than Crane Mount)</td>
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<td>M.C.</td>
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<td>Pumps - Water</td>
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<td>Quick Tower - No Cab, Under 100 Feet In Height Based To Boom</td>
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<td>Remote Control Operator On Rubber Tired Earth Moving Equipment</td>
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<td></td>
<td>Operators - Underground Sewer &amp; Water</td>
<td>Rigger and Bellman</td>
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<td>Rigger/Signal Person, Bellman (Certified)</td>
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<td>Roller, Other Than Plant Mix</td>
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<td>Sewer &amp; Water</td>
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<td>Roller, Plant Mix Or Multi-lift Materials</td>
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<td>Saws - Concrete</td>
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<td>Operators - Underground Sewer &amp; Water</td>
<td>Scraper, Self Propelled Under 45 Yards</td>
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<td>$66.05</td>
<td>7</td>
<td>3</td>
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<td></td>
<td>Operators - Underground Sewer &amp; Water</td>
<td>Scrapers - Concrete &amp; Carry All</td>
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<td></td>
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<td>Scrapers, Self-propelled: 45 Yards And Over</td>
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<td>Sewer &amp; Water</td>
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<td>Service Engineers - Equipment</td>
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<td>$63.17</td>
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<td>Operators - Underground Sewer &amp; Water</td>
<td>Shotcrete/Gunite Equipment</td>
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<td>$66.05</td>
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<tr>
<td></td>
<td>Operators - Underground Sewer &amp; Water</td>
<td>Shovel, Excavator, Backhoe, Tractors Under 15 Metric Tons</td>
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<td>$67.16</td>
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<tr>
<td></td>
<td>Operators - Underground Sewer &amp; Water</td>
<td>Shovel, Excavator, Backhoe: Over 30 Metric Tons To 50 Metric Tons</td>
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<td>Operators - Underground Sewer &amp; Water</td>
<td>Shovel, Excavator, Backhoes, Tractors: 15 To 30 Metric Tons</td>
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<td>Shovel, Excavator, Backhoes: Over 50 Metric Tons To 90 Metric Tons</td>
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<td>3K</td>
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<tr>
<td></td>
<td>Tower Crane Up To 175' In Height Base To Boom</td>
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<td><strong>Power Equipment Operators - Underground Sewer &amp; Water</strong></td>
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<td>3K</td>
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<td>Tower Crane: over 175' through 250' in height, base to boom</td>
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<td>Tower Cranes: over 250' in height from base to boom</td>
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<td>Transporters, All Track Or Truck Type</td>
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<td>3K</td>
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<td></td>
<td>Truck Crane Oiler/driver - 100 Tons And Over</td>
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<td>Truck Crane Oiler/Driver Under 100 Tons</td>
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<td>Kittitas</td>
<td><strong>Power Equipment Operators - Underground Sewer &amp; Water</strong></td>
<td>$66.57</td>
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<td><strong>Power Line Clearance Tree Trimmers</strong></td>
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<td>Refrigeration &amp; Air Conditioning Mechanics</td>
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<td>Kittitas</td>
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<td>Residential Cement Masons</td>
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<td>Residential Drywall Applicators</td>
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<td>Kittitas</td>
<td>Residential Drywall Tapers</td>
<td>Journey Level</td>
<td>$19.32</td>
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<td>Kittitas</td>
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<td>Journey Level</td>
<td>$31.43</td>
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<td>Residential Glaziers</td>
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<td>Residential Painters</td>
<td>Journey Level</td>
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<td>Kittitas</td>
<td>Residential Plumbers &amp; Pipefitters</td>
<td>Journey Level</td>
<td>$21.56</td>
<td>1</td>
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<td>Kittitas</td>
<td>Residential Refrigeration &amp; Air Conditioning Mechanics</td>
<td>Journey Level</td>
<td>$13.50</td>
<td>1</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Residential Sheet Metal Workers</td>
<td>Journey Level (Field or Shop)</td>
<td>$46.22</td>
<td>5A</td>
<td>1X</td>
<td>View</td>
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<td>Kittitas</td>
<td>Residential Soft Floor Layers</td>
<td>Journey Level</td>
<td>$21.64</td>
<td>1</td>
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<td>Kittitas</td>
<td>Residential Sprinkler Fitters (Fire Protection)</td>
<td>Journey Level</td>
<td>$20.70</td>
<td>1</td>
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<tr>
<td>Kittitas</td>
<td>Residential Stone Masons</td>
<td>Journey Level</td>
<td>$26.95</td>
<td>1</td>
<td>View</td>
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<td></td>
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<tr>
<td>Kittitas</td>
<td>Residential Terrazzo Workers</td>
<td>Journey Level</td>
<td>$14.86</td>
<td>1</td>
<td>View</td>
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<td>Kittitas</td>
<td>Residential Terrazzo/Tile Finishers</td>
<td>Journey Level</td>
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<td>1</td>
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<td>Kittitas</td>
<td>Residential Tile Setters</td>
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<td>View</td>
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<td>Roofers</td>
<td>Irritable Bituminous Roofer</td>
<td>$44.06</td>
<td>7G</td>
<td>4I</td>
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<td>Kittitas</td>
<td>Roofers</td>
<td>Journeyman Roofer, Waterproofer, Kettleman</td>
<td>$41.06</td>
<td>7G</td>
<td>4I</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Sheet Metal Workers</td>
<td>Journey Level (Field or Shop)</td>
<td>$63.31</td>
<td>5A</td>
<td>1X</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Sign Makers &amp; Installers (Electrical)</td>
<td>Journey Level</td>
<td>$14.65</td>
<td>1</td>
<td>View</td>
<td></td>
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<tr>
<td>Kittitas</td>
<td>Sign Makers &amp; Installers (Non-Electrical)</td>
<td>Journey Level</td>
<td>$14.65</td>
<td>1</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Soft Floor Layers</td>
<td>Journey Level</td>
<td>$16.00</td>
<td>1</td>
<td>View</td>
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<td>Kittitas</td>
<td>Solar Controls For Windows</td>
<td>Journey Level</td>
<td>$13.50</td>
<td>1</td>
<td>View</td>
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<td>Kittitas</td>
<td>Sprinkler Fitters (Fire Protection)</td>
<td>Journey Level</td>
<td>$56.82</td>
<td>7J</td>
<td>1R</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Stage Rigging Mechanics (Non Structural)</td>
<td>Journey Level</td>
<td>$13.50</td>
<td>1</td>
<td>View</td>
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<td>Kittitas</td>
<td>Stone Masons</td>
<td>Journey Level</td>
<td>$50.44</td>
<td>5A</td>
<td>1M</td>
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<td>Location</td>
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<td>Grade Level</td>
<td>Hourly Rate</td>
<td>Code</td>
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<td>Street And Parking Lot Sweeper Workers</td>
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<td>$14.00</td>
<td>1</td>
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<td>Assistant Construction Site Surveyor</td>
<td>$66.05</td>
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<td>3K</td>
<td>8X</td>
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<td>Surveyors</td>
<td>Chainman</td>
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<td>7A</td>
<td>3K</td>
<td>8X</td>
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<td>Construction Site Surveyor</td>
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<td>7A</td>
<td>3K</td>
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<td>Journey Level</td>
<td>$41.22</td>
<td>5I</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Cable Splicer</td>
<td>$41.81</td>
<td>5A</td>
<td>2B</td>
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<td>Telephone Line Construction - Outside</td>
<td>Hole Digger/Ground Person</td>
<td>$23.53</td>
<td>5A</td>
<td>2B</td>
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<td>Telephone Line Construction - Outside</td>
<td>Installer (Repairer)</td>
<td>$40.09</td>
<td>5A</td>
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<td>Telephone Line Construction - Outside</td>
<td>Special Aparatus Installer I</td>
<td>$41.81</td>
<td>5A</td>
<td>2B</td>
<td></td>
<td>View</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Special Aparatus Installer II</td>
<td>$40.99</td>
<td>5A</td>
<td>2B</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Telephone Equipment Operator (Heavy)</td>
<td>$41.81</td>
<td>5A</td>
<td>2B</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Telephone Equipment Operator (Light)</td>
<td>$38.92</td>
<td>5A</td>
<td>2B</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Telephone Lineperson</td>
<td>$38.92</td>
<td>5A</td>
<td>2B</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Television Groundperson</td>
<td>$22.32</td>
<td>5A</td>
<td>2B</td>
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<td>Telephone Line Construction - Outside</td>
<td>Television Lineman/Installer</td>
<td>$29.60</td>
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<td>Telephone Line Construction - Outside</td>
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<td>$31.67</td>
<td>5A</td>
<td>2B</td>
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<td>Kittitas</td>
<td>Telephone Line Construction - Outside</td>
<td>Tree Trimmer</td>
<td>$38.92</td>
<td>5A</td>
<td>2B</td>
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<td>Kittitas</td>
<td>Terrazzo Workers</td>
<td>Journey Level</td>
<td>$43.61</td>
<td>5A</td>
<td>1M</td>
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<td>Kittitas</td>
<td>Tile Setters</td>
<td>Journey Level</td>
<td>$43.61</td>
<td>5A</td>
<td>1M</td>
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<td>Kittitas</td>
<td>Tile, Marble &amp; Terrazzo Finishers</td>
<td>Journey Level</td>
<td>$35.73</td>
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<td>Kittitas</td>
<td>Traffic Control Stripers</td>
<td>Journey Level</td>
<td>$47.68</td>
<td>7A</td>
<td>1K</td>
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<td>Kittitas</td>
<td>Truck Drivers</td>
<td>Asphalt Mix Over 20 Yards</td>
<td>$46.42</td>
<td>5D</td>
<td>1V</td>
<td>8M</td>
<td>View</td>
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<td>Kittitas</td>
<td>Truck Drivers</td>
<td>Asphalt Mix To 20 Yards</td>
<td>$46.05</td>
<td>5D</td>
<td>1V</td>
<td>8M</td>
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<td>Kittitas</td>
<td>Truck Drivers</td>
<td>Dump Truck</td>
<td>$46.05</td>
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<td>1V</td>
<td>8M</td>
<td>View</td>
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<td>Truck Drivers</td>
<td>Dump Truck &amp; Trailer</td>
<td>$46.42</td>
<td>5D</td>
<td>1V</td>
<td>8M</td>
<td>View</td>
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<td>Kittitas</td>
<td>Truck Drivers</td>
<td>Other Trucks</td>
<td>$45.94</td>
<td>5D</td>
<td>1V</td>
<td>8M</td>
<td>View</td>
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<td>Kittitas</td>
<td>Truck Drivers - Ready Mix</td>
<td>Transit Mixers 20 yards and under</td>
<td>$46.42</td>
<td>5D</td>
<td>1V</td>
<td>8M</td>
<td>View</td>
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<tr>
<td>Kittitas</td>
<td>Truck Drivers - Ready Mix</td>
<td>Transit Mixers over 20 yards</td>
<td>$46.75</td>
<td>5D</td>
<td>1V</td>
<td>8M</td>
<td>View</td>
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<td>Kittitas</td>
<td>Well Drillers &amp; Irrigation Pump Installers</td>
<td>Irrigation Pump Installer</td>
<td>$16.51</td>
<td>1</td>
<td></td>
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<td>View</td>
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<td>Kittitas</td>
<td></td>
<td>Oiler</td>
<td>$13.50</td>
<td>1</td>
<td></td>
<td></td>
<td>View</td>
</tr>
<tr>
<td>Location</td>
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<td>Occupation</td>
<td>Rate</td>
<td>Quantity</td>
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<tr>
<td>Kittitas</td>
<td>Well Drillers &amp; Irrigation Pump Installers</td>
<td>Well Driller</td>
<td>$13.50</td>
<td>1</td>
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**Overtime Codes**

Overtime calculations are based on the hourly rate actually paid to the worker. On public works projects, the hourly rate must be not less than the prevailing rate of wage minus the hourly rate of the cost of fringe benefits actually provided for the worker.

1. **ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.**

   B. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   C. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   D. The first two (2) hours before or after a five-eight (8) hour workweek day or a four-ten (10) hour workweek day and the first eight (8) hours worked the next day after either workweek shall be paid at one and one-half times the hourly rate of wage. All additional hours worked and all worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   E. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   F. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours worked, except Labor Day, shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

   G. The first ten (10) hours worked on Saturdays and the first ten (10) hours worked on a fifth calendar weekday in a four-ten hour schedule, shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day Monday through Saturday and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   H. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions or equipment breakdown) shall be paid at one and one-half times the hourly rate of wage. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   I. All hours worked on Sundays and holidays shall also be paid at double the hourly rate of wage.

   J. The first two (2) hours after eight (8) regular hours Monday through Friday and the first ten (10) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over ten (10) hours Monday through Saturday, Sundays and holidays shall be paid at double the hourly rate of wage.

   K. All hours worked on Saturdays and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

   M. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

   N. All hours worked on Saturdays (except makeup days) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.
Overtime Codes Continued

1. O. The first ten (10) hours worked on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays, holidays and after twelve (12) hours, Monday through Friday and after ten (10) hours on Saturday shall be paid at double the hourly rate of wage.

P. All hours worked on Saturdays (except makeup days if circumstances warrant) and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

Q. The first two (2) hours after eight (8) regular hours Monday through Friday and up to ten (10) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day Monday through Saturday and all hours worked on Sundays and holidays (except Christmas day) shall be paid at double the hourly rate of wage. All hours worked on Christmas day shall be paid at two and one-half times the hourly rate of wage.

R. All hours worked on Sundays and holidays shall be paid at two times the hourly rate of wage.

S. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays and all other overtime hours worked, except Labor Day, shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

U. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays (except Labor Day) shall be paid at two times the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

V. All hours worked on Sundays and holidays (except Thanksgiving Day and Christmas day) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Thanksgiving Day and Christmas day shall be paid at double the hourly rate of wage.

W. All hours worked on Saturdays and Sundays (except make-up days due to conditions beyond the control of the employer) shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

X. The first four (4) hours after eight (8) regular hours Monday through Friday and the first twelve (12) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over twelve (12) hours Monday through Saturday, Sundays and holidays shall be paid at double the hourly rate of wage. When holiday falls on Saturday or Sunday, the day before Saturday, Friday, and the day after Sunday, Monday, shall be considered the holiday and all work performed shall be paid at double the hourly rate of wage.

Y. All hours worked outside the hours of 5:00 am and 5:00 pm (or such other hours as may be agreed upon by any employer and the employee) and all hours worked in excess of eight (8) hours per day (10 hours per day for a 4 x 10 workweek) and on Saturdays and holidays (except labor day) shall be paid at one and one-half times the hourly rate of wage. (except for employees who are absent from work without prior approval on a scheduled workday during the workweek shall be paid at the straight-time rate until they have worked 8 hours in a day (10 in a 4 x 10 workweek) or 40 hours during that workweek.) All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and Labor Day shall be paid at double the hourly rate of wage.

Z. All hours worked on Saturdays and Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid the straight time rate of pay in addition to holiday pay.
Overtime Codes Continued

2. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

B. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage.

C. All hours worked on Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at two times the hourly rate of wage.

F. The first eight (8) hours worked on holidays shall be paid at the straight hourly rate of wage in addition to the holiday pay. All hours worked in excess of eight (8) hours on holidays shall be paid at double the hourly rate of wage.

G. All hours worked on Sunday shall be paid at two times the hourly rate of wage. All hours worked on paid holidays shall be paid at two and one-half times the hourly rate of wage including holiday pay.

H. All hours worked on Sunday shall be paid at two times the hourly rate of wage. All hours worked on holidays shall be paid at one and one-half times the hourly rate of wage.

O. All hours worked on Sundays and holidays shall be paid at one and one-half times the hourly rate of wage.

R. All hours worked on Sundays and holidays and all hours worked over sixty (60) in one week shall be paid at double the hourly rate of wage.

U. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked over 12 hours in a day or on Sundays and holidays shall be paid at double the hourly rate of wage.

W. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage. On a four-day, ten-hour weekly schedule, either Monday thru Thursday or Tuesday thru Friday schedule, all hours worked after ten shall be paid at double the hourly rate of wage. The first eight (8) hours worked on the fifth day shall be paid at one and one-half times the hourly rate of wage. All other hours worked on the fifth, sixth, and seventh days and on holidays shall be paid at double the hourly rate of wage.

3. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

A. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal shift, and all work on Saturdays shall be paid at time and one-half the straight time rate. Hours worked over twelve hours (12) in a single shift and all work performed after 6:00 pm Saturday to 6:00 am Monday and holidays shall be paid at double the straight time rate of pay. Any shift starting between the hours of 6:00 pm and midnight shall receive an additional one dollar ($1.00) per hour for all hours worked that shift. The employer shall have the sole discretion to assign overtime work to employees. Primary consideration for overtime work shall be given to employees regularly assigned to the work to be performed on overtime situations. After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.

C. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal shift, and all work on Saturdays shall be paid at one and one-half times the hourly rate of wage. All work performed after 6:00 pm Saturday to 5:00 am Monday and Holidays shall be paid at double the hourly rate of wage. After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.
3. E. All hours worked Sundays and holidays shall be paid at double the hourly rate of wage. Each week, once 40 hours of straight time work is achieved, then any hours worked over 10 hours per day Monday through Saturday shall be paid at double the hourly wage rate.

F. All hours worked on Sunday shall be paid at one and one-half times the hourly rate of wage. All hours worked on Saturday shall be paid at two times the hourly rate of wage. All hours worked on paid holidays shall be paid at two and one-half times the hourly rate of wage including holiday pay.

H. All work performed on Sundays between March 16th and October 14th and all Holidays shall be compensated for at two (2) times the regular rate of pay. Work performed on Sundays between October 15th and March 15th shall be compensated at one and one half (1-1/2) times the regular rate of pay.

J. All hours worked between the hours of 10:00 pm and 5:00 am, Monday through Friday, and all hours worked on Saturdays shall be paid at a one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

K. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal 5 am to 6pm shift, and all work on Saturdays shall be paid at one and one-half times the hourly rate of wage. All work performed after 6:00 pm Saturday to 5:00 am Monday and Holidays, and all hours worked in excess of twelve (12) hours in a single shift shall be paid at double the hourly rate of wage.

After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more. When an employee returns to work without at least eight (8) hours time off since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until he/she shall have the eight (8) hours rest period.

4. ALL HOURS WORKED IN EXCESS OF EIGHT (8) HOURS PER DAY OR FORTY (40) HOURS PER WEEK SHALL BE PAID AT ONE AND ONE-HALF TIMES THE HOURLY RATE OF WAGE.

A. All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at double the hourly rate of wage. All hours worked on Saturdays, Sundays and holidays shall be paid at double the hourly rate of wage.

B. All hours worked over twelve (12) hours per day and all hours worked on holidays shall be paid at double the hourly rate of wage.

C. On Monday through Friday, the first four (4) hours of overtime after eight (8) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay, unless a four (4) day ten (10) hour workweek has been established. On a four (4) day ten (10) hour workweek scheduled Monday through Thursday, or Tuesday through Friday, the first two (2) hours of overtime after ten (10) hours of straight time work shall be paid at one and one half (1-1/2) times the straight time rate of pay. On Saturday, the first ten (10) hours of work shall be paid at one and one half (1-1/2) times the straight time rate of pay, except that if the job is down on Monday through Friday due to weather conditions or other conditions outside the control of the employer, the first ten (10) hours on Saturday may be worked at the straight time rate of pay. All hours worked over twelve (12) hours in a day and all hours worked on Sunday and Holidays shall be paid at two (2) times the straight time rate of pay.
4. D. All hours worked in excess of eight (8) hours per day or forty (40) hours per week shall be paid at double the hourly rate of wage. All hours worked on Saturday, Sundays and holidays shall be paid at double the hourly rate of pay. Rates include all members of the assigned crew.

EXCEPTION:
On all multipole structures and steel transmission lines, switching stations, regulating, capacitor stations, generating plants, industrial plants, associated installations and substations, except those substations whose primary function is to feed a distribution system, will be paid overtime under the following rates:

The first two (2) hours after eight (8) regular hours Monday through Friday of overtime on a regular workday, shall be paid at one and one-half times the hourly rate of wage. All hours in excess of ten (10) hours will be at two (2) times the hourly rate of wage. The first eight (8) hours worked on Saturday will be paid at one and one-half (1-1/2) times the hourly rate of wage. All hours worked in excess of eight (8) hours on Saturday, and all hours worked on Sundays and holidays will be at the double the hourly rate of wage.

All overtime eligible hours performed on the above described work that is energized, shall be paid at the double the hourly rate of wage.

E. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

On a four-day, ten-hour weekly schedule, either Monday thru Thursday or Tuesday thru Friday schedule, all hours worked after ten shall be paid at double the hourly rate of wage. The Monday or Friday not utilized in the normal four-day, ten hour work week, and Saturday shall be paid at one and one half (1½) times the regular shift rate for the first eight (8) hours. All other hours worked Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

F. All hours worked between the hours of 6:00 pm and 6:00 am, Monday through Saturday, shall be paid at a premium rate of 20% over the hourly rate of wage. All hours worked on Sundays shall be paid at one and one-half times the hourly rate of wage. All hours worked on holidays shall be paid at double the hourly rate of wage.

G. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked Monday through Saturday over twelve (12) hours and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

H. The first two (2) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All other overtime hours worked, except Labor Day, and all hours on Sunday shall be paid at double the hourly rate of wage. All hours worked on Labor Day shall be paid at three times the hourly rate of wage.

I. The First eight (8) hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of eight (8) per day on Saturdays shall be paid at double the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

J. The first eight (8) hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of eight (8) hours on a Saturday shall be paid at double the hourly rate of wage. All hours worked over twelve (12) in a day, and all hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.

K. All hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage, so long as Saturday is the sixth consecutive day worked. All hours worked over twelve (12) in a day Monday through Saturday, and all hours worked on Sundays and Holidays shall be paid at double the hourly rate of wage.
4. L. The first twelve (12) hours worked on a Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked on a Saturday in excess of twelve (12) hours shall be paid at double the hourly rate of pay. All hours worked over twelve (12) in a day Monday through Friday, and all hours worked on Sundays shall be paid at double the hourly rate of wage. All hours worked on a holiday shall be paid at one and one-half times the hourly rate of wage, except that all hours worked on Labor Day shall be paid at double the hourly rate of pay.

M. All hours worked on Sunday and Holidays shall be paid at double the hourly rate. Any employee reporting to work less than nine (9) hours from their previous quitting time shall be paid for such time at time and one-half times the hourly rate.

N. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays, and all work performed between the hours of midnight (12:00 AM) and eight AM (8:00 AM) every day shall be paid at double the hourly rate of wage.

O. All hours worked between midnight Friday to midnight Sunday shall be paid at one and one-half the hourly rate of wage. After an employee has worked in excess of eight (8) continuous hours in any one or more calendar days, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of six (6) hours or more. All hours worked on Holidays shall be paid at double the hourly rate of wage.

P. All hours worked on Holidays shall be paid at one and one-half times the hourly rate of wage.

Q. The first four (4) hours after eight (8) regular hours Monday through Friday and the first eight (8) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. All hours worked over twelve (12) hours Monday through Saturday shall be paid at double the hourly rate. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

R. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage, so long as Saturday is the sixth consecutive day worked. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

S. All hours worked on Saturdays and Holidays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays shall be paid at double the hourly rate of wage.

T. The first two (2) hours of overtime for hours worked Monday-Friday shall be paid at one and one-half times the hourly rate of wage. All hours worked in excess of ten (10) hours per day shall be paid at double the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage. For work on Saturday which is scheduled prior to the end of shift on Friday, the first six (6) hours work shall be paid at one and one-half times the hourly rate of wage, and all hours over (6) shall be paid double the hourly rate of wage. For work on Saturday which was assigned following the close of shift on Friday, all work shall be paid at double the hourly rate of wage.

U. The first four (4) hours after eight (8) regular hours Monday through Friday and the first twelve (12) hours on Saturday shall be paid at one and one-half times the hourly rate of wage. (Except on makeup days if work is lost due to inclement weather, then the first eight (8) hours on Saturday may be paid the regular rate.) All hours worked over twelve (12) hours Monday through Saturday, and all hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.
Overtime Codes Continued

4. V. Work performed in excess of ten (10) hours of straight time per day when four ten (10) hour shifts are established or outside the normal shift (5 am to 6pm), and all work on Saturdays, except for make-up days shall be paid at time and one-half (1 ½) the straight time rate.

In the event the job is down due to weather conditions, then Saturday may be worked as a voluntary make-up day at the straight time rate. However, Saturday shall not be utilized as a make-up day when a holiday falls on Friday. All work performed on Sundays and holidays and work in excess of twelve (12) hours per day shall be paid at double (2x) the straight time rate of pay.

After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

When an employee returns to work without a break of eight (8) hours since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

W. All hours worked on Saturdays (except makeup days if work is lost due to inclement weather conditions) shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage.

When an employee returns to work without at least eight (8) hours time off since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.

X. All hours worked on Saturdays shall be paid at one and one-half times the hourly rate of wage. All hours worked on Sundays and holidays shall be paid at double the hourly rate of wage. Work performed outside the normal shift of 6 am to 6pm shall be paid at one and one-half the straight time rate, (except for special shifts or three shift operations). All work performed on Sundays and holidays shall be paid at double the hourly rate of wage. Shifts may be established when considered necessary by the Employer.

The Employer may establish shifts consisting of eight (8) or ten (10) hours of work (subject to WAC 296-127-022), that shall constitute a normal forty (40) hour work week. The Employer can change from a 5-eight to a 4-ten hour schedule or back to the other. All hours of work on these shifts shall be paid for at the straight time hourly rate. Work performed in excess of eight hours (or ten hours per day (subject to WAC 296-127-022) shall be paid at one and one-half the straight time rate.

When due to conditions beyond the control of the Employer, or when contract specifications require that work can only be performed outside the regular day shift, then by mutual agreement a special shift may be worked at the straight time rate, eight (8) hours work for eight (8) hours pay. The starting time shall be arranged to fit such conditions of work.

When an employee returns to work without at a break of eight (8) hours since their previous shift, all such time shall be a continuation of shift and paid at the applicable overtime rate until such time as the employee has had a break of eight (8) hours.
Overtime Codes Continued

4. Y. Work performed in excess of eight (8) hours of straight time per day, or ten (10) hours of straight time per day when four ten (10) hour shifts are established, or forty (40) hours of straight time per week, Monday through Friday, or outside the normal shift, and all work on Saturdays shall be paid at time and one-half the straight time rate. All work performed after 6:00 pm Saturday to 6:00 am Monday and holidays shall be paid at double the straight time rate of pay.

Any shift starting between the hours of 6:00 pm and midnight shall receive an additional one dollar ($1.00) per hour for all hours worked that shift.

After an employee has worked eight (8) hours at an applicable overtime rate, all additional hours shall be at the applicable overtime rate until such time as the employee has had a break of eight (8) hours or more.

Holiday Codes


Holiday Codes Continued


Z. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, And Christmas Day (7). If a holiday falls on Saturday, the preceding Friday shall be considered as the holiday. If a holiday falls on Sunday, the following Monday shall be considered as the holiday.

7. A. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any Holiday Which Falls On A Sunday Shall Be Observed As A Holiday On The Following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

B. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

C. Holidays: New Year's Day, Martin Luther King Jr. Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.
Holiday Codes Continued


E. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

F. Holidays: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the last working day before Christmas Day and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.


H. Holidays: New Year's Day, Martin Luther King Jr. Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

I. Holidays: New Year's Day, President’s Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, The Day Before Christmas Day And Christmas Day (9). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

J. Holidays: New Year's Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day and Christmas Day (6). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

K. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, the Friday and Saturday after Thanksgiving Day, and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

L. Holidays: New Year's Day, Memorial Day, Independence Day, Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

M. Paid Holidays: New Year's Day, The Day after or before New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and the Day after or before Christmas Day (10). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

N. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day (7). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. When Christmas falls on a Saturday, the preceding Friday shall be observed as a holiday.

Holiday Codes Continued

7. Q. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the Last Working Day before Christmas Day and Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. If any of the listed holidays falls on a Saturday, the preceding Friday shall be a regular work day.

R. Paid Holidays: New Year's Day, the day after or before New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and the day after or before Christmas Day (10). If any of the listed holidays fall on Saturday, the preceding Friday shall be observed as the holiday. If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

S. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Friday after Thanksgiving Day, Christmas Day, the Day after Christmas, and A Floating Holiday (9). If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

T. Paid Holidays: New Year's Day, the Day after or before New Year’s Day, President’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and The Day after or before Christmas Day (10). If any of the listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

V. Holidays: New Year's Day, President’s Birthday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, the day before or after Christmas, and the Day after or before New Year’s Day. If any of the above listed holidays falls on a Sunday, the day observed by the Nation shall be considered a holiday and compensated accordingly.

W. Holidays: New Year's Day, Day After New Year’s, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Eve Day, Christmas Day, the day after Christmas, the day before New Year’s Day, and a Floating Holiday.

X. Holidays: New Year's Day, Day before or after New Year’s Day, Presidents’ Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Day, and the day before or after Christmas day. If a holiday falls on a Saturday or on a Friday that is the normal day off, then the holiday will be taken on the last normal workday. If the holiday falls on a Monday that is the normal day off or on a Sunday, then the holiday will be taken on the next normal workday.

Y. Holidays: New Year's Day, Presidents’ Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day (8). If the holiday falls on a Sunday, then the day observed by the federal government shall be considered a holiday and compensated accordingly.

Z. Holidays: New Year's Day, President’s Day, Independence Day, Memorial Day, Labor Day, Thanksgiving Day, The Friday After Thanksgiving Day, And Christmas Day (8). Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday. Any holiday which falls on a Saturday shall be observed as a holiday on the preceding Friday.

15. A. Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, the day before Christmas Day and Christmas Day. (8) Any holiday which falls on a Sunday shall be observed as a holiday on the following Monday.


**Note Codes**

8. D.  Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.

L.  Workers on hazmat projects receive additional hourly premiums as follows - Level A: $0.75, Level B: $0.50, and Level C: $0.25.

M.  Workers on hazmat projects receive additional hourly premiums as follows: Levels A & B: $1.00, Levels C & D: $0.50.

N.  Workers on hazmat projects receive additional hourly premiums as follows - Level A: $1.00, Level B: $0.75, Level C: $0.50, and Level D: $0.25.

P.  Workers on hazmat projects receive additional hourly premiums as follows - Class A Suit: $2.00, Class B Suit: $1.50, Class C Suit: $1.00, and Class D Suit $0.50.

Q.  The highest pressure registered on the gauge for an accumulated time of more than fifteen (15) minutes during the shift shall be used in determining the scale paid.

S.  Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.

T.  Effective August 31, 2012 – A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. This classification is only effective on or after August 31, 2012.

U.  Workers on hazmat projects receive additional hourly premiums as follows – Class A Suit: $2.00, Class B Suit: $1.50, and Class C Suit: $1.00. Workers performing underground work receive an additional $0.40 per hour for any and all work performed underground, including operating, servicing and repairing of equipment. The premium for underground work shall be paid for the entire shift worked. Workers who work suspended by a rope or cable receive an additional $0.50 per hour. The premium for work suspended shall be paid for the entire shift worked. Workers who do “pioneer” work (break open a cut, build road, etc.) more than one hundred fifty (150) feet above grade elevation receive an additional $0.50 per hour.
8. **In addition to the hourly wage and fringe benefits, the following depth and enclosure premiums shall be paid. The premiums are to be calculated for the maximum depth and distance into an enclosure that a diver reaches in a day. The premiums are to be paid one time for the day and are not used in calculating overtime pay.**

Depth premiums apply to depths of fifty feet or more. Over 50’ to 100’ - $2.00 per foot for each foot over 50 feet. Over 101’ to 150’ - $3.00 per foot for each foot over 101 feet. Over 151’ to 220’ - $4.00 per foot for each foot over 220 feet. Over 221’ - $5.00 per foot for each foot over 221 feet.

Enclosure premiums apply when divers enter enclosures (such as pipes or tunnels) where there is no vertical ascent and is measured by the distance travelled from the entrance. 25’ to 300’ - $1.00 per foot from entrance. 300’ to 600’ - $1.50 per foot beginning at 300’. Over 600’ - $2.00 per foot beginning at 600’.

W. **Meter Installers work on single phase 120/240V self-contained residential meters. The Lineman/Groundmen rates would apply to meters not fitting this description.**

X. **Workers on hazmat projects receive additional hourly premiums as follows - Class A Suit: $2.00, Class B Suit: $1.50, Class C Suit: $1.00, and Class D Suit: $0.50. Special Shift Premium: Basic hourly rate plus $2.00 per hour.**

When due to conditions beyond the control of the Employer or when an owner (not acting as the contractor), a government agency or the contract specifications requires that work can only be performed outside the normal 5 am to 6pm shift, then the special shift premium will be applied to the basic hourly rate. When an employee works on a special shift, they shall be paid a special shift premium for each hour worked unless they are in OT or Double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)

Y. **Tide Work: When employees are called out between the hours of 6:00 p.m. and 6:00 a.m. to work on tide work (work located in the tide plane) all time worked shall be at one and one-half times the hourly rate of pay.**

Swinging Stage/Boatswains Chair: Employees working on a swinging state or boatswains chair or under conditions that require them to be tied off to allow their hands to be free shall receive seventy-five cents ($0.75) per hour above the classification rate.

Z. **Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.**

Special Shift Premium: Basic hourly rate plus $2.00 per hour. When due to conditions beyond the control of the Employer or when an owner (not acting as a contractor), a government agency or the contract specifications require that more than (4) hours of a special shift can only be performed outside the normal 6 am to 6pm shift, then the special shift premium will be applied to the basic straight time for the entire shift. When an employee works on a special shift, they will be paid a special shift premium for each hour worked unless they are in overtime or double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)
9. A. Workers working with supplied air on hazmat projects receive an additional $1.00 per hour.

   Special Shift Premium: Basic hourly rate plus $2.00 per hour. When due to conditions beyond the control of the Employer or when an owner (not acting as the contractor), a government agency or the contract specifications require that more than four (4) hours of a special shift can only be performed outside the normal 6 am to 6 pm shift, then the special shift premium will be applied to the basic straight time for the entire shift. When an employee works on a special shift, they shall be paid a special shift premium for each hour worked unless they are in overtime or double-time status. (For example, the special shift premium does not waive the overtime requirements for work performed on Saturday or Sunday.)

   Certified Crane Operator Premium: Crane operators requiring certifications shall be paid $0.50 per hour above their classification rate.

   Boom Pay Premium: All cranes including tower shall be paid as follows based on boom length:

   (A) – 130’ to 199’ – $0.50 per hour over their classification rate.
   (B) – 200’ to 299’ – $0.80 per hour over their classification rate.
   (C) – 300’ and over – $1.00 per hour over their classification rate.

B. The highest pressure registered on the gauge for an accumulated time of more than fifteen (15) minutes during the shift shall be used in determining the scale paid.

   Tide Work: When employees are called out between the hours of 6:00 p.m. and 6:00 a.m. to work on tide work (work located in the tide plane) all time worked shall be at one and one-half times the hourly rate of pay. Swinging Stage/Boatswains Chair: Employees working on a swinging stage or boatswains chair or under conditions that require them to be tied off to allow their hands to be free shall receive seventy-five cents ($0.75) per hour above the classification rate.

C. Tide Work: When employees are called out between the hours of 6:00 p.m. and 6:00 a.m. to work on tide work (work located in the tide plane) all time worked shall be at one and one-half times the hourly rate of pay. Swinging Stage/Boatswains Chair: Employees working on a swinging stage or boatswains chair or under conditions that require them to be tied off to allow their hands to be free shall receive seventy-five cents ($0.75) per hour above the classification rate.

Effective August 31, 2012 – A Traffic Control Supervisor shall be present on the project whenever flagging or spotting or other traffic control labor is being utilized. A Traffic Control Laborer performs the setup, maintenance and removal of all temporary traffic control devices and construction signs necessary to control vehicular, bicycle, and pedestrian traffic during construction operations. Flaggers and Spotters shall be posted where shown on approved Traffic Control Plans or where directed by the Engineer. All flaggers and spotters shall possess a current flagging card issued by the State of Washington, Oregon, Montana, or Idaho. These classifications are only effective on or after August 31, 2012.

D. Industrial Painter wages are required for painting within industrial facilities such as treatment plants, pipelines, towers, dams, bridges, power generation facilities and manufacturing facilities such as chemical plants, etc., or anywhere abrasive blasting is necessary to prepare surfaces, or hazardous materials encapsulation is required.

E. Heavy Construction includes construction, repair, alteration or additions to the production, fabrication or manufacturing portions of industrial or manufacturing plants, hydroelectric or nuclear power plants and atomic reactor construction. Workers on hazmat projects receive additional hourly premiums as follows -Level A: $1.00, Level B: $0.75, Level C: $0.50, And Level D: $0.25.
PART 6

APPENDIX
APPENDIX A

SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA
APPENDIX A

SUPPLEMENTAL BIDDER RESPONSIBILITY CRITERIA FORMS
MAIN STREET LIFT STATION

These forms shall be completed in their entirety and submitted by the apparent two lowest Bidders to the City of Kittitas by 12:00 p.m. (noon) of the second business day following the bid submittal deadline.

Failure to submit and meet the requirements as stated in Section 2.01.8 of the General Conditions shall be grounds for rejection of the bid. The City of Kittitas will be the sole judge in determining if the prospective contractor meets the minimum experience requirements.

Contractor:

Name: ____________________________________________________________
Address: __________________________________________________________
Phone: ____________________________________________________________
Contact Person: ____________________________________________________

2. Delinquent State Taxes

Instructions to Bidders: Check the appropriate box

☐ The Bidder does not owe delinquent taxes to the Washington State Department of Revenue.

☐ Alternatively, the Bidder does owe delinquent taxes to the Washington State Department of Revenue.

If the Bidder owes delinquent taxes, they must submit a written payment plan approved by the Department of Revenue, to the Contracting Agency.

______________________________  ________________________________
(Date)                        (Signature)

______________________________
(Print Name)

______________________________
(Title)
3. **Claims Against Retainage and Bonds:**

Instructions to Bidders: Check the appropriate box

- [ ] The Bidder **has not** had claims against retainage and bonds in the 3 years prior to the bid submittal date.

- [ ] Alternatively, the Bidder **has** had claims against retainage and bonds in the 3 years prior to the bid submittal date.

If the Bidder **has** had claims against retainage and bonds in the 3 years prior to the bid submittal date, submit a list of public works projects completed during this period that have had claims against retainage and bonds and include name of Project, contact information for the Owner, a list of claims filed against retainage and/or payment bond for any of the projects listed; and a written explanation of circumstances surrounding each claim and the ultimate resolution of the claim.

__________________________________________  ____________________________________
(Date)                                           (Signature)

______________________________________________
(Print Name)

______________________________________________
(Title)
4. **Public Bidding Crime:**

Instructions to Bidders: Check the appropriate box

☐ The undersigned certifies that the Bidder and/or its Owners **have not** been convicted of a crime involving bidding on a public works contract in the 5 years prior to the bid submittal date.

☐ Alternatively, the undersigned confirms that the Bidder and/or its Owners **have** been convicted of a crime involving bidding on a public works contract in the 5 years prior to the bid submittal date.

If the Bidder and/or its Owners **have** been convicted of a crime involving bidding on a public works contract, provide a written explanation identifying the date of the conviction and a description of the circumstances surrounding the conviction.

________________________________________  ____________________________________
(Date)                                                   (Signature)

______________________________
(Print Name)

______________________________
(Title)
5. **Termination for Cause/Termination for Default**

Instructions to Bidders: Check the appropriate box

☐ The undersigned certifies that the Bidder has not had any public works contracts terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date.

☐ Alternatively, the undersigned confirms that the Bidder has had public works contracts terminated for cause or terminated for default by a government agency in the 5 years prior to the bid submittal date.

If the Bidder has had any public works contracts terminated for cause or terminated for default in the 5 years prior to the bid submittal date, provide a written explanation for all contracts terminated for cause or terminated for default by identifying the project contract that was terminated, the government agency which terminated the Contract, the date of the termination, and a description of the circumstances surrounding the termination.

\[\text{(Date)} \quad \text{(Signature)}\]

\[\text{(Print Name)}\]

\[\text{(Title)}\]
6. **Lawsuits**

Instructions to Bidders: Check the appropriate box

☐ The undersigned certifies that the Bidder has not had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts.

☐ Alternatively, the undersigned confirms that the Bidder has had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts.

If the Bidder has had any lawsuits with judgments entered against the Bidder in the 5 years prior to the bid submittal date that demonstrate a pattern of failing to meet the terms of contracts, submit a list of lawsuits along with a written explanation of the circumstances surrounding each lawsuit. The Contracting Agency shall evaluate these explanations to determine whether the lawsuits demonstrate a pattern of failing to meet the terms of contracts.

______________________________  ______________________________
(Date)  (Signature)

______________________________
(Print Name)

______________________________
(Title)
7. **Contract Time (Liquidated Damages)**

Instructions to Bidders: Check the appropriate box

☐ The undersigned certifies that the Bidder has not had liquidated damages assessed on any project it has completed in the 5 years prior to the bid submittal date.

☐ Alternatively, the undersigned confirms that the Bidder has had liquidated damages assessed on projects in the 5 years prior to the bid submittal date.

If the Bidder has had liquidated damages assessed against projects in the 5 years prior to the bid submittal date, submit a list of projects along with Owner contact information, and number of days assessed liquidated damages. The Contracting Agency shall determine whether the Contractor has a pattern of failing to complete projects within Contract Time.

______________________________  ______________________________
(Date)                        (Signature)

______________________________
(Print Name)

______________________________
(Title)
8. **Capacity and Experience**

The Bidder shall have sufficient current capacity and the Project Superintendent assigned to the Project shall have experience to meet the requirements of this Project. The Bidder and Project Superintendent shall have successfully completed at least two projects as the prime contractor, of a similar size and scope, during the 5-year period immediately preceding the bid submittal deadline for this project. Similar size is defined as a minimum of 70 percent of the bid amount submitted by the Bidder.

A. Capacity

   i. Gross dollar amount of work currently under contract:

   

   ii. Gross dollar amount of contracts currently not completed:

   

   iii. List five major pieces of equipment which are anticipated to be used on this project by the Contractor and note which items are owned by the Contractor and which are to be leased or rented from others:

   

   iv. Number of superintendents on Bidder’s staff:
B. Experience

i. General character of work performed by firm:

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

ii. Identify who will be the superintendent on this project and years of experience. Also, list the number of years this person has been with your firm.

_____________________________________________________________________
_____________________________________________________________________

iii. Similar Size and Scope Projects Completed in the Past 5 Years

#1 Owner’s Name and Contact Information: ________________

Owner is a Government Agency? ___ Yes ___ No
Superintendent’s Name: _____________________________
Project Name: _________________________________
Awarded Contract Amount: _______________________
Final Contract Amount: __________________________
Completion Date: _______________________________
Project Description: ____________________________

_____________________________________________________________________
_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________

_____________________________________________________________________


SC-8 of 9
#2 Owner’s Name and Contact Information: ______________
_________________________________________________

Owner is a Government Agency?  ___ Yes  ____ No
Superintendent’s Name: ______________________________
Project Name: ________________________________
Awarded Contract Amount: ______________________________
Final Contract Amount: ______________________________
Completion Date: ______________________________
Project Description: ______________________________

#3 Owner’s Name and Contact Information: ______________
_________________________________________________

Owner is a Government Agency?  ___ Yes  ____ No
Superintendent’s Name: ______________________________
Project Name: ______________________________
Awarded Contract Amount: ______________________________
Final Contract Amount: ______________________________
Completion Date: ______________________________
Project Description: ______________________________

_________________________________________________
APPENDIX B

TEMPORARY CONSTRUCTION PERMITS
KITTITAS, KITTIAS COUNTY, STATE OF WASHINGTON
MAIN STREET LIFT STATION

TEMPORARY CONSTRUCTION EASEMENT

Parcel Number: 632233

Abbreviated Legal Description: Sec. 11, T17N, R19E, SW ¼ NE ¼ Taxlot 3 & SE ¼ NE1/4 Taxlot 14

Property Owner: Gibb, John R Etux & Gibb, Kevin W Etux

The undersigned, _______________________________________________________________, their heirs, successors and assigns, hereinafter together referred to as "GRANTOR(S)", for and in consideration of improvements to the Main Street Lift Station, does hereby convey and grant to the City of Kittitas, a temporary construction easement in, along and across the Grantor’s property, for the purpose of constructing certain sanitary sewer pump station improvements per City Standards and approved City Plans (Project Plans), and do further grant the use of immediately adjacent property for the purpose of performing this work, including excavating, installing new pump station, blending new improvements into adjacent private property by shaping, grading, and restoring the surface, to include related and miscellaneous construction items, as necessary, all costs of which shall be borne by the City.

The GRANTOR hereby and the City, by accepting and signing this document, mutually convenant and agree as follows:

(1) City shall upon completion of the work, remove all debris and restore any disturbed surface of the above described property as was caused by City’s licensed, bonded, and insured Contractor, to a condition equal to or better than that which existed at the date of this agreement.

(2) Access to GRANTOR’S property shall be maintained at all times during the City’s Main Street Lift Station project.

(3) This Temporary Construction Easement shall terminate upon the City’s formal acceptance of the completion of this Project, or by December 31, 2020, whichever shall first occur.

DATED THIS __________ DAY OF _____________, 20____.

On this day personally appeared before me ____________________________ to me known to be individual(s) described in and who executed the within and foregoing instrument and acknowledged that he/she/they signed the same as his/her/their free and voluntary act and deed for the uses and purposes herein mentioned.
Given under my hand and official seal this _____ day of __________________, 20____.

__________________________________________________

Notary Public in and for the State of Washington, Residing at
APPENDIX C

BORING LOGS
(FOR INFORMATION ONLY)
RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

<table>
<thead>
<tr>
<th>COHESIONLESS SOILS</th>
<th>COHESIVE SOILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N (blows/ft)</td>
</tr>
<tr>
<td>Very Loose</td>
<td>0 to 4</td>
</tr>
<tr>
<td>Loose</td>
<td>4 to 10</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>10 to 30</td>
</tr>
<tr>
<td>Dense</td>
<td>30 to 50</td>
</tr>
<tr>
<td>Very Dense</td>
<td>over 50</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

USCS SOIL CLASSIFICATION SYSTEM

<table>
<thead>
<tr>
<th>MAJOR DIVISIONS</th>
<th>GROUP DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Grained</td>
<td>GW Well-graded GRAVEL</td>
</tr>
<tr>
<td>Soils</td>
<td>GP Poorly-graded GRAVEL</td>
</tr>
<tr>
<td>More than 50%</td>
<td>GM Silty GRAVEL</td>
</tr>
<tr>
<td>of Coarse</td>
<td>GC Clayey GRAVEL</td>
</tr>
<tr>
<td>Fraction Retained on No. 4 Sieve</td>
<td></td>
</tr>
<tr>
<td>Finer than 50%</td>
<td>SW Well-graded SAND</td>
</tr>
<tr>
<td>of Coarse</td>
<td>SP Poorly-graded SAND</td>
</tr>
<tr>
<td>Fraction Passing No. 4 Sieve</td>
<td></td>
</tr>
<tr>
<td>Finer than 50%</td>
<td>SM Silty SAND</td>
</tr>
<tr>
<td>of Coarse</td>
<td>SC Clayey SAND</td>
</tr>
<tr>
<td>Fraction Passing No. 200 Sieve</td>
<td></td>
</tr>
<tr>
<td>Finer than 50%</td>
<td>ML SILT</td>
</tr>
<tr>
<td>of Coarse</td>
<td>CL Lean CLAY</td>
</tr>
<tr>
<td>Fraction Passing No. 200 Sieve</td>
<td></td>
</tr>
<tr>
<td>Finer than 50%</td>
<td>OL Organic Silt/Organic CLAY</td>
</tr>
<tr>
<td>of Coarse</td>
<td>MH Elastic SILT</td>
</tr>
<tr>
<td>Fraction Passing No. 200 Sieve</td>
<td></td>
</tr>
<tr>
<td>Finer than 50%</td>
<td>CH Fat CLAY</td>
</tr>
<tr>
<td>of Coarse</td>
<td>OH Organic Silt/Organic CLAY</td>
</tr>
<tr>
<td>Highly Organic Soils</td>
<td>PT PEAT</td>
</tr>
</tbody>
</table>

COMPONENT DEFINITIONS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>SIZE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulders</td>
<td>Larger than 12 in</td>
</tr>
<tr>
<td>Cobble</td>
<td>3 in to 12 in</td>
</tr>
<tr>
<td>Gravel</td>
<td>3 in to No. 4 (4.5mm)</td>
</tr>
<tr>
<td>Coarse gravel</td>
<td>3 in to 3/4 in</td>
</tr>
<tr>
<td>Fine gravel</td>
<td>3/4 in to No. 4 (4.5mm)</td>
</tr>
<tr>
<td>Sand</td>
<td>No. 4 (4.5mm) to No. 200 (0.074 mm)</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>No. 4 (4.5mm) to No. 10 (2.0 mm)</td>
</tr>
<tr>
<td>Medium sand</td>
<td>No. 10 (2.0 mm) to No. 40 (0.42 mm)</td>
</tr>
<tr>
<td>Fine sand</td>
<td>No. 40 (0.42 mm) to No. 200 (0.074 mm)</td>
</tr>
<tr>
<td>Silt and Clay</td>
<td>Smaller than No. 200 (0.074mm)</td>
</tr>
</tbody>
</table>

COMPONENT PROPORTIONS

<table>
<thead>
<tr>
<th>PROPORTION RANGE</th>
<th>DESCRIBTIVE TERMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5%</td>
<td>Clean</td>
</tr>
<tr>
<td>5 - 12%</td>
<td>Slightly (Clayey, Silty, Sandy)</td>
</tr>
<tr>
<td>12 - 30%</td>
<td>Clayey, Silty, Sandy, Gravely</td>
</tr>
<tr>
<td>30 - 50%</td>
<td>Very (Clayey, Silty, Sandy, Gravely)</td>
</tr>
</tbody>
</table>

MOISTURE CONTENT

| DRY | Absence of moisture, dry to the touch. |
| MOIST | Damp but no visible water. |
| WET | Visible free water, usually soil is below water table. |

LEGEND OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

Caribou Creek Bridge Replacement
Kittitas, Washington

PROJECT NO.: 2005-028
FIGURE: A-1

NOTES: Soil classifications presented on exploration logs are based on visual and laboratory observation. Soil descriptions are presented in the following general order:
- Density/consistency, color, modifiers (if any) GROUP NAME, additions to group name (if any), moisture content. Proportion, gradation, and uniformity of constituents, additional comments.
- Geological Interpretation

Please refer to the discussion in the report text as well as the exploration logs for a more complete description of subsurface conditions.
Drilling Company: Holocene Drilling
Drilling Method: Hollow Stem Auger - Mobile B61
Sampling Method: SPT/w/autohammer
Surface Elevation: ± feet

Location: Station 22+95, 15' N of Centerline of Existing Road
Date Started: 03/24/2005
Date Completed: 03/24/2005
Logged by: B. Hawkins

For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report.

Note: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

Caribou Creek Bridge Replacement
Kittitas, Washington

Boring: BH-1
Project No.: 2005-028
Figure: A-2
For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report.

NOTE: This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>SYMBOL</th>
<th>USGS SOIL CLASS</th>
<th>DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>MOISTURE CONTENT (%)</th>
<th>OTHER TESTS</th>
<th>GROUNDWATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>ML</td>
<td></td>
<td>Soft to medium stiff, dark brown, fine sandy SILT, moist. Abundant organics/roots noted.</td>
<td>S-1</td>
<td>35</td>
<td>GS</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>ML</td>
<td></td>
<td>Medium stiff, brown and dark brown, fine sandy SILT, moist. Pinhole structure noted from root decay. Rootlets noted. Trace fine gravel.</td>
<td>S-2</td>
<td>35</td>
<td>GS</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GP</td>
<td>GM</td>
<td>Loose to medium dense, brown and dark brown, silty, sandy, fine to coarse GRAVEL and COBBLES, moist to wet. Gravel and cobbles primarily basalt.</td>
<td>S-3</td>
<td>9</td>
<td>GS</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>GP</td>
<td>GM</td>
<td>Medium dense/dense, brown, silty, sandy, fine to coarse GRAVEL and COBBLES, wet. Gravel and cobbles primarily basalt.</td>
<td>S-4</td>
<td>11</td>
<td>GS</td>
<td></td>
</tr>
</tbody>
</table>

Total depth = 6.5 feet. Static ground water level at 6 feet at time of excavation. Some minor caving/slothing of sidewalls below 4 feet.

**NOTE:** For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.
NOTE: For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.
EXCAVATION COMPANY: Holocene Drilling
EXCAVATING EQUIPMENT: Backhoe - JD 310 E
SURFACE ELEVATION: ± Feet

LOCATION: Station 15+28, Centerline
DATE COMPLETED: 3/24/05
LOGGED BY: B. Hawkins

DEPTH (feet)

USGS SOIL CLASS.

DESCRIPTION

SAMPLE TYPE

MOISTURE CONTENT (%)

OTHER TESTS

GROUNDWATER

SKETCH OF SIDE OF PIT

HORIZONTAL DISTANCE (feet)

DEPTH (feet)

NOTE: For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

Caribou Creek Bridge Replacement
Kittitas, Washington

LOG OF TEST PIT
TP-3
PAGE: 1 of 1
PROJECT NO.: 2005-028
FIGURE: A-6
EXCAVATION COMPANY: Holocene Drilling
EXCAVATING EQUIPMENT: Backhoe - JD 310 E
SURFACE ELEVATION:  Feet

LOCATION: Station 21+25, Centerline
DATE COMPLETED: 3/24/05
LOGGED BY: B. Hawkins

DEPTH (feet)  SYMBOL  USGS SOIL CLASS  DESCRIPTION
0          ML       Soft to medium stiff, dark brown, fine sandy SILT, moist. Rootlets and organics noted. Pinnate structure noted. [LOESS]
2          GP       Loose/medium dense, brown, silty/clayey, sandy, fine to coarse GRAVEL and COBBLES, moist. Gravel and cobbles are primarily rounded to subrounded. [FLOOD DEPOSIT]
4          GM
6          S-1     33 GS CBR/DD
8          S-2     9 GS
10         S-3     18

Total depth = 7.5 feet.
Slight ground water seepage at 7.5 feet.
No caving of sidewalls noted.

NOTE: For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

Caribou Creek Bridge Replacement
Kittitas, Washington

LOG OF TEST PIT
TP-4
PAGE: 1 of 1

PROJECT NO.: 2005-028  FIGURE: A-7
### RELATIVE DENSITY OR CONSISTENCY VERSUS SPT N-VALUE

<table>
<thead>
<tr>
<th>COHESIONLESS SOILS</th>
<th>COHESIVE SOILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density</td>
<td>Approximate Relative Density (%)</td>
</tr>
<tr>
<td>Very Loose</td>
<td>0 to 4</td>
</tr>
<tr>
<td>Loose</td>
<td>4 to 10</td>
</tr>
<tr>
<td>Medium Dense</td>
<td>10 to 30</td>
</tr>
<tr>
<td>Dense</td>
<td>30 to 50</td>
</tr>
<tr>
<td>Very Dense</td>
<td>over 50</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### USCS SOIL CLASSIFICATION SYSTEM

<table>
<thead>
<tr>
<th>MAJOR DIVISIONS</th>
<th>GROUP DESCRIPTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Grained Soils</td>
<td>Gravel and Gravelly Soils</td>
</tr>
<tr>
<td></td>
<td>More than 50% of Coarse Fraction Retained on No. 4 Sieve</td>
</tr>
<tr>
<td></td>
<td>Sand and Sandy Soils</td>
</tr>
<tr>
<td></td>
<td>50% or More of Coarse Fraction Passing No. 4 Sieve</td>
</tr>
<tr>
<td>Fine Grained Soils</td>
<td>Silt and Clay</td>
</tr>
<tr>
<td></td>
<td>50% or More Passing No. 200 Sieve</td>
</tr>
</tbody>
</table>

### COMPONENT DEFINITIONS

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>SIZE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boulders</td>
<td>Larger than 12 in</td>
</tr>
<tr>
<td>Cobbles</td>
<td>3 in to 12 in</td>
</tr>
<tr>
<td>Gravel</td>
<td>3 in to No. 4 (4.5mm)</td>
</tr>
<tr>
<td>Coarse gravel</td>
<td>3 in to 3/4 in</td>
</tr>
<tr>
<td>Fine gravel</td>
<td>3/4 in to No. 4 (4.5mm)</td>
</tr>
<tr>
<td>Sand</td>
<td>No. 4 (4.5mm) to No. 100 (0.074 mm)</td>
</tr>
<tr>
<td>Coarse sand</td>
<td>No. 4 (4.5mm) to No. 100 (2.0 mm)</td>
</tr>
<tr>
<td>Medium sand</td>
<td>No. 10 (2.0 mm) to No. 40 (0.42 mm)</td>
</tr>
<tr>
<td>Fine sand</td>
<td>No. 40 (0.42 mm) to No. 200 (0.074 mm)</td>
</tr>
<tr>
<td>Silt and Clay</td>
<td>Smaller than No. 200 (0.074mm)</td>
</tr>
</tbody>
</table>

### COMPONENT PROPORTIONS

<table>
<thead>
<tr>
<th>PROPORTION RANGE</th>
<th>DESCRIPTIVE TERMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5%</td>
<td>Clean</td>
</tr>
<tr>
<td>5 - 12%</td>
<td>Slightly (Clayey, Silty, Sandy)</td>
</tr>
<tr>
<td>12 - 30%</td>
<td>Clayey, Silty, Sandy, Gravelly</td>
</tr>
<tr>
<td>30 - 50%</td>
<td>Very (Clayey, Silty, Sandy, Gravelly)</td>
</tr>
</tbody>
</table>

Components are arranged in order of increasing quantities.

### MOISTURE CONTENT

<table>
<thead>
<tr>
<th>MOISTURE CONTENT</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>DRY</td>
<td>Absence of moisture, dry to the touch.</td>
</tr>
<tr>
<td>MOIST</td>
<td>Slightly damp but no visible water.</td>
</tr>
<tr>
<td>WET</td>
<td>Visible free water, soil is below water table.</td>
</tr>
</tbody>
</table>

---

Kittitas WWTP Improvements Project
Kittitas, Washington

LEON OF TERMS AND SYMBOLS USED ON EXPLORATION LOGS

PROJECT NO.: 2005-014
FIGURE: A-1
Drilling Company: Holocene Drilling
Drilling Method: ODEX (rotary air-percussion)
Sampling Method: SPT with Automatic Trip Hammer
Location: New well (See Figure 2)

**Standard Penetration Test**
(140 lb. weight, 30" drop)

- S-1: 3-10-18
- S-2: 8-13-22
- S-3: 12-17-22 GS
- S-4: 25-25-29
- S-5: 50/5*
- S-6: 22-50/5*
- S-7: 50/4*
- S-8: 3-5-8 %F
- S-9: 12-17-35 %F

**Drill Log**

- **SC**
  - Depth: 0 feet
  - Description: Medium dense, brownish gray, clayey, fine SAND, to very sandy CLAY, moist. Caliche lenses/pockets noted with strong chemical reaction to HCl.
  - Sample: FILL

- **SC**
  - Depth: 5 feet
  - Description: Medium dense, olive grayish brown, very sandy CLAY, moist. Fractured coarse gravel in sample tip (due to sampling).

- **GP**
  - Depth: 10 feet
  - Description: Caliches lenses/pockets noted with strong chemical reaction to HCl.
  - Sample: Sample tip (due to sampling) in sample S-3.

- **GM**
  - Depth: 15 feet
  - Description: Medium dense to very dense, brown to grayish brown, sandy, fine to coarse GRAVEL, wet. Water on sampler at 10 feet. Fractured gravel (due to sampling) in sample S-5.

- **FLOOD DEPOSIT**
  - Depth: 20 feet
  - Description: Sampling action suggests coarse gravel or cobble at 15 feet. Gravel becomes highly weathered.

- **ML**
  - Depth: 30 feet
  - Description: Stiff, reddish brown, fine sandy SILT, very moist. White quartz crystals noted.

- **ML**
  - Depth: 40 feet
  - Description: Hard, dark yellowish brown, slightly sandy SILT, moist.

Total depth drilled = 31.5 feet.
Ground water encountered approximately 10 feet below ground surface during drilling.

**NOTE:** This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

Kittitas WWTP Improvements Project
Kittitas, Washington

BORING: B-1

PAGE: 1 of 1

PROJECT NO.: 2005-014

FIGURE: A-2
**EXCAVATION COMPANY:** City of Kittitas  
**EXCAVATING EQUIPMENT:** JD 310 Extend-a-hoe  
**SURFACE ELEVATION:** ± Feet  

**LOCATION:** SW Corner of new SBR (See Figure 2)  
**DATE COMPLETED:** 3/1/05  
**LOGGED BY:** E. Andersen  

### Sketch of West Side of Pit

**Depth (feet)**  
<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>DESCRIPTION</th>
<th>UCSCS SOIL CLASS</th>
<th>SAMPLE TYPE</th>
<th>SAMPLE NUMBER</th>
<th>MOISTURE CONTENT (%)</th>
<th>OTHER TESTS</th>
<th>GROUNDWATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>GM</td>
<td>Loose to medium dense, brown, silty, sandy, fine to coarse GRAVEL, with cobbles, moist. Some wood (sticks) in upper 2 feet. <em>[FLOOD DEPOSIT]</em></td>
<td>GM</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Becomes medium dense to dense, silty, sandy, fine to coarse GRAVEL with cobbles below 2 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Significant percentage of cobbles below 3 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Becomes wet below 5.5 feet.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 0      | Total depth = 6 feet.  
Ground water encountered at 5.5 feet below ground surface during excavating. | | | | | | |

**NOTE:** For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.
EXCAVATION COMPANY: City of Kittitas
EXCAVATING EQUIPMENT: JD 310 Extend-a-hoe
SURFACE ELEVATION: 4 Feet

LOCATION: SE Corner of new SBR (See Figure 2)
DATE COMPLETED: 3/1/05
LOGGED BY: E. Andersen

<table>
<thead>
<tr>
<th>DEPTH (feet)</th>
<th>SYMBOL</th>
<th>USC3 SOIL CLASS.</th>
<th>DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>SAMPLE NUMBER</th>
<th>OTHER TESTS</th>
<th>MOISTURE CONTENT (%)</th>
<th>GROUNDWATER</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SM</td>
<td></td>
<td>Loose, brown, silty to very silty, fine to medium SAND with gravel, moist.</td>
<td>[FILL]</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SM</td>
<td></td>
<td>Loose, gray, silty fine SAND, moist.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GM</td>
<td></td>
<td>Loose to medium dense, grayish brown, silty, sandy, fine to coarse GRAVEL, moist. Occasional to significant amount of cobbles. [FLOOD DEPOSIT] Lens of pale white to light yellowish brown, silty GRAVEL, moist. (Caliche?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ground water encountered at 5.5 feet. Soil is wet below 5.5 feet.

Total depth = 6 feet.
Ground water encountered at 5.5 feet below ground surface during excavating.

NOTE: For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

LOG OF TEST PIT
TP-2
Kittitas WWTP Improvements Project
Kittitas, Washington

PROJECT NO.: 2005-014
FIGURE: A-4
EXCAVATION COMPANY: City of Kittitas
EXCAVATING EQUIPMENT: JD 310 Extend-a-hoe
SURFACE ELEVATION: ± Feet

LOCATION: NE Corner of new SBR (See Figure 2)
DATE COMPLETED: 3/1/05
LOGGED BY: E. Andersen

DEPTH (feet)

DESCRIPTION

GM Loose to medium dense, silty, sandy, fine to coarse GRAVEL with occasional cobbles, moist to wet. [FLOOD DEPOSIT]

1-foot thick lens of pale white to light yellowish brown, silty GRAVEL, moist (caliche?)

Ground water at 5 feet. Soil is wet below 5 feet.

Total depth = 6 feet. Ground water encountered at 5.5 feet below ground surface during excavating.

NOTE: For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.

LOG OF TEST PIT
TP-3
Kittitas WWTP Improvements Project
Kittitas, Washington

PROJECT NO.: 2005-014
FIGURE: A-5
<table>
<thead>
<tr>
<th>DEPTH (feet)</th>
<th>SYMBOL</th>
<th>USGS SOIL CLASS.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>GP</td>
<td></td>
<td>[FILL]</td>
</tr>
<tr>
<td>2</td>
<td>GM</td>
<td></td>
<td>Loose to medium dense, silty to slightly silty, sandy, fine to coarse GRAVEL with occasional cobbles, moist to wet. [FLOOD DEPOSIT] 1-foot thick lens of pale white to light yellowish brown, silty GRAVEL, moist (caliche?)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td>Ground water at 6.5 feet. Soil is wet below 6.5 feet.</td>
</tr>
</tbody>
</table>

Total depth = 7 feet.
Ground water encountered at 6.5 feet below ground surface during excavating.

NOTE: For a proper understanding of the nature of subsurface conditions, this exploration log should be read in conjunction with the text of the geotechnical report. This log of subsurface conditions applies only at the specified location and on the date indicated and therefore may not necessarily be indicative of other times and/or locations.