SCADA / TELEMETRY UPGRADE PROJECT

PACIFIC, WASHINGTON

Bid Number WT1702

Prepared by:

Follett Engineering, PLLC
Electrical Engineering & Consulting
1037 NE 65th St. #316
Seattle, WA 98115

March 2019
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APPENDIX A: Washington State Prevailing Wage Rates for King County

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I. Invitation to Bid
INVITATION TO BID

BID

Notice is hereby given that sealed proposals will be received by the City of Pacific at City Hall, 100 3rd Avenue SE, Pacific, Washington 98047 until 11:00 a.m. local time on April 19, 2019, for the upgrade of the City SCADA / Telemetry system in the City of Pacific located at 224 County Line Road and multiple other locations. Bids received after that date and time, even if mailed earlier, will not be accepted. Any questions may be referred to: Jim Morgan, Public Works Manager, (253) 929-1113.

GENERAL SCOPE OF WORK

There will be a mandatory pre-bid conference at 9:00 a.m. on April 12, 2019 at the project site, 224 County Line Road, Pacific, Washington. Prospective bidders are required to attend. Bids received from bidders who do not attend the mandatory pre-bid meeting will not be accepted.

The work to be performed will include all labor, materials, equipment, permits, agency and public notifications, and incidentals necessary to upgrade the City’s SCADA / Telemetry located at 224 County Line Road. The following is a partial list of the activities required:

- Provide and install components for electrical upgrades
- Provide and install components for telemetry upgrades
- Clean up after installation

Estimated Bid Range: $400,000 - $550,000

BID FORM

Each Bid must be submitted on the prescribed forms. All Bids must be submitted in a sealed envelope that is marked with the Bid Number WT1702, and the Project: SCADA / TELEMETRY UPGRADE PROJECT. The envelope must also show the bidder’s name and address.

BID SECURITY

The Bid must be accompanied by a Bid Bond, certified check or a cashier’s check in an amount not less than five (5) percent of the base bid, not including Washington State Sales Tax. The Bid Bond is a guarantee that the lowest responsive bidder will, within 15 calendar days of the Notice of Award, execute a contract document with the City of Pacific. Should the selected bidder fail to execute the contract documents within the specified time, the Bid Bond shall be subject to forfeit.

ACCEPTANCE OR REJECTION OF BIDS

The City of Pacific reserves the right to reject any or all bids, waive any irregularities or technicalities, and to accept any bid if that action is believed to be in the best interest of the City. The City of Pacific reserves the right to select any item(s) or reject any or all item(s).
opening, and **no** bids may be withdrawn for 30 days after bid opening without the expressed **written** consent of the City of Pacific.

**PROJECT DOCUMENTS**
Electronic bid documents (plans and specifications) are available at the City of Pacific website for download [http://www.pacificwa.gov/departments/public_works.htm](http://www.pacificwa.gov/departments/public_works.htm). Please self-register to receive addendums by sending contact information to kharter@ci.pacific.wa.us.

**SCHEDULE**
The selected bidder must be able to begin Work within ten (10) working days after receiving a Notice to Proceed. All work must be completed within one hundred sixty (160) working days including the first day on the site.

**STATE/LOCAL REQUIREMENTS**
State, and local E.E.O., Affirmative Action, Labor Standards, and Prevailing Wage Laws and all other requirements are applicable to all activities related to this project, and must be complied with by all contractors, subcontractors, and lower tier subcontractors.

**AFFIRMATIVE ACTION ON BID**
The City of Pacific is an Equal Opportunity Employer. Women and Minority contractors, King County businesses, and King County lower income residents, whom are qualified to perform all or part of the required services, are encouraged to participate by bidding the project, or by offering their services to other bidders as subcontractors or suppliers.
II. Legal Documents
BID BOND

KNOW ALL MEN BY THESE PRESENTS that we, the undersigned, _________________, as Principal, and _________________, as Surety, are hereby held and firmly bound unto the City of Pacific, Washington, as Owner in the penal sum of _________________, for the payment of which, well and truly made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

SIGNED this __________ day of __________, 20____.

The condition of the above obligation is such that whereas the Principal has submitted to the City of Pacific (Owner) a certain Bid, attached hereto and hereby made a part hereof to enter into a contract in writing for the: SCADA / TELEMETRY UPGRADE PROJECT.

NOW, THEREFORE,

a) If said Bid shall be rejected, or in the alternate,

b) If said Bid shall be accepted and the Principal shall execute and deliver a Contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any extension.

IN WITNESS WHEREOF: The Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

(Principal)

SEAL

(Surety)

By: ___________________________

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.
# STATEMENT OF QUALIFICATIONS

**Similar Project Completed:**

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<tr>
<th>Name of Project</th>
<th>Address</th>
<th>Date Completed</th>
<th>Type of Improvement</th>
<th>Value of Contract</th>
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**Similar Projects Under Contract:**

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<th>Address</th>
<th>Date Completed</th>
<th>Type of Improvement</th>
<th>Value of Contract</th>
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**Proposed Equipment to be used on Project:**

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<th>Size</th>
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Firm: ____________________________

Name: ____________________________

Signature: ________________________

City of Pacific  March 2019  
Bid Proposal  II-2  
SCADA / Telemetry Upgrade Project  Project No. WT1702
LETTER OF SUBCONTRACTOR

(To be Submitted Prior to Contract Award Date)

We, the undersigned, intend to employ the following subcontractors in order to fully perform the work outlined in these specifications.

We intend to employ the firm of:

<table>
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<tr>
<th>Trade</th>
<th>Subcontractor Name/Address</th>
<th>Washington Contractor’s Registration No.</th>
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And represent and warrant that the work will be performed by said subcontractors in a good and workmanlike manner and under our direct supervision. We further represent and warrant that the work to be performed by them constitutes approximately ____________ percent of the total dollar value of said Contract.

Firm: ____________________________

Name: __________________________

Address: _________________________

Telephone: ______________________
CERTIFICATION OF EQUAL EMPLOYMENT OPPORTUNITY REPORT

Certification with regard to Performance of Previous Contracts or Subcontracts subject to the Equal Opportunity Clause and the filing of Required Reports.

The bidder _____________________, proposed subcontractor _____________________, hereby certifies that he/she has ____, has not ____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, and that he/she has ____, has not ____, filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government Contracting or administering agency, or the former President’s Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

(Company)

By:

(Title)

Date: ________________________________

NOTE: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7 [b][1]), and must be submitted by bidders and proposed subcontractors which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. Generally only contracts or subcontracts of $10,000 or under are exempt.

Currently, Standard for 100 (EEO-1) is the only report required by the Executive Order or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should not that 41 CFR 60-1.7(b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.
NON-COLLUSION AFFIDAVIT CERTIFICATE

STATE OF WASHINGTON )
 )ss.
County of ____________)  

____________________ ________________________, being first duly sworn, on his/her oath says that the bid above submitted is a genuine and not a collusive bid, or made in the interest or on behalf of any person not therein named; and he/she further says that the said bidder has not directly or indirectly induced or solicited any bidder on the above work or supplies to put in a sham bid, or any other person or corporation to refrain from bidding; and that said bidder has not in any manner sought by collusion to secure to his/herself an advantage over any other bidder or bidders.

____________________  
(Contractor)

Subscribed and sworn to before me this __________ day of ____________, 20____.

______________
Notary Public in and for the State of Washington, residing at __________________.
Gentlemen:

1. The undersigned hereby certifies that he has examined the location and construction detail work as outlined on the Plans and Specifications for the City of Pacific SCADA / TELEMETRY UPGRADE PROJECT is familiar with the local conditions at the location of the work to be done, and has read and thoroughly understands the Plans and Specifications and the Contract governing the work and the method by which payment will be made for said work in accordance with said Plans, Specifications, and Contract at the following scheduled unit prices. All items shall be filled out showing unit prices and total amount of each item.

2. The Contract amount shall be the unit price of each item. Correct extensions based on unit prices bid and the approximate quantities shown are for the comparison for bid only and payments for unit priced items will be based on actual quantities measured in accordance with the requirements of the Contract Specifications. Limits of lump sum priced items will be as described in the Contract Drawings and Specifications.

The undersigned has checked the above amounts and understands that the Owner will not be responsible for any errors or omissions on the part of the undersigned in making up this proposal.

In order for the Owner to consider a proposal, all items on the proposal must be filled in completely.

3. It is agreed that this proposal may not be withdrawn within a period of thirty (30) days after the date set for the opening thereof.

4. In accordance with the Specifications, the undersigned further agrees to so plan the work and to prosecute it with such diligence that said work shall be commenced within ten (10) calendar days after notice to proceed. All work on this project shall be completed 160 working days.

(Contractor's License No.)          (Contractor's UBI No.)

By:

(Authorized Official)

(Address)

Receipt of the following Addenda to the Plans and/or Specifications is hereto acknowledged:

<table>
<thead>
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<th>Addendum No.</th>
<th>Addendum Receipt Date</th>
<th>Signed Acknowledgement</th>
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City of Pacific
Bid Proposal
SCADA / Telemetry Upgrade Project

March 2019
II-6
Project No. WT1702
## CONTRACT BID

### SCHEDULE OF PRICES

**SCADA / TELEMETRY UPGRADE PROJECT**

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>QUANTITY</th>
<th>DESCRIPTION OF ITEM</th>
<th>UNIT PRICE</th>
<th>AMOUNT</th>
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<td>$ Twenty Thousand Dollars</td>
<td>$20,000.00</td>
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Sub-Total (Bid Items 1-10) $ 

Washington State Sales Tax (10.00%) $ 

**TOTAL** $ 

Owner reserves the right to reject any or all bids. The basis of award shall be as stated in the Instructions to Bidders.
III. Contract
CITY OF PACIFIC
CONTRACT

THIS AGREEMENT is entered into between the City of Pacific (the “City”) and _______________________ of ________________, Washington, (the “Contractor”), for the project known as ____________________________________________ (the “Project”), Contract Number ________________.

PROJECT DESCRIPTION. This Project provides for ____________________________________________________________.

IN CONSIDERATION OF THE TERMS AND CONDITIONS CONTAINED HEREIN, THE PARTIES AGREE AS FOLLOWS:

CITY RESPONSIBILITIES. The City agrees to engage the Contractor to perform all work necessary to complete the Project according to the Project plans and specifications under the terms and conditions contained in this Agreement. The City agrees to pay the Contractor according to the Project plans and specifications and the schedule of unit or itemized prices outlined in the Contractor’s bid proposal at the time, in the manner and upon the conditions provided for in this agreement. The contract bid amount is $___________, which includes any applicable sales or use tax.

CONTRACTOR RESPONSIBILITIES. The Contractor shall perform all work and furnish and bear the expense of all tools, materials, equipment and labor as may be required for the transfer of materials and for construction and completion of the Project, except as is otherwise designated in the Project plans and specifications. The Contractor agrees to perform any necessary alterations in or additions to the work as required by the City. The Contractor shall complete the Project in accordance with and as described in the Project plans and specifications, and the edition of the Washington State Standard Specifications for Road, Bridge, and Municipal Construction (WSDOT Specifications) referenced in the Project specifications. Contractor binds himself, his heirs, executors, administrators, successors and assigns.

PROJECT TIMELINE. Work on the Project shall begin on the date provided in the Notice to Proceed and shall be completed in the number of 160 Working days outlined in the Project specifications.

LIQUIDATED DAMAGES. If the Project is not completed within the allotted working days, the Contractor agrees to pay to the City liquidated damages in the amount calculated per the WSDOT Specifications for each day the Project remains incomplete after expiration of the Project timeline.

DOCUMENTS INCORPORATED BY REFERENCE. The documents incorporated by reference, as if fully set forth in this Agreement, include the Project plans and specifications, the Contractor’s bid proposal, and the edition of the Washington State Standard Specifications for Road, Bridge, and Municipal Construction referenced in the Project specifications.

INDEMNIFICATION. The Contractor agrees to indemnify, defend, and hold harmless the City and its officers and employees, from any claims, suits, actions, damages or liability whatsoever which may result from or arise out of the Contractor's work under this Agreement. This provision shall not apply to those claims or damages that are determined to have been caused by the sole negligence of the City, its officers, or employees.

EFFECTIVE DATE. The parties to this Agreement have caused it to be fully executed on the date of the last authorizing signature below.

CITY OF PACIFIC

Mayor ______________________ Date __________

Approved as to form:

City Attorney _________________ Date __________

CONTRACTOR

I certify by signing below that I am a duly authorized signatory for the Contractor:

______________________________ Date __________

(Printed Name)

______________________________ Date __________

(Printed Title)
BONDS

PUBLIC WORKS PAYMENT BOND

To: The City of Pacific

Bond No. _____________

The City of Pacific (City) has awarded to _____________________ (Principal), a contract for the construction of the project designated as _____________________ (Contract), and said Principal is required under the terms of that Contract to furnish a payment bond in accord with Title 39.08 Revised Code of Washington (RCW) and (where applicable) 60.28 RCW.

The Principal, and ___________________________________ (Surety), a corporation organized under the laws of the State of __________ and licensed to do business in the State of Washington as surety and named in the current list of "Surety Companies Acceptable in Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Dept., are jointly and severally held and firmly bound to the City, in the sum of _______________________________ US Dollars ($_________________) Total Contract Amount, subject to the provisions herein.

This statutory payment bond shall become null and void, if and when the Principal, its heirs, executors, administrators, successors, or assigns shall pay all persons in accordance with RCW Titles 39.08, and 39.12 including all workers, laborers, mechanics, subcontractors, and materialmen, and all persons who shall supply such contractor or subcontractor with provisions and supplies for the carrying on of such work, and if such payment obligations have not been fulfilled, this bond shall remain in full force and effect.

The Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the specifications accompanying the Contract, or to the work to be performed under the Contract shall in any way affect its obligation on this bond, except as provided herein, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the work performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this bond and notice to Surety is not required for such increased obligation.

This bond may be executed in two (2) original counterparts, and shall be signed by the parties’ duly authorized officers. This bond will only be accepted if it is accompanied by a fully executed and authentic power of attorney for the officer executing on behalf of the surety.

PRINCIPAL

Principal Signature Date
Printed Name Title

SURETY

Surety Signature Date
Printed Name Title

Name, address, and telephone of local office/agent of Surety Company is:

____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
PERFORMANCE BOND

To: The City of Pacific
Bond No. ______________

The City of Pacific (City) has awarded to _____________________ (Principal), a contract for the construction of the project designated as _____________________ (Contract), and said Principal is required to furnish a bond for performance of all obligations under the Contract.

The Principal, and ___________________________________ (Surety), a corporation, organized under the laws of the State of ________________ and licensed to do business in the State of Washington as surety and named in the current list of "Surety Companies Acceptable in Federal Bonds" as published in the Federal Register by the Audit Staff Bureau of Accounts, U.S. Treasury Dept., are jointly and severally held and firmly bound to the ***, in the sum of $_________________ US Dollars ($_________________ ) Total Contract Amount, subject to the provisions herein.

This statutory performance bond shall become null and void, if and when the Principal, its heirs, executors, administrators, successors, or assigns shall well and faithfully perform and complete all of the Principal's obligations, conditions, and duties under the Contract and in addition shall indemnify, defend, and protect the City against any claim of direct or indirect loss resulting from the failure of the Principal (or any of the employees, Subcontractors, or lower tier subcontractors of the Principal) to faithfully perform all obligations, conditions, and duties under the Contract; or resulting from the failure of the Principal (or Subcontractors or lower tier subcontractors of the Principal) to pay all laborers, mechanics, Subcontractors, lower tier subcontractors, material person, or any other person who provides supplies or provisions for carrying out the Work; or to fulfill all the terms and conditions of all duly authorized modifications, additions, and changes to said Contract that may hereafter be made, at the time and in the manner therein specified; and if such obligations, conditions, and duties have not been fulfilled, this bond shall remain in full force and effect.

The Surety for value received agrees that no change, extension of time, alteration or addition to the terms of the Contract, the specifications accompanying the Contract, or to the work to be performed under the Contract shall in any way affect its obligation on this bond, and waives notice of any change, extension of time, alteration or addition to the terms of the Contract or the work performed. The Surety agrees that modifications and changes to the terms and conditions of the Contract that increase the total amount to be paid the Principal shall automatically increase the obligation of the Surety on this bond and notice to Surety is not required for such increased obligation.

This bond may be executed in two (2) original counterparts, and shall be signed by the parties’ duly authorized officers. This bond will only be accepted if it is accompanied by a fully executed and authentic power of attorney for the officer executing on behalf of the surety.

PRINCIPAL

Principal Signature Date
Printed Name
Title

SURETY

Surety Signature Date
Printed Name
Title
MAINTENANCE BOND

Pacific Project #: WT1702
Surety Bond #: 
Date Posted: 
Expiration Date: November 6, 2021

RE: Project Name: SCADA / Telemetry Upgrade Project
Owner/Developer/Contractor:
Project Address: 100 3rd Ave SE, Pacific, WA 98047

KNOW ALL PERSONS BY THESE PRESENTS: That we, ________________ (hereinafter called the "Principal"), and ________________, a corporation organized under the laws of the State of ________________, and authorized to transact surety business in the State of Washington (hereinafter called the "Surety"), are held and firmly bound unto the City of Pacific, Washington, in the sum of ________________ dollars ($ ________________), lawful money of the United States of America, for the payment of which sum we and each of us bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, by these presents. THE CONDITIONS of the above obligation are such that:

WHEREAS, the above named Principal has constructed and installed certain improvements on public property in connection with a project as described above within the City of Pacific; and

WHEREAS, in accordance with the contract between the Principal and the City of Pacific, the Principal is required to post a bond for the 24 months following project completion in order to ensure that the project does not contain defects that require repair and to cover the cost of repair during that 24-month period; and

WHEREAS, such bond is needed in order to provide security for the obligation of the Principal to repair and/or replace said improvements against defects in workmanship, materials or installation for a period of twenty four (24) months after written and final acceptance of the same and approval by the City;

NOW, THEREFORE, this Maintenance Bond has been secured and is hereby submitted to the City. It is understood and agreed that this obligation shall continue in effect until released in writing by the City of Pacific, but only after the Principal has performed and satisfied the following conditions:

A. The work or improvements installed by the Principal and subject to the terms and conditions of this Bond are as follows: (insert complete description of work here)
Provide all labor, materials, equipment, permits, agency and public notifications, and incidentals necessary to complete the SCADA / Telemetry system upgrades.

B. The Principal and Surety agree that the work and improvements installed in the above-
referenced project shall remain free from defects in material, workmanship and installation (or, in the case of landscaping, shall survive,) for a period of twenty four (24) months after written and final acceptance of the same and approval by the City. Maintenance is defined as acts carried out to prevent a decline, lapse or cessation of the state of the project or improvements as accepted by the City during the twenty four (24) month period after final and written acceptance, and includes, but is not limited to, repair or replacement of defective workmanship, materials or installations.

C. The Principal shall, at its sole cost and expense, carefully replace and/or repair any damage or defects in workmanship, materials or installation to the City-owned real property on which improvements have been installed, and leave the same in as good condition as it was before commencement of the work.

D. The Principal and the Surety agree that in the event any of the improvements or restoration work installed or completed by the Principal as described herein, fail to remain free from defects in materials, workmanship or installation (or in the case of landscaping, fail to survive), for a period of twenty four (24) months from the date of acceptance of the work by the City, the Principal shall repair and/replace the same within ten (10) days of demand by the City, and if the Principal should fail to do so, then the Surety shall:

1. Within twenty (20) days of demand of the City, make written commitment to the City that it will either:
   
a). remedy the default itself with reasonable diligence pursuant to a time schedule acceptable to the City; or
   
b). tender to the City within an additional ten (10) days the amount necessary, as determined by the City, for the City to remedy the default, up to the total bond amount.

   Upon completion of the Surety's duties under either of the options above, the Surety shall then have fulfilled its obligations under this bond. If the Surety elects to fulfill its obligation pursuant to the requirements of subsection D(1)(b), the City shall notify the Surety of the actual cost of the remedy, upon completion of the remedy. The City shall return, without interest, any overpayment made by the Surety, and the Surety shall pay to the City any actual costs which exceeded the City's estimate, limited to the bond amount.

2. In the event the Principal fails to make repairs or provide maintenance within the time period requested by the City, then the City, its employees and agents shall have the right at the City's sole election to enter onto said property described above for the purpose of repairing or maintaining the improvements. This provision shall not be construed as creating an obligation on the part of the City or its representatives to repair or maintain such improvements.

E. Corrections. Any corrections required by the City shall be commenced within ten (10) days of notification by the City and completed within thirty (30) days of the date of notification.
If the work is not performed in a timely manner, the City shall have the right, without recourse to legal action, to take such action under this bond as described in Section D above.

F. Extensions and Changes. No change, extension of time, alteration or addition to the work to be performed by the Principal shall affect the obligation of the Principal or Surety on this bond, unless the City specifically agrees, in writing, to such alteration, addition, extension or change. The Surety waives notice of any such change, extension, alteration or addition thereunder.

G. Enforcement. It is specifically agreed by and between the parties that in the event any legal action must be taken to enforce the provisions of this bond or to collect said bond, the prevailing party shall be entitled to collect its costs and reasonable attorney fees as a part of the reasonable costs of securing the obligation hereunder. In the event of settlement or resolution of these issues prior to the filing of any suit, the actual costs incurred by the City, including reasonable attorney fees, shall be considered a part of the obligation hereunder secured. Said costs and reasonable legal fees shall be recoverable by the prevailing party, not only from the proceeds of this bond, but also over and above said bond as a part of any recovery (including recovery on the bond) in any judicial proceeding. The Surety hereby agrees that this Agreement shall be governed by the laws of the State of Washington. Venue of any litigation arising out of this Agreement shall be in King County Superior Court.

H. Bond Expiration. This bond shall remain in full force and effect until the obligations secured hereby have been fully performed and until released in writing by the City at the request of the Surety or Principal.

DATED this ___ day of ________________, 2019.

SURETY COMPANY
(Signature must be notarized)

By: ________________________________  By: ________________________________
   Its ______________________________  Its ______________________________

DEVELOPER/OWNER
(Signature must be notarized)

Business Name: ____________________  Business Name: ____________________

Business Address: __________________  Business Address: __________________

City/State/Zip Code: ________________  City/State/Zip Code: ________________

Telephone Number: ________________  Telephone Number: ________________
CITY OF PACIFIC

By: _________________________ Date: _________________________
Leanne Guier, Mayor

APPROVED AS TO FORM:

________________________________
Office of the City Attorney

CHECK FOR ATTACHED NOTARY SIGNATURE

_____ Individual (Form P-1)
_____ Corporation (Form P-2)
_____ Surety Company (Form P-2)
CERTIFICATE OF INSURANCE

This certifies to the City of Pacific, Pacific, Washington, that the following described policies have been issued to:

<table>
<thead>
<tr>
<th>Policies and Insurees</th>
<th>Bodily Injury Property Damage</th>
<th>Policy No.</th>
<th>Expiration Date</th>
</tr>
</thead>
</table>

Worker’s Compensation  Employer’s Liability

(Insurer)

Comprehensive General Liability

<table>
<thead>
<tr>
<th>Each Person</th>
<th>Each Occurrence</th>
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<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each Occurrence

Aggregate

COMBINED SINGLE LIMIT

All policies are in effect at this time and will not be canceled, limited, or allowed to expire without renewal until after thirty (30) days’ written notice has been given to the Certificate Holder named on the top line. Any coverage afforded the Certificate Holder as an additional insured shall apply as primary and not excess to any insurance issued in the name of the Certificate Holder.

NOTE TO CONTRACTOR: City of Pacific and its authorized agents shall be named as additional insured for this policy.
CERTIFICATE OF INSURANCE (SAMPLE)

PRODUCER
Hurley, Atkins & Stewart, Inc.
1800 Ninth Ave., #1500
Seattle WA 98101
Phone: 206-682-5656

INSURED
INSURER A: 
INSURER B: 
INSURER C: 
INSURER D: 
INSURER E:

COVERAGES

<table>
<thead>
<tr>
<th>INR</th>
<th>LTD</th>
<th>TYPE OF INSURANCE</th>
<th>POLICY NUMBER</th>
<th>POLICY EFFECTIVE DATE (MM/DD/YY)</th>
<th>POLICY EXPIRATION DATE (MM/DD/YY)</th>
<th>LIMITS</th>
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<tbody>
<tr>
<td></td>
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<td>GENERAL LIABILITY</td>
<td></td>
<td></td>
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<td>COMMERCIAL GENERAL LIABILITY</td>
<td>CLAIMS MADE</td>
<td>OCCUR</td>
<td>EACH OCCURRENCE $</td>
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<td>FIRE DAMAGE (Any one fire) $</td>
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<td></td>
<td>MED-EXP (Any One Person) $</td>
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<td>PROPERTY DAMAGE $</td>
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<td>GENERAL AGGREGATE $</td>
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<td>PRODUCTS - COMB./IND. AGG. $</td>
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<td>AUTO/MOBILE LIABILITY</td>
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<td>ANY AUTO</td>
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<td>BOOBY INJURY (Per Accident) $</td>
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<td>SCHEDULED AUTOS</td>
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<td>PROPERTY DAMAGE $</td>
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<td>HIRED AUTOS</td>
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<td>NON-OWNED AUTOS</td>
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<td></td>
<td>GARAGE LIABILITY</td>
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<td></td>
<td></td>
<td>ANY AUTO</td>
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<td></td>
<td>OTHER THAN AUTO ONLY: $</td>
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<td></td>
<td></td>
<td>EXCESS LIABILITY</td>
<td></td>
<td></td>
<td>EACH OCCURRENCE $</td>
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<td>OCCUR</td>
<td>CLAIMS MADE</td>
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<td>AGGREGATE $</td>
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<td>RETENTION</td>
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<td></td>
<td>WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY</td>
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</tbody>
</table>

DESCRIPTION OF OPERATIONS/LOCATIONS/Vehicles/Exclusions Added by Endorsements/Special Provisions

CERTIFICATE HOLDER

ADDITIONAL INSURED; INSURER LETTER:

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL ENDEAVOR TO MAIL DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT. BUT FAILURE TO DO SO IS SHANNON TO IMPOSE NO OBLIGATION OR LIABILITY OF ANY KIND UPON THE INSURER, ITS AGENTS OR REPRESENTATIVES.

ACORD 25-S (7/97) ©ACORD CORPORATION 1988
**STATEMENT OF INTENT TO PAY PREVAILING WAGES**

Public Works Contract
$40.00 Filing Fee Required

<table>
<thead>
<tr>
<th>Intent ID # (Assigned by L&amp;I)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Name</td>
<td></td>
</tr>
<tr>
<td>Contract Awarding Agency (public agency - not federal or private)</td>
<td></td>
</tr>
<tr>
<td>Awarding Agency Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Awarding Agency Project Contact Person</td>
<td>Phone Number</td>
</tr>
<tr>
<td>County where work will be performed</td>
<td>City where work will be performed</td>
</tr>
<tr>
<td>Bid date (mm/dd/yyyy)</td>
<td>Date contract awarded (mm/dd/yyyy)</td>
</tr>
<tr>
<td>Will all work be subcontracted?</td>
<td>Do you intend to use subcontractors?</td>
</tr>
<tr>
<td>dobrotek exh 12345678</td>
<td>Yes</td>
</tr>
<tr>
<td>Prime Contractor Registration Number</td>
<td>Prime’s UBI Number</td>
</tr>
<tr>
<td>Prime’s Contractor Registration Number</td>
<td>Prime’s Phone Number</td>
</tr>
<tr>
<td>Number of Owner/Operators that own at least 3% of the company who will perform work on the project:</td>
<td></td>
</tr>
<tr>
<td>Will employees perform work on this project?</td>
<td>Yes</td>
</tr>
<tr>
<td>If “Yes”, please list worker’s craft/trade/occupation below. (If you choose “No” and this changes later, you certify that you will submit a new form listing workers.)</td>
<td></td>
</tr>
<tr>
<td>Craft/Trade/Occupation. (Do NOT list apprentices.) When using employees in more than one craft, each craft transaction must be accurately recorded on the time sheet.</td>
<td></td>
</tr>
<tr>
<td>Estimated number of workers</td>
<td>Rate of hourly pay</td>
</tr>
<tr>
<td>Company Name</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>State</td>
</tr>
<tr>
<td>Contractor Registration Number</td>
<td>UBI Number</td>
</tr>
<tr>
<td>Industrial Insurance Account Number</td>
<td></td>
</tr>
<tr>
<td>Email Address</td>
<td>Phone Number</td>
</tr>
</tbody>
</table>

**For L&I Use Only**

- L&I Check Number: $40 or $

<table>
<thead>
<tr>
<th>Check Number:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Issued By:</td>
<td></td>
</tr>
</tbody>
</table>

DO NOT SEPARATE FORMS PRIOR TO APPROVAL BY L&I
(White & canary copies must be submitted—canary will be retained by L&I after approval.)
IV. Special Provisions
SPECIAL PROVISIONS
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INTRODUCTION TO THE SPECIAL PROVISIONS

(August 14, 2013 APWA GSP)

The work on this project shall be accomplished in accordance with the Standard Specifications for Road, Bridge and Municipal Construction, 2018 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 these Special Provisions, all of which are made a part of the Contract Documents, shall govern all of the Work.

These Special Provisions are made up of both General Special Provisions (GSPs) from various sources, which may have project-specific fill-ins; and project-specific Special Provisions. Each Provision either supplements, modifies, or replaces the comparable Standard Specification, or is a new Provision. The deletion, amendment, alteration, or addition to any subsection or portion of the Standard Specifications is meant to pertain only to that particular portion of the section, and in no way should it be interpreted that the balance of the section does not apply.

The project-specific Special Provisions are not labeled as such. The GSPs are labeled under the headers of each GSP, with the effective date of the GSP and its source. For example:

(March 8, 2013 APWA GSP)
(April 1, 2013 WSDOT GSP)
(August 1, 2014 CoP GSP)

Also incorporated into the Contract Documents by reference are:
- Manual on Uniform Traffic Control Devices for Streets and Highways, currently adopted edition, with Washington State modifications, if any
- Standard Plans for Road, Bridge and Municipal Construction, WSDOT/APWA, current edition

Contractor shall obtain copies of these publications, at Contractor's own expense.

END OF SECTION
DIVISION 1 – GENERAL REQUIREMENTS

DESCRIPTION OF WORK
(March 13, 1995 WSDOT GSP)

This Contract provides for the provision and installation of electrical and SCADA / telemetry equipment, all in accordance with the attached Contract Plans, these Contract Provisions, and the Standard Specifications.

1-01 DEFINITIONS AND TERMS

1-01.3 Definitions
(January 4, 2016 APWA GSP)

Delete the heading Completion Dates and the three paragraphs that follow it, and replace them with the following:

**Dates**

**Bid Opening Date**
The date on which the Contracting Agency publicly opens and reads the Bids.

**Award Date**
The date of the formal decision of the Contracting Agency to accept the lowest responsible and responsive Bidder for the Work.

**Contract Execution Date**
The date the Contracting Agency officially binds the Agency to the Contract.

**Notice to Proceed Date**
The date stated in the Notice to Proceed on which the Contract time begins.

**Substantial Completion Date**
The day the Engineer determines the Contracting Agency has full and unrestricted use and benefit of the facilities, both from the 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 Contract.

**Physical Completion Date**
The day all of the Work is physically completed on the project. All documentation required by the Contract and required by law does not necessarily need to be furnished by the Contractor by this date.

**Completion Date**
The day all the Work specified in the Contract is completed and all the obligations of the Contractor under the contract are fulfilled by the Contractor. All documentation required by the Contract and required by law must be furnished by the Contractor before establishment of this date.
Final Acceptance Date
The date on which the Contracting Agency accepts the Work as complete.

Supplement this Section with the following:

All references in the Standard Specifications, Amendments, or WSDOT General Special
Provisions, to the terms “Department of Transportation”, “Washington State Transportation
Commission”, “Commission”, “Secretary of Transportation”, “Secretary”, “Headquarters”, and
“State Treasurer” shall be revised to read “Contracting Agency”.

All references to the terms “State” or “state” shall be revised to read “Contracting Agency”
unless the reference is to an administrative agency of the State of Washington, a State
statute or regulation, or the context reasonably indicates otherwise.

All references to “State Materials Laboratory” shall be revised to read “Contracting Agency
designated location”.

All references to “final contract voucher certification” shall be interpreted to mean the
Contracting Agency form(s) by which final payment is authorized, and final completion and
acceptance granted.

Additive
A supplemental unit of work or group of bid items, identified separately in the Bid Proposal,
which may, at the discretion of the Contracting Agency, 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 Bid
Proposal, from which the Contracting Agency may make a choice between different
methods or material of construction for performing the same work.

Business Day
A business day is any day from Monday through Friday except holidays as listed in Section
1-08.5.

Contract Bond
The definition in the Standard Specifications for “Contract Bond” applies to whatever bond
form(s) are required by the Contract Documents, which may be a combination of a Payment
Bond and a Performance Bond.

Contract Documents
See definition for “Contract”.

Contract Time
The period of time established by the terms and conditions of the Contract within which the
Work must be physically completed.

Notice of Award
The written notice from the Contracting Agency to the successful Bidder signifying the
Contracting Agency’s acceptance of the Bid Proposal.
Notice to Proceed

The written notice from the Contracting Agency 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.

Traffic

Both vehicular and non-vehicular traffic, such as pedestrians, bicyclists, wheelchairs, and equestrian traffic.

END OF SECTION
1-02  BID PROCEDURES AND CONDITIONS

1-02.1 Prequalification of Bidders

Delete this Section and replace it with the following:

1-02.1 Qualifications of Bidder
(January 24, 2011 APWA GSP)

Before award of a public works contract, a bidder must meet at least the minimum qualifications of RCW 39.04.350(1) to be considered a responsible bidder and qualified to be awarded a public works project.

(October 24, 2018 CoP GSP)

It is anticipated that this project may be funded in part by state or federal grants. Neither the State of Washington nor any of its departments or employees are, or shall be, a party to this contract or any subcontract.

1-02.2 Plans and Specifications
(June 27, 2011 APWA GSP)

Delete this section and replace it with the following:

Information as to where Bid Documents can be obtained or reviewed can be found in the Call for Bids (Advertisement for Bids) for the work.

After award of the contract, plans and specifications will be issued to the Contractor at no cost as detailed below:

<table>
<thead>
<tr>
<th>To Prime Contractor</th>
<th>No. of Sets</th>
<th>Basis of Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced plans (11&quot; x 17&quot;)</td>
<td>2</td>
<td>Furnished automatically upon award.</td>
</tr>
<tr>
<td>Contract Provisions</td>
<td>2</td>
<td>Furnished automatically upon award.</td>
</tr>
<tr>
<td>Large plans (e.g., 22&quot; x 34&quot;)</td>
<td>2</td>
<td>Furnished only upon request.</td>
</tr>
</tbody>
</table>

Additional plans and Contract Provisions may be obtained by the Contractor from the source stated in the Call for Bids, at the Contractor’s own expense.

1-02.4 Examination of Plans, Specifications and Site of Work

1-02.4(2) Subsurface Information
(March 8, 2013 APWA GSP)

The second sentence in the first paragraph is revised to read:
The Summary of Geotechnical Conditions and the boring logs, if and when included as an appendix to the Special Provisions, shall be considered as part of the Contract.

1-02.5 Proposal Forms  
(July 31, 2017  APWA GSP)

Delete this section and replace it with the following:

The Proposal Form will identify the project and its location and describe the work. It will also list estimated quantities, units of measurement, the items of work, and the materials to be furnished at the unit bid prices. The bidder shall complete spaces on the proposal form that call for, but are not limited to, unit prices; extensions; summations; the total bid amount; signatures; date; and, where applicable, retail sales taxes and acknowledgment of addenda; the bidder’s name, address, telephone number, and signature; the bidder’s UDBE/DBE/M/WBE commitment, if applicable; a State of Washington Contractor’s Registration Number; and a Business License Number, if applicable. Bids shall be completed by typing or shall be printed in ink by hand, preferably in black ink. The required certifications are included as part of the Proposal Form.

The Contracting Agency reserves the right to arrange the proposal forms with alternates and additives, if such be to the advantage of the Contracting Agency. The bidder shall bid on all alternates and additives set forth in the Proposal Form unless otherwise specified.

1-02.6 Preparation of Proposal  
(July 11, 2018  APWA GSP)

Supplement the second paragraph with the following:

4. If a minimum bid amount has been established for any item, the unit or lump sum price must equal or exceed the minimum amount stated.

5. Any correction to a bid made by interlineation, alteration, or erasure, shall be initialed by the signer of the bid.

Delete the last two paragraphs, and replace them with the following:

If no Subcontractor is listed, the Bidder acknowledges that it does not intend to use any Subcontractor to perform those items of work.

The Bidder shall submit with their Bid a completed Contractor Certification Wage Law Compliance form, provided by the Contracting Agency. Failure to return this certification as part of the Bid Proposal package will make this Bid Nonresponsive and ineligible for Award. A Contractor Certification of Wage Law Compliance form is included in the Proposal Forms.

The Bidder shall make no stipulation on the Bid Form, nor qualify the bid in any manner.

A bid by a corporation shall be executed in the corporate name, by the president or a vice president (or other corporate officer accompanied by evidence of authority to sign).
A bid by a partnership shall be executed in the partnership name, and signed by a partner. A copy of the partnership agreement shall be submitted with the Bid Form if any UDBE requirements are to be satisfied through such an agreement.

A bid by a joint venture shall be executed in the joint venture name and signed by a member of the joint venture. A copy of the joint venture agreement shall be submitted with the Bid Form if any UDBE requirements are to be satisfied through such an agreement.

1-02.7 Bid Deposit
(March 8, 2013 APWA GSP)

Supplement this section with the following:

Bid bonds shall contain the following:

1. Contracting Agency-assigned number for the project;
2. Name of the project;
3. The Contracting Agency named as obligee;
4. The amount of the bid bond stated either as a dollar figure or as a percentage which represents five percent of the maximum bid amount that could be awarded;
5. Signature of the bidder’s officer empowered to sign official statements. The signature of the person authorized to submit the bid should agree with the signature on the bond, and the title of the person must accompany the said signature;
6. The signature of the surety’s officer empowered to sign the bond and the power of attorney.

If so stated in the Contract Provisions, bidder must use the bond form included in the Contract Provisions.

If so stated in the Contract Provisions, cash will not be accepted for a bid deposit.

1-02.13 Irregular Proposals
(June 20, 2017 APWA GSP)

Delete this section and replace it with the following:

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 Contracting Agency 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, as required in Section 1-02.6;
   h. The Bidder fails to submit or properly complete an Underutilized Disadvantaged Business Enterprise Certification, if applicable, as required in Section 1-02.6;
i. The Bidder fails to submit written confirmation from each UDBE firm listed on the Bidder’s completed UDBE Utilization Certification that they are in agreement with the bidder’s UDBE participation commitment, if applicable, as required in Section 1-02.6, or if the written confirmation that is submitted fails to meet the requirements of the Special Provisions;

j. The Bidder fails to submit UDBE Good Faith Effort documentation, if applicable, as required in Section 1-02.6, or if the documentation that is submitted fails to demonstrate that a Good Faith Effort to meet the Condition of Award was made;

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

l. 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.

1-02.14 Disqualification of Bidders
(May 17, 2018 APWA GSP, Option A)

Delete this Section and replace it with the following:

A Bidder will be deemed not responsible if the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1), as amended.

The Contracting Agency will verify that the Bidder meets the mandatory bidder responsibility criteria in RCW 39.04.350(1). To assess bidder responsibility, the Contracting Agency reserves the right to request documentation as needed from the Bidder and third parties concerning the Bidder’s compliance with the mandatory bidder responsibility criteria.

If the Contracting Agency determines the Bidder does not meet the mandatory bidder responsibility criteria in RCW 39.04.350(1) and is therefore not a responsible Bidder, the Contracting Agency 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 two (2) business days of the Contracting Agency’s determination by presenting its appeal and any additional information to the Contracting Agency. The Contracting Agency will consider the appeal and any additional information before issuing its final determination. If the final determination affirms that the Bidder is not responsible, the Contracting Agency 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 Contracting Agency’s final determination.

1-02.15 Pre Award Information
(August 14, 2013 APWA GSP)

Revise this section to read:
Before awarding any contract, the Contracting Agency may require one or more of these items or actions of the apparent lowest responsible bidder:

1. A complete statement of the origin, composition, and manufacture of any or all materials to be used,
2. Samples of these materials for quality and fitness tests,
3. A progress schedule (in a form the Contracting Agency requires) showing the order of and time required for the various phases of the work,
4. A breakdown of costs assigned to any bid item,
5. Attendance at a conference with the Engineer or representatives of the Engineer,
6. Obtain, and furnish a copy of, a business license to do business in the city or county where the work is located.
7. Any other information or action taken that is deemed necessary to ensure that the bidder is the lowest responsible bidder.

END OF SECTION
1-03 AWARD AND EXECUTION OF CONTRACT

1-03.1 Consideration of Bids
(January 23, 2006 APWA GSP)

Revise the first paragraph to read:

After opening and reading proposals, the Contracting Agency 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 will control. If a minimum bid amount has been established for any item and the bidder’s unit or lump sum price is less than the minimum specified amount, the Contracting Agency will unilaterally revise the unit or lump sum price, to the minimum specified amount and recalculate the extension. The total of extensions, corrected where necessary, including sales taxes where applicable and such additives and/or alternates as selected by the Contracting Agency, will be used by the Contracting Agency for award purposes and to fix the Awarded Contract Price amount and the amount of the contract bond.

1-03.1(1) Identical Bid Totals
(January 4, 2016 APWA GSP)

Revise this section to read:

After opening Bids, if two or more lowest responsive Bid totals are exactly equal, then the tiebreaker will be the Bidder with an equal lowest bid, that proposed to use the highest percentage of recycled materials in the Project, per the form submitted with the Bid Proposal. If those percentages are also exactly equal, then the tiebreaker will be determined by drawing as follows: Two or more slips of paper will be marked as follows: one marked “Winner” and the other(s) marked “unsuccessful”. The slips will be folded to make the marking unseen. The slips will be placed inside a box. One authorized representative of each Bidder shall draw a slip from the box. Bidders shall draw in alphabetic order by the name of the firm as registered with the Washington State Department of Licensing. The slips shall be unfolded and the firm with the slip marked “Winner” will be determined to be the successful Bidder and eligible for Award of the Contract. Only those Bidders who submitted a Bid total that is exactly equal to the lowest responsive Bid, and with a proposed recycled materials percentage that is exactly equal to the highest proposed recycled materials amount, are eligible to draw.

1-03.3 Execution of Contract
(October 1, 2005 APWA GSP)

Revise this section to read:

Copies of the Contract Provisions, including the unsigned Form of Contract, will be available for signature by the successful bidder on the first business day following award. The number of copies to be executed by the Contractor will be determined by the Contracting Agency.

Within $$10$$ calendar days after the award date, the successful bidder shall return the signed Contracting Agency-prepared contract, an insurance certification as required by Section 1-07.18, and a satisfactory bond as required by law and Section 1-03.4.
execution of the contract by the Contracting Agency, the successful bidder shall provide any
pre-award information the Contracting Agency may require under Section 1-02.15.

Until the Contracting Agency executes a contract, no proposal shall bind the Contracting
Agency nor shall any work begin within the project limits or within Contracting Agency-
furnished sites. The Contractor shall bear all risks for any work begun outside such areas
and for any materials ordered before the contract is executed by the Contracting Agency.

If the bidder experiences circumstances beyond their control that prevents return of the
contract documents within the calendar days after the award date stated above, the
Contracting Agency may grant up to a maximum of $10 additional calendar days for
return of the documents, provided the Contracting Agency deems the circumstances warrant
it.

1-03.4 Contract Bond
(July 23, 2015 APWA GSP)

Delete the first paragraph and replace it with the following:

The successful bidder shall provide executed payment and performance bond(s) for the full
contract amount. The bond may be a combined payment and performance bond; or be
separate payment and performance bonds. In the case of separate payment and
performance bonds, each shall be for the full contract amount. The bond(s) shall:

1. Be on Contracting Agency-furnished form(s);
2. Be signed by an approved surety (or sureties) that:
   a. Is registered with the Washington State Insurance Commissioner, and
   b. Appears on the current Authorized Insurance List in the State of Washington
      published by the Office of the Insurance Commissioner,
3. Guarantee that the Contractor will perform and comply with all obligations, duties, and
   conditions under the Contract, including but not limited to the duty and obligation to
   indemnify, defend, and protect the Contracting Agency against all losses and claims
   related directly or indirectly from any failure:
   a. Of the Contractor (or any of the employees, subcontractors, or lower tier
      subcontractors of the Contractor) to faithfully perform and comply with all contract
      obligations, conditions, and duties, or
   b. Of the Contractor (or the subcontractors or lower tier subcontractors of the
      Contractor) to pay all laborers, mechanics, subcontractors, lower tier subcontractors,
      material person, or any other person who provides supplies or provisions for carrying
      out the work;
4. Be conditioned upon the payment of taxes, increases, and penalties incurred on the
   project under titles 50, 51, and 82 RCW; and
5. Be accompanied by a power of attorney for the Surety’s officer empowered to sign the
   bond; and
6. Be signed by an officer of the Contractor empowered to sign official statements (sole
   proprietor or partner). If the Contractor is a corporation, the bond(s) must be signed by
   the president or vice president, unless accompanied by written proof of the authority of
   the individual signing the bond(s) to bind the corporation (i.e., corporate resolution,
   power of attorney, or a letter to such effect signed by the president or vice president).

1-03.7 Judicial Review
(July 23, 2015 APWA GSP)
Revise this section to read:

Any decision made by the Contracting Agency regarding the Award and execution of the Contract or Bid rejection shall be conclusive subject to the scope of judicial review permitted under Washington Law. Such review, if any, shall be timely filed in the Superior Court of the county where the Contracting Agency headquarters is located, provided that where an action is asserted against a county, RCW 36.01.05 shall control venue and jurisdiction.

END OF SECTION
1-04  SCOPE OF THE WORK

1-04.2 Coordination of Contract Documents, Plans, Special Provisions, Specifications, and Addenda
(March 13, 2012 APWA GSP)

Revise the second paragraph to read:

Any inconsistency in the parts of the contract shall be resolved by following this order of precedence (e.g., 1 presiding over 2, 2 over 3, 3 over 4, and so forth):

1. Addenda,
2. Proposal Form,
3. Special Provisions,
4. Contract Plans,
5. Amendments to the Standard Specifications,
6. Standard Specifications,
7. Contracting Agency’s Standard Plans or Details (if any), and
8. WSDOT Standard Plans for Road, Bridge, and Municipal Construction.

END OF SECTION
1-05  CONTROL OF WORK

1-05.7 Removal of Defective and Unauthorized Work

(October 1, 2005 APWA GSP)

Supplement this section with the following:

If the Contractor fails to remedy defective or unauthorized work within the time specified in a written notice from the Engineer, or fails to perform any part of the work required by the Contract Documents, the Engineer may correct and remedy such work as may be identified in the written notice, with Contracting Agency forces or by such other means as the Contracting Agency may deem necessary.

If the Contractor fails to comply with a written order to remedy what the Engineer determines to be an emergency situation, the Engineer may have the defective and unauthorized work corrected immediately, have the rejected work removed and replaced, or have work the Contractor refuses to perform completed by using Contracting Agency or other forces. An emergency situation is any situation when, in the opinion of the Engineer, a delay in its remedy could be potentially unsafe, or might cause serious risk of loss or damage to the public.

Direct or indirect costs incurred by the Contracting Agency 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 Engineer 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.

No adjustment in contract time or compensation will be allowed because of the delay in the performance of the work attributable to the exercise of the Contracting Agency’s rights provided by this Section.

The rights exercised under the provisions of this section shall not diminish the Contracting Agency’s right to pursue any other avenue for additional remedy or damages with respect to the Contractor’s failure to perform the work as required.

1-05.11 Final Inspection

Delete this section and replace it with the following:

1-05.11 Final Inspections and Operational Testing

(October 1, 2005 APWA GSP)

1-05.11(1) Substantial Completion Date

When the Contractor considers the work to be substantially complete, the Contractor shall so notify the Engineer and request the Engineer establish the Substantial Completion Date. The Contractor’s request shall list the specific items of work that remain to be completed in order to reach physical completion. The Engineer will schedule an inspection of the work
with the Contractor to determine the status of completion. The Engineer may also establish the Substantial Completion Date unilaterally.

If, after this inspection, the Engineer concurs with the Contractor that the work is substantially complete and ready for its intended use, the Engineer, by written notice to the Contractor, will set the Substantial Completion Date. If, after this inspection the Engineer does not consider the work substantially complete and ready for its intended use, the Engineer will, by written notice, so notify the Contractor giving the reasons therefor.

Upon receipt of written notice concurring in or denying substantial completion, whichever is applicable, the Contractor shall pursue vigorously, diligently and without unauthorized interruption, the work necessary to reach Substantial and Physical Completion. The Contractor shall provide the Engineer with a revised schedule indicating when the Contractor expects to reach substantial and physical completion of the work.

The above process shall be repeated until the Engineer establishes the Substantial Completion Date and the Contractor considers the work physically complete and ready for final inspection.

1-05.11(2) Final Inspection and Physical Completion Date

When the Contractor considers the work physically complete and ready for final inspection, the Contractor, by written notice, shall request the Engineer to schedule a final inspection. The Engineer will set a date for final inspection. The Engineer and the Contractor will then make a final inspection and the Engineer will notify the Contractor in writing of all particulars in which the final inspection reveals the work incomplete or unacceptable. The Contractor shall immediately take such corrective measures as are necessary to remedy the listed deficiencies. Corrective work shall be pursued vigorously, diligently, and without interruption until physical completion of the listed deficiencies. This process will continue until the Engineer is satisfied the listed deficiencies have been corrected.

If action to correct the listed deficiencies is not initiated within 7 days after receipt of the written notice listing the deficiencies, the Engineer may, upon written notice to the Contractor, take whatever steps are necessary to correct those deficiencies pursuant to Section 1-05.7.

The Contractor will not be allowed an extension of contract time because of a delay in the performance of the work attributable to the exercise of the Engineer’s right hereunder.

Upon correction of all deficiencies, the Engineer will notify the Contractor and the Contracting Agency, in writing, of the date upon which the work was considered physically complete. That date shall constitute the Physical Completion Date of the contract, but shall not imply acceptance of the work or that all the obligations of the Contractor under the contract have been fulfilled.

1-05.11(3) Operational Testing

It is the intent of the Contracting Agency to have at the Physical Completion Date a complete and operable system. Therefore, when the work involves the installation of machinery or other mechanical equipment; street lighting, electrical distribution or signal systems; irrigation systems; buildings; or other similar work it may be desirable for the
Engineer to have the Contractor operate and test the work for a period of time after final inspection but prior to the physical completion date. Whenever items of work are listed in the Contract Provisions for operational testing they shall be fully tested under operating conditions for the time period specified to ensure their acceptability prior to the Physical Completion Date. During and following the test period, the Contractor shall correct any items of workmanship, materials, or equipment which prove faulty, or that are not in first class operating condition. Equipment, electrical controls, meters, or other devices and equipment to be tested during this period shall be tested under the observation of the Engineer, so that the Engineer may determine their suitability for the purpose for which they were installed. The Physical Completion Date cannot be established until testing and corrections have been completed to the satisfaction of the Engineer.

The costs for power, gas, labor, material, supplies, and everything else needed to successfully complete operational testing, shall be included in the unit contract prices related to the system being tested, unless specifically set forth otherwise in the proposal.

Operational and test periods, when required by the Engineer, shall not affect a manufacturer’s guaranties or warranties furnished under the terms of the contract.

1-05.13 Superintendents, Labor and Equipment of Contractor
(August 14, 2013 APWA GSP)

Delete the sixth and seventh paragraphs of this section.

1-05.15 Method of Serving Notices
(March 25, 2009 APWA GSP)

Revise the second paragraph to read:

All correspondence from the Contractor shall be directed to the Project Engineer. 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, must be in paper format, hand delivered or sent via mail delivery service to the Project Engineer's office. Electronic copies such as e-mails or electronically delivered copies of correspondence will not constitute such notice and will not comply with the requirements of the Contract.

Add the following new section:

1-05.16 Water and Power
(October 1, 2005 APWA GSP)

The Contractor shall make necessary arrangements, and shall bear the costs for power and water necessary for the performance of the work, unless the contract includes power and water as a pay item.

Add the following new section:
1-05.17 Oral Agreements  
(October 1, 2005 APWA GSP)

No oral agreement or conversation with any officer, agent, or employee of the Contracting Agency, 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 Contracting Agency, unless subsequently put in writing and signed by the Contracting Agency.

Add the following new section:

1-05.18 Record Drawings  
(March 8, 2013 APWA GSP)

The Contractor shall maintain one set of full size plans for Record Drawings, updated with clear and accurate redlined field revisions on a daily basis, and within 2 business days after receipt of information that a change in Work has occurred. The Contractor shall not conceal any work until the required information is recorded.

This Record Drawing set shall be used for this purpose alone, shall be kept separate from other Plan sheets, and shall be clearly marked as Record Drawings. These Record Drawings shall be kept on site at the Contractor’s field office, and shall be available for review by the Contracting Agency at all times. The Contractor shall bring the Record Drawings to each progress meeting for review.

The preparation and upkeep of the Record Drawings is to be the assigned responsibility of a single, experienced, and qualified individual. The quality of the Record Drawings, in terms of accuracy, clarity, and completeness, is to be adequate to allow the Contracting Agency to modify the computer-aided drafting (CAD) Contract Drawings to produce a complete set of Record Drawings for the Contracting Agency without further investigative effort by the Contracting Agency.

The Record Drawing markups shall document all changes in the Work, both concealed and visible. Items that must be shown on the markups include but are not limited to:

- Actual dimensions, arrangement, and materials used when different than shown in the Plans.
- Changes made by Change Order or Field Order.
- Changes made by the Contractor.
- Accurate locations of storm sewer, sanitary sewer, water mains and other water appurtenances, structures, conduits, light standards, vaults, width of roadways, sidewalks, landscaping areas, building footprints, channelization and pavement markings, etc. Include pipe invert elevations, top of castings (manholes, inlets, etc.).

If the Contract calls for the Contracting Agency to do all surveying and staking, the Contracting Agency will provide the elevations at the tolerances the Contracting Agency requires for the Record Drawings.
When the Contract calls for the Contractor to do the surveying/staking, the applicable tolerance limits include, but are not limited to the following:

<table>
<thead>
<tr>
<th>As-built description</th>
<th>Vertical</th>
<th>Horizontal</th>
</tr>
</thead>
<tbody>
<tr>
<td>As-built sanitary &amp; storm invert and grate elevations</td>
<td>± 0.01 foot</td>
<td>± 0.01 foot</td>
</tr>
<tr>
<td>As-built monumentation</td>
<td>± 0.001 foot</td>
<td>± 0.001 foot</td>
</tr>
<tr>
<td>As-built waterlines, inverts, valves, hydrants</td>
<td>± 0.10 foot</td>
<td>± 0.10 foot</td>
</tr>
<tr>
<td>As-built ponds/swales/water features</td>
<td>± 0.10 foot</td>
<td>± 0.10 foot</td>
</tr>
<tr>
<td>As-built buildings (fin. Floor elev.)</td>
<td>± 0.01 foot</td>
<td>± 0.10 foot</td>
</tr>
<tr>
<td>As-built gas lines, power, TV, Tel, Com</td>
<td>± 0.10 foot</td>
<td>± 0.10 foot</td>
</tr>
<tr>
<td>As-built signs, signals, etc.</td>
<td>N/A</td>
<td>± 0.10 foot</td>
</tr>
</tbody>
</table>

Making Entries on the Record Drawings:

- Use erasable colored pencil (not ink) for all markings on the Record Drawings, conforming to the following color code:
  - Additions - Red
  - Deletions - Green
  - Comments - Blue
  - Dimensions - Graphite
- Provide the applicable reference for all entries, such as the change order number, the request for information (RFI) number, or the approved shop drawing number.
- Date all entries.
- Clearly identify all items in the entry with notes similar to those in the Contract Drawings (such as pipe symbols, centerline elevations, materials, pipe joint abbreviations, etc.).

The Contractor shall certify on the Record Drawings that said drawings are an accurate depiction of built conditions, and in conformance with the requirements detailed above. The Contractor shall submit final Record Drawings to the Contracting Agency. Contracting Agency acceptance of the Record Drawings is one of the requirements for achieving Physical Completion.

Payment will be made for the following bid item:

| Record Drawings (Minimum Bid $ 2,000.00) | Lump Sum |

Payment for this item will be made on a prorated monthly basis for work completed in accordance with this section up to 75% of the lump sum bid. The final 25% of the lump sum item will be paid upon submittal and approval of the completed Record Drawings set prepared in conformance with these Special Provisions.

A minimum bid amount has been entered in the Bid Proposal for this item. The Contractor must bid at least that amount.
1-06 CONTROL OF MATERIAL

Section 1-06 is supplemented with the following:

1-06.1 Approval of Materials Prior to Use

1-06.1(4) Fabrication Inspection Expense
(June 27, 2011 APWA GSP)

Delete this section in its entirety.

1-06.6 Recycled Materials
(June 27, 2011 APWA GSP)

Delete this section, including its subsections, and replace it with the following:

The Contractor shall make their best effort to utilize recycled materials in the construction of the project. Approval of such material use shall be as detailed elsewhere in the Standard Specifications.

Prior to Physical Completion, the Contractor shall report the quantity of recycled materials that were utilized in the construction of the project for each of the items listed in Section 9-03.21. The report shall include hot mix asphalt, recycled concrete aggregate, recycled glass, steel furnace slag, and other recycled materials (e.g., utilization of on-site material and aggregates from concrete returned to the supplier). The Contractor’s report shall be provided on DOT form 350-075 Recycled Materials Reporting.

END OF SECTION
1-07 LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC

1-07.1 Laws to be Observed

(October 1, 2005 APWA GSP)

Supplement this section with the following:

In cases of conflict between different safety regulations, the more stringent regulation shall apply.

The Washington State Department of Labor and Industries shall be the sole and paramount administrative agency responsible for the administration of the provisions of the Washington Industrial Safety and Health Act of 1973 (WISHA).

The Contractor shall maintain at the project site office, or other well known place at the project site, all articles necessary for providing first aid to the injured. The Contractor shall establish, publish, and make known to all employees, procedures for ensuring immediate removal to a hospital, or doctor’s care, persons, including employees, who may have been injured on the project site. Employees should not be permitted to work on the project site before the Contractor has established and made known procedures for removal of injured persons to a hospital or a doctor’s care.

The Contractor shall have sole responsibility for the safety, efficiency, and adequacy of the Contractor’s plant, appliances, and methods, and for any damage or injury resulting from their failure, or improper maintenance, use, or operation. The Contractor shall be solely and completely responsible for the conditions of the project site, including safety for all persons and property in the performance of the work. This requirement shall apply continuously, and not be limited to normal working hours. The required or implied duty of the Engineer to conduct construction review of the Contractor’s performance does not, and shall not, be intended to include review and adequacy of the Contractor’s safety measures in, on, or near the project site.

1-07.2 State Taxes

Delete this section, including its sub-sections, in its entirety and replace it with the following:

1-07.2 State Sales Tax

(June 27, 2011 APWA GSP)

The Washington State Department of Revenue has issued special rules on the State sales tax. Sections 1-07.2(1) through 1-07.2(3) are meant to clarify those rules. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The Contracting Agency 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 1-07.2(2) describes this exception.

The Contracting Agency will pay the retained percentage (or release the Contract Bond if a FHWA-funded Project) 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 Contracting Agency 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 this contract or not. Any amount so deducted will be paid into the proper State fund.

1-07.2(1) State Sales Tax - Rule 171

WAC 458-20-171, and its related rules, applies 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.

1-07.2(2) State Sales Tax - Rule 170

WAC 458-20-170, and its related rules, applies 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 Contracting Agency, retail sales tax on the full contract price. The Contracting Agency 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 Contracting Agency 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.

1-07.2(3) Services

The Contractor shall not collect retail sales tax from the Contracting Agency on any contract wholly for professional or other services (as defined in Washington State Department of Revenue Rules 138 and 244).
1-07.5 Environmental Regulations

1-07.5(1) General

Section 1-07.5(1) is supplemented with the following:

(August 1, 2014 CoP GSP)

No construction related activity shall contribute to the degradation of the environment, allow material to enter surface or ground waters, or allow particulate emissions to the atmosphere, which exceed state or federal standards. Any actions that potentially allow a discharge to state waters must have prior approval of the Washington State Department of Ecology.

1-07.6 Permits and Licenses

Section 1-07.6 is supplemented with the following:

(January 2, 2018)

The Contracting Agency has obtained the below-listed permit(s) for this project. A copy of the permit(s) is attached as an appendix for informational purposes. Copies of these permits, including a copy of the Transfer of Coverage form, when applicable, are required to be onsite at all times.

Contact with the permitting agencies, concerning the below-listed permit(s), shall be made through the Engineer with the exception of when the Construction Stormwater General Permit coverage is transferred to the Contractor, direct communication with the Department of Ecology is allowed. The Contractor shall be responsible for obtaining Ecology’s approval for any Work requiring additional approvals (e.g. Request for Chemical Treatment Form). The Contractor shall obtain additional permits as necessary. All costs to obtain and comply with additional permits shall be included in the applicable Bid items for the Work involved.

- Labor and Industries Electrical Permit(s)
- Business License
- Permit for Work in Street Right of Way

1-07.7 Load Limits

Section 1-07.7 is supplemented with the following:

(March 13, 1995 WSDOT GSP)

If the sources of materials provided by the Contractor necessitate hauling over roads other than State Highways, the Contractor shall, at the Contractor's expense, make all arrangements for the use of the haul routes.

1-07.16 Protection and Restoration of Property

1-07.16(2) Vegetation Protection and Restoration

Section 1-07.16(2) is supplemented with the following:
Vegetation and soil protection zones for trees shall extend out from the trunk to a distance of 1-foot radius for each inch of trunk diameter at breast height.

Vegetation and soil protection zones for shrubs shall extend out from the stems at ground level to twice the radius of the shrub.

Vegetation and soil protection zones for herbaceous vegetation shall extend to encompass the diameter of the plant as measured from the outer edge of the plant.

**1-07.17 Utilities and Similar Facilities**

Section 1-07.17 is supplemented with the following:

Locations and dimensions shown in the Plans for existing facilities are in accordance with available information obtained without uncovering, measuring, or other verification.

Public and private utilities, or their Contractors, will furnish all work necessary to adjust, relocate, replace, or construct their facilities unless otherwise provided for in the Plans or these Special Provisions. Such adjustment, relocation, replacement, or construction will be done during the prosecution of the work for this project.

The Contractor shall attend a mandatory utility preconstruction meeting with the Engineer, all affected Subcontractors, and all utility owners and their Contractors prior to beginning onsite work.

The following addresses and telephone numbers of utility companies or their Contractors that will be adjusting, relocating, replacing, or constructing utilities within the project limits are supplied for the Contractor's use:

**Puget Sound Energy (PSE)**
Hong Nguyen, Project Manager
Phone: (425) 395-6904

**Century Link**
Alex Harb
Phone: (206) 345-4476
Alex.Harb@centuryLink.com

**Comcast**
Jerry Steele
Phone: (253) 288-7532
Email: Jerry.Steele2@Cable.Comcast.com

Other utility contacts for the project include:
City of Pacific – Sanitary Sewer and Water
Attn: Jim Schunke
1-07.18 Public Liability and Property Damage Insurance

Delete this section in its entirety, and replace it with the following:

1-07.18 Insurance
(January 4, 2016 APWA GSP)

1-07.18(1) General Requirements

A. The Contractor shall procure and maintain the insurance described in all subsections of section 1-07.18 of these Special Provisions, from insurers with a current A. M. Best rating of not less than A-: VII and licensed to do business in the State of Washington. The Contracting Agency reserves the right to approve or reject the insurance provided, based on the insurer’s financial condition.

B. The Contractor shall keep this insurance in force without interruption from the 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 below.

C. If any insurance policy is written on a claims made form, its retroactive date, and that of all subsequent renewals, shall be no later than the effective date of this Contract. The policy shall state that coverage is claims made, and state the retroactive date. Claims-made form coverage shall be maintained by the Contractor for a minimum of 36 months following the Completion Date or earlier termination of this Contract, and the Contractor shall annually provide the Contracting Agency with proof of renewal. If renewal of the claims made form of coverage becomes unavailable, or economically prohibitive, the Contractor shall purchase an extended reporting period (“tail”) or execute another form of guarantee acceptable to the Contracting Agency to assure financial responsibility for liability for services performed.

D. The Contractor’s Automobile Liability, Commercial General Liability and Excess or Umbrella Liability insurance policies shall be primary and non-contributory insurance as respects the Contracting Agency’s insurance, self-insurance, or self-insured pool coverage. Any insurance, self-insurance, or self-insured pool coverage maintained by the Contracting Agency shall be excess of the Contractor’s insurance and shall not contribute with it.

E. The Contractor shall provide the Contracting Agency and all additional insureds with written notice of any policy cancellation, within two business days of their receipt of such notice.

F. The Contractor shall not begin work under the Contract until the required insurance has been obtained and approved by the Contracting Agency.

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

H. All costs for insurance shall be incidental to and included in the unit or lump sum prices
of the Contract and no additional payment will be made.

1-07.18(2) Additional Insured

All insurance policies, with the exception of Workers Compensation, and of Professional
Liability and Builder’s Risk (if required by this Contract) shall name the following listed
toies as additional insured(s) using the forms or endorsements required herein:

- the Contracting Agency and its officers, elected officials, employees, agents, and
  volunteers
- City of Pacific and its officers, elected officials, employees, agents, and volunteers
- Follett Engineering, PLLC

The above-listed entities shall be additional insured(s) for the full available limits of liability
maintained by the Contractor, irrespective of whether such limits maintained by the
Contractor are greater than those required by this Contract, and irrespective of whether the
Certificate of Insurance provided by the Contractor pursuant to 1-07.18(4) describes limits
lower than those maintained by the Contractor.

For Commercial General Liability insurance coverage, the required additional insured
endorsements shall be at least as broad as ISO forms CG 20 10 10 01 for ongoing
operations and CG 20 37 10 01 for completed operations.

1-07.18(3) Subcontractors

The Contractor shall cause each Subcontractor of every tier 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 all Subcontractors of every tier add all entities listed in
1-07.18(2) as additional insureds, and provide proof of such on the policies as required by
that section as detailed in 1-07.18(2) using an endorsement as least as broad as ISO CG 20
10 10 01 for ongoing operations and CG 20 37 10 01 for completed operations.

Upon request by the Contracting Agency, the Contractor shall forward to the Contracting
Agency evidence of insurance and copies of the additional insured endorsements of each
Subcontractor of every tier as required in 1-07.18(4) Verification of Coverage.

1-07.18(4) Verification of Coverage

The Contractor shall deliver to the Contracting Agency a Certificate(s) of Insurance and
endorsements for each policy of insurance meeting the requirements set forth herein when
the Contractor delivers the signed Contract for the work. Failure of Contracting Agency to
demand such verification of coverage with these insurance requirements or failure of
Contracting Agency to identify a deficiency from the insurance documentation provided shall not be construed as a waiver of Contractor’s obligation to maintain such insurance.

Verification of coverage shall include:

1. An ACORD certificate or a form determined by the Contracting Agency to be equivalent.

2. Copies of all endorsements naming Contracting Agency and all other entities listed in 107.18(2) as additional insured(s), showing the policy number. The Contractor may submit a copy of any blanket additional insured clause from its policies instead of a separate endorsement.

3. Any other amendatory endorsements to show the coverage required herein.

4. A notation of coverage enhancements on the Certificate of Insurance shall not satisfy these requirements – actual endorsements must be submitted.

Upon request by the Contracting Agency, the Contractor shall forward to the Contracting Agency a full and certified copy of the insurance policy(s). If Builders Risk insurance is required on this Project, a full and certified copy of that policy is required when the Contractor delivers the signed Contract for the work.

1-07.18(5) Coverages and Limits

The insurance shall provide the minimum coverages and limits set forth below. 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 Contracting Agency’s recourse to any remedy available at law or in equity.

All deductibles and self-insured retentions must be disclosed and are subject to approval by the Contracting Agency. The cost of any claim payments falling within the deductible or self-insured retention shall be the responsibility of the Contractor. In the event an additional insured incurs a liability subject to any policy’s deductibles or self-insured retention, said deductibles or self-insured retention shall be the responsibility of the Contractor.

1-07.18(5)A Commercial General Liability

Commercial General Liability insurance shall be written on coverage forms at least as broad as ISO occurrence form CG 00 01, including but not limited to liability arising from premises, operations, stopgap liability, independent contractors, products-completed operations, personal and advertising injury, and liability assumed under an insured contract. There shall be no exclusion for liability arising from explosion, collapse, or underground property damage.

The Commercial General Liability insurance shall be endorsed to provide a per project general aggregate limit, using ISO form CG 25 03 05 09 or an equivalent endorsement.

Contractor shall maintain Commercial General Liability Insurance arising out of the Contractor’s completed operations for at least three years following Substantial Completion of the Work.
Such policy must provide the following minimum limits:

- $1,000,000 Each Occurrence
- $2,000,000 General Aggregate
- $2,000,000 Products & Completed Operations Aggregate
- $1,000,000 Personal & Advertising Injury each offence
- $1,000,000 Stop Gap / Employers' Liability each accident

1-07.18(5)B Automobile Liability

Automobile Liability shall cover owned, non-owned, hired, and leased vehicles; and shall be written on a coverage form at least as broad as ISO form CA 00 01. If the work involves the transport of pollutants, the automobile liability policy shall include MCS 90 and CA 99 endorsements.

Such policy must provide the following minimum limit:

- $1,000,000 Combined single limit each accident

1-07.18(5)C Workers’ Compensation

The Contractor shall comply with Workers’ Compensation coverage as required by the Industrial Insurance laws of the State of Washington.

1-07.23 Public Convenience and Safety

1-07.23(1) Construction Under Traffic

Section 1-07.23(1) is supplemented with the following:

(January 2, 2012 WSDOT GSP)

Work Zone Clear Zone

The Work Zone Clear Zone (WZCZ) applies during working and nonworking hours. The WZCZ applies only to temporary roadside objects introduced by the Contractor’s operations and does not apply to preexisting conditions or permanent Work. Those work operations that are actively in progress shall be in accordance with adopted and approved Traffic Control Plans, and other contract requirements.

During nonworking hours, equipment or materials shall not be within the WZCZ unless they are protected by permanent guardrail or temporary concrete barrier. The use of temporary concrete barrier shall be permitted only if the Engineer approves the installation and location.

During actual hours of work, unless protected as described above, only materials absolutely necessary to construction shall be within the WZCZ and only construction vehicles absolutely necessary to construction shall be allowed within the WZCZ or allowed to stop or park on the shoulder of the roadway.
The Contractor’s nonessential vehicles and employees private vehicles shall not be permitted to park within the WZCZ at any time unless protected as described above.

Deviation from the above requirements shall not occur unless the Contractor has requested the deviation in writing and the Engineer has provided written approval.

Minimum WZCZ distances are measured from the edge of traveled way and will be determined as follows:

Minimum Work Zone Clear Zone Distance

<table>
<thead>
<tr>
<th>Regulatory Posted Speed</th>
<th>Distance From Traveled Way (Feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>35 mph or less</td>
<td>10 *</td>
</tr>
<tr>
<td>40 mph</td>
<td>15</td>
</tr>
<tr>
<td>45 to 55 mph</td>
<td>20</td>
</tr>
<tr>
<td>60 mph or greater</td>
<td>30</td>
</tr>
</tbody>
</table>

* or 2-feet beyond the outside edge of sidewalk

END OF SECTION
1-08 PROSECUTION AND PROGRESS

Add the following new section:

1-08.0 Preliminary Matters
(May 25, 2006 APWA GSP)

Add the following new section:

1-08.0(1) Preconstruction Conference
(October 10, 2008 APWA GSP)

Prior to the Contractor beginning the work, a preconstruction conference will be held between the Contractor, the Engineer, and such other interested parties as may be invited. The purpose of the preconstruction conference will be:

1. To review the initial progress schedule;
2. To establish a working understanding among the various parties associated or affected by the work;
3. To establish and review procedures for progress payment, notifications, approvals, submittals, etc.;
4. To establish normal working hours for the work;
5. To review safety standards and traffic control; and
6. To discuss such other related items as may be pertinent to the work.

The Contractor shall prepare and submit at the preconstruction conference the following:

1. A breakdown of all lump sum items;
2. A preliminary schedule of working drawing submittals; and
3. A list of material sources for approval if applicable.

Add the following new section:

1-08.0(2) Hours of Work
(December 8, 2014 APWA GSP)

Except in the case of emergency or unless otherwise approved by the Engineer, the normal working hours for the Contract shall be any consecutive 8-hour period between 8:00 a.m. and 6:00 p.m. Monday through Friday, exclusive of a lunch break. If the Contractor desires different than the normal working hours stated above, the request must be submitted in writing prior to the preconstruction conference, subject to the provisions below. The working hours for the Contract shall be established at or prior to the preconstruction conference.

All working hours and days are also subject to local permit and ordinance conditions (such as noise ordinances).

If the Contractor wishes to deviate from the established working hours, the Contractor shall submit a written request to the Engineer for consideration. This request shall state what hours are being requested, and why. Requests shall be submitted for review no later than $5 working days prior to the day(s) the Contractor is requesting to change the hours.
If the Contracting Agency approves such a deviation, such approval may be subject to certain other conditions, which will be detailed in writing. For example:

1. On non-Federal aid projects, requiring the Contractor to reimburse the Contracting Agency for the costs in excess of straight-time costs for Contracting Agency representatives who worked during such times. (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 Contracting Agency’s material testing lab; inspectors; and other Contracting Agency employees or third party consultants when, in the opinion of the Engineer, such work necessitates their presence.)

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

3. 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.

4. If a 4-10 work schedule is requested and approved the non-working day for the week will be charged as a working day.

5. If Davis Bacon wage rates apply to this Contract, all requirements must be met and recorded properly on certified payroll

1-08.3 Progress Schedule

1-08.3(2)A Type A Progress Schedule
(March 13, 2012 APWA GSP)

Revise this section to read:

The Contractor shall submit 3 copies of a Type A Progress Schedule no later than at the preconstruction conference, or some other mutually agreed upon submittal time. The schedule may be a critical path method (CPM) schedule, bar chart, or other standard schedule format. Regardless of which format used, the schedule shall identify the critical path. The Engineer will evaluate the Type A Progress Schedule and approve or return the schedule for corrections within 15 calendar days of receiving the submittal.

1-08.4 Prosecution of Work

Delete this section in its entirety, and replace it with the following:

1-08.4 Notice to Proceed and Prosecution of Work
(July 23, 2015 APWA GSP)

Notice to Proceed will be given after the contract has been executed and the contract bond and evidence of insurance have been approved and filed by the Contracting Agency. The Contractor shall not commence with the work until the Notice to Proceed has been given by the Engineer. The Contractor shall commence construction activities on the project site within ten days of the Notice to Proceed Date, unless otherwise approved in writing. The Contractor shall diligently pursue the work to the physical completion date within the time...
specified in the contract. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the contract.

When shown in the Plans, the first order of work shall be the installation of high visibility fencing to delineate all areas for protection or restoration, as described in the Contract. Installation of high visibility fencing adjacent to the roadway shall occur after the placement of all necessary signs and traffic control devices in accordance with 1-10.1(2). Upon construction of the fencing, the Contractor shall request the Engineer to inspect the fence. No other work shall be performed on the site until the Contracting Agency has accepted the installation of high visibility fencing, as described in the Contract.

1-08.5 Time for Completion

Section 1-08.5 is supplemented with the following:

(March 13, 1995 WSDOT GSP)

This project shall be physically completed within 160 working days.

(September 12, 2016 APWA GSP, Option A)

Revise the third and fourth paragraphs to read:

Contract time shall begin on the first working day following the Notice to Proceed Date. Each working day shall be charged to the contract as it occurs, until the contract work is physically complete. If substantial completion has been granted and all the authorized working days have been used, charging of working days will cease. Each week the Engineer will provide the Contractor a statement that shows the number of working days: (1) charged to the contract the week before; (2) specified for the physical completion of the contract; and (3) remaining for the physical completion of the contract. The statement will also show the nonworking days and any partial or whole day the Engineer declares as unworkable. Within 10 calendar days after the date of each statement, the Contractor shall file a written protest of any alleged discrepancies in it. To be considered by the Engineer, the protest shall be in sufficient detail to enable the Engineer to ascertain the basis and amount of time disputed. By not filing such detailed protest in that period, the Contractor shall be deemed as having accepted the statement as correct. If the Contractor is approved to work 10 hours a day and 4 days a week (a 4-10 schedule) and the fifth day of the week in which a 4-10 shift is worked would ordinarily be charged as a working day then the fifth day of that week will be charged as a working day whether or not the Contractor works on that day.

Revise the sixth paragraph to read:

The Engineer will give the Contractor written notice of the completion date of the contract after all the Contractor’s obligations under the contract have been performed by the Contractor. The following events must occur before the Completion Date can be established:
1. The physical work on the project must be complete; and

2. The Contractor must furnish all documentation required by the contract and required by law, to allow the Contracting Agency to process final acceptance of the contract. The following documents must be received by the Project Engineer prior to establishing a completion date:

a. Certified Payrolls (per Section 1-07.9(5)).
b. Material Acceptance Certification Documents
c. Monthly Reports of Amounts Credited as DBE Participation, as required by the Contract Provisions.
d. Final Contract Voucher Certification
e. Copies of the approved “Affidavit of Prevailing Wages Paid” for the Contractor and all Subcontractors
f. Property owner releases per Section 1-07.24

1-08.9 Liquidated Damages
(August 14, 2013 APWA GSP)

Revise the fourth paragraph to read:

When the Contract Work has progressed to Substantial Completion as defined in the Contract, the Engineer may determine that the work is Substantially Complete. The Engineer will notify the Contractor in writing of the Substantial Completion Date. For overruns in Contract time occurring after the date so established, the formula for liquidated damages shown above will not apply. For overruns in Contract time occurring after the Substantial Completion Date, liquidated damages shall be assessed on the basis of direct engineering and related costs assignable to the project until the actual Physical Completion Date of all the Contract Work. The Contractor shall complete the remaining Work as promptly as possible. Upon request by the Project Engineer, the Contractor shall furnish a written schedule for completing the physical Work on the Contract.

END OF SECTION
1-09 MEASUREMENT AND PAYMENT

1-09.6 Force Account
(October 10, 2008 APWA GSP)

Supplement this section with the following:

The Contracting Agency has estimated and included in the Proposal, dollar amounts for all items to be paid per force account, only to provide a common proposal for Bidders. All such dollar amounts are to become a part of Contractor's total bid. However, the Contracting Agency does not warrant expressly or by implication that the actual amount of work will correspond with those estimates. Payment will be made on the basis of the amount of work actually authorized by Engineer.

1-09.9 Payments
(March 13, 2012 APWA GSP)

Delete the first four paragraphs and replace them with the following:

The basis of payment will be the actual quantities of Work performed according to the Contract and as specified for payment.

The Contractor shall submit a breakdown of the cost of lump sum bid items at the Preconstruction Conference, to enable the Project Engineer to determine the Work performed on a monthly basis. A breakdown is not required for lump sum items that include a basis for incremental payments as part of the respective Specification. Absent a lump sum breakdown, the Project Engineer will make a determination based on information available. The Project Engineer's determination of the cost of work shall be final.

Progress payments for completed work and material on hand will be based upon progress estimates prepared by the Engineer. A progress estimate cutoff date will be established at the preconstruction conference.

The initial progress estimate will be made not later than 30 days after the Contractor commences the work, and successive progress estimates will be made every month thereafter until the Completion Date. Progress estimates made during progress of the work are tentative, and made only for the purpose of determining progress payments. The progress estimates are subject to change at any time prior to the calculation of the final payment.

The value of the progress estimate will be the sum of the following:

1. Unit Price Items in the Bid Form — the approximate quantity of acceptable units of work completed multiplied by the unit price.
2. Lump Sum Items in the Bid Form — based on the approved Contractor's lump sum breakdown for that item, or absent such a breakdown, based on the Engineer's determination.
3. Materials on Hand — 100 percent of invoiced cost of material delivered to Job site or other storage area approved by the Engineer.
4. Change Orders — entitlement for approved extra cost or completed extra work as determined by the Engineer.
Progress payments will be made in accordance with the progress estimate less:
1. Retainage per Section 1-09.9(1), on non FHWA-funded projects;
2. The amount of progress payments previously made; and
3. Funds withheld by the Contracting Agency for disbursement in accordance with the
   Contract Documents.

Progress payments for work performed shall not be evidence of acceptable performance or
an admission by the Contracting Agency that any work has been satisfactorily completed.
The determination of payments under the contract will be final in accordance with Section
1-05.1.

(March 13, 2012 APWA GSP)

Supplement this section with the following:

Lump sum item breakdowns are not required when the bid price for the lump sum item is
less than $20,000.

1-09.9(1) Retainage

Section 1-09.9(1) content and title is deleted and replaced with the following:

(June 27, 2011 WSDOT GSP)

Vacant

1-09.12 Audits

1-09.12(1) General
(August 1, 2014 CoP GSP)

Supplement this section with the following:

The Contractor shall provide for the safe access to the construction site and to the
Contractor’s records by Washington State Department of Ecology personnel.

All instances in this section referring to the Contracting Agency shall also refer to the
Washington State Department of Ecology.

1-09.13 Claims Resolution

1-09.13(3) Claims $250,000 or Less
(October 1, 2005 APWA GSP)

Delete this Section and replace it with the following:

The Contractor and the Contracting Agency mutually agree that those claims that total
$250,000 or less, submitted in accordance with Section 1-09.11, and not resolved by
nonbinding ADR processes, shall be resolved through litigation unless the parties mutually
agree in writing to resolve the claim through binding arbitration.
Revise the third paragraph to read:

The Contracting Agency and the Contractor mutually agree to be bound by the decision of the arbitrator, and judgment upon the award rendered by the arbitrator may be entered in the Superior Court of the county in which the Contracting Agency’s headquarters are located. The decision of the arbitrator and the specific basis for the decision shall be in writing. The arbitrator shall use the contract as a basis for decisions.
1-10 TEMPORARY TRAFFIC CONTROL

1-10.2 Traffic Control Management

1-10-2(1) General

Section 1-10.2(1) is supplemented with the following:

(January 3, 2017 WSDOT GSP, Option 1)

Only training with WSDOT TCS card and WSDOT training curriculum is recognized in the State of Washington. The Traffic Control Supervisor shall be certified by one of the following:

- The Northwest Laborers-Employers Training Trust
  27055 Ohio Ave.
  Kingston, WA 98346
  (360) 297-3035

- Evergreen Safety Council
  12545 135th Ave. NE
  Kirkland, WA 98034-8709
  1-800-521-0778

- The American Traffic Safety Services Association
  15 Riverside Parkway, Suite 100
  Fredericksburg, Virginia 22406-1022
  Training Dept. Toll Free (877) 642-4637
  Phone: (540) 368-1701

1-10.4 Measurement

1-10.4(1) Lump Sum Bid for Project (No Unit Items)

Section 1-10.4(1) is supplemented with the following:

(August 2, 2004 WSDOT GSP)

The proposal contains the item “Project Temporary Traffic Control”, lump sum. The provisions of Section 1-10.4(1) shall apply.

END OF SECTION

END OF DIVISION
APPENDICES
(January 2, 2012 WSDOT GSP)

The following appendices are attached and made a part of this contract:

APPENDIX A:
Washington State Prevailing Wage Rates.

APPENDIX B:
Record Drawings and Project Photos.

END OF SECTION
STANDARD PLANS
(January 7, 2019)

The State of Washington Standard Plans for Road, Bridge and Municipal Construction M21-01 transmitted under Publications Transmittal No. PT 16-048, effective August 6, 2018 is made a part of this contract.

The Standard Plans are revised as follows:

A-40.10
Section View, PCCP to HMA Longitudinal Joint, callout, was – “Sawed Groove ~ Width 3/16” (IN) MIN. to 5/16” (IN) MAX. ~ Depth 1” (IN) MIN. ~ see Std. Spec. 5-04.3(12)B” is revised to read; “Sawed Groove ~ Width 3/16” (IN) MIN. to 5/16” (IN) MAX. ~ Depth 1” (IN) MIN. ~ see Std. Spec. Section 5-04.3(12)A2”

A-50.10
Sheet 2 of 2, Plan, with Single Slope Barrier, reference C-14a is revised to C-70.10

A-50.20
Sheet 2 of 2, Plan, with Anchored Barrier, reference C-14a is revised to C-70.10

A-50.30
Sheet 2 of 2, Plan (top), reference C-14a is revised to C-70.1

B-10.60
DELETED

B-82.20
DELETED

B-90.40
Valve Detail - DELETED

C-2C
CASE 9A (typical of 2 callouts): The dimensions were “3'-0” MIN. ~ TO FACE OF GUARDRAIL”. are now revised to read “5'-0” MIN ~ TO FACE OF GUARDRAIL”.

C-4b
DELETED

C-4e
DELETED

C-4f
Sheet 1, BULLNOSE GRADING PLAN: Slopes shall be not steeper than 10H:1V for the bullnose guardrail system including slopes into the guardrail face to 1 foot behind the guardrail post.

Sheet 2, POST 1R & 1L, 2R & 2L, 3R TO 8R and 3L TO 8L, 9R TO 12 R and 9L TO
12L elevation view details: Slopes into the guardrail face to 1 foot behind the guardrail
post shall not be steeper than 10H:1V.

Sheet 3, SECTION B, callout – was: “THE NUT SHALL BE ASTM A563D STEEL, AND
GALVANIZED ACCORDING TO STANDARD SPEC. 9-16.3(3).” Is revised to read: “THE
NUT SHALL BE ASTM A307 STEEL, AND GALVANIZED ACCORDING TO STANDARD
SPEC. 9-16.3(3).”

C-20.14
CASE 3-31: The dimension was “5’-0” MIN” from the back of guardrail to the center of
railroad signal support is now revised to “5’-0” MIN” from face of guardrail to the front edge
of the railroad signal support.

Note 3, was – “The slope from the edge of the shoulder into the face of the guardrail cannot
exceed 10H : 1V when the face of the guardrail is less than 12’ – 0” from the edge of the
shoulder.” Is revised to read: “The slope from the edge of the shoulder into the face of the
guardrail cannot be steeper than 10H : 1V when the face of the guardrail is less than 12’ –
0” from the edge of the shoulder. The slope from the edge of the shoulder into the face of
the guardrail cannot be steeper than 6H : 1V when the guardrail is 12’ – 0” or more from the
edge of the shoulder.”

C-20.18
ALL CASES: The dimensions were “3’-0” MIN” from the face of guardrail to the front edge of
the fixed feature are now revised to “5’-0” MIN” from the face of guardrail to the front edge of
the fixed feature.

Note 1, was – “The slope from the edge of the shoulder into the face of the guardrail should
not exceed 10H : 1V when the guardrail is within 12’ – 0” from the edge of the shoulder.” Is
revised to read: “The slope from the edge of the shoulder into the face of the guardrail
should not be steeper than 10H : 1V when the guardrail is less than 12’ – 0” from the edge
of the shoulder. The slope from the edge of the shoulder into the face of the guardrail should
not be steeper than 6H : 1V when the guardrail is 12’ – 0” or more from the edge of
shoulder.”

C-22.14
DELETED

C-22.16
Note 3, formula, was: “Elevation G = (Elevation S – D x (0.1) + 31” is revised to read:
“Elevation G = (Elevation S – D x (0.1) + 31/12”

C-22.40
PLAN VIEW, MSKT-SP-MGS (TL-3) SHOWN: The dimension was “4’-0” MIN” from the 2
face of the terminal to the edge of the widened embankment is now revised to “4’-0” MIN”
from the back of the terminal post to the edge of the widened embankment.

Elevation View, MSKT-SP-MGS (TL-3), dimension, MSKT-SP-MGS (TL-3) SYSTEM
LENGTH = 50’ – 0”, dimension is revised to read: 46’ – 101/2”

C-22.45
PLAN VIEW, MSKT-SP-MGS (TL-2) SHOWN: The dimension was “4’-0” MIN” from the face
of the terminal to the edge of the widened embankment is now revised to “4’-0” MIN” from
the back of the terminal post to the edge of the widened embankment.

Elevation View, MSKT-SP-MGS (TL-2), dimension, MSKT-SP-MGS (TL-2) SYSTEM
LENGTH = 25’ – 0”, dimension is revised to read 34’ – 4 1/2”

Elevation View, SOFTSTOP (TL-2), dimension, SOFTSTOP (TL-2) SYSTEM LENGTH = 38’
– 3 1/2”, dimension is revised to read 38’ – 4 1/2”

Note 6, was – “…flare of 38.29 : 1 or flatter is allowed over the system length of 38’ – 3 ½”
with a maximum…” is revised to read: “…flare of 38.38 : 1 or flatter is allowed over the
system length of 38’ – 4 1/2” with a maximum…”

C-25.26
Elevation View, TYPE 23: The guardrail height dimension was 2’-8” from the top of the thrie
beam to the top of the bridge curb is now revised to 2’-8” from the top of the thrie beam to
the top of the ground line.

C-25.80
Plan View, callout, was – “12” (IN) BLOCKOUT” is revised to read; “12” (IN) or 8” (IN)
BLOCKOUT (12” (IN) SHOWN)”
Elevation View, add labels to posts (below view); beginning at left side of view – Label Posts
as follows; POST 1, POST 2 through POST 6”.

General Notes, add Note 6. Note reads as follows; “6. Post 1 shall use an 8 inch blockout,
and posts 2 through post 6 shall use 12 inch or 8 inch blockouts.”

C-40.14
DELETED

C-90.10
DELETED

D-10.10
Wall Type 1 may be used if no traffic barrier is attached on top of the wall. Walls with traffic
barriers attached on top of the wall are considered non-standard and shall be designed in
accordance with the current WSDOT Bridge Design Manual (BDM) and the revisions stated
in the 11/3/15 Bridge Design memorandum.

D-10.15
Wall Type 2 may be used if no traffic barrier is attached on top of the wall. Walls with traffic
barriers attached on top of the wall are considered non-standard and shall be designed in
accordance with the current WSDOT BDM and the revisions stated in the 11/3/15 Bridge
Design memorandum.

D-10.20
Wall Type 3 may be used in all cases. The last sentence of Note 6 on Wall Type 3 shall be
revised to read: The seismic design of these walls has been completed using a site adjusted
(effective) peak ground acceleration of 0.32g.
D-10.25
Wall Type 4 may be used in all cases. The last sentence of Note 6 on Wall Type 4 shall be
revised to read: The seismic design of these walls has been completed using a site adjusted
(effective) peak ground acceleration of 0.32g.

D-10.30
Wall Type 5 may be used in all cases.

D-10.35
Wall Type 6 may be used in all cases.

D-10.40
Wall Type 7 may be used if no traffic barrier is attached on top of the wall. Walls with traffic
barriers attached on top of the wall are considered non-standard and shall be designed in
accordance with the current WSDOT BDM and the revisions stated in the 11/3/15 Bridge
Design memorandum.

D-10.45
Wall Type 8 may be used if no traffic barrier is attached on top of the wall. Walls with traffic
barriers attached on top of the wall are considered non-standard and shall be designed in
accordance with the current WSDOT BDM and the revisions stated in the revisions stated in
the 11/3/15 Bridge Design memorandum.

D-15.10
STD Plans D-15 series “Traffic Barrier Details for Reinforced Concrete Retaining Walls” are
withdrawn. Special designs in accordance with the current WSDOT BDM are required in
place of these STD Plans.

D-15.20
STD Plans D-15 series “Traffic Barrier Details for Reinforced Concrete Retaining Walls” are
withdrawn. Special designs in accordance with the current WSDOT BDM are required in
place of these STD Plans.

D-15.30
STD Plans D-15 series “Traffic Barrier Details for Reinforced Concrete Retaining Walls” are
withdrawn. Special designs in accordance with the current WSDOT BDM are required in
place of these STD Plans.

F-10.12
Section Title, was – “Depressed Curb Section” is revised to read: “Depressed Curb and
Gutter Section”

F-10.40
“EXTRUDED CURB AT CUT SLOPE”, Section detail - Deleted

F-10.42
DELETE – “Extruded Curb at Cut Slope” View

H-70.20
Sheet 2, Spacing Detail, Mailbox Support Type 1, reference to Standard Plan I-70.10 is
revised to H-70.10
I-30.30
8” Diameter Wattle Spacing Table, lower left corner, was – “Slope: 1H : 1V, Maximum Spacing: 10’ – 0” is revised to read: “Slope: 1H : 1V, Maximum Spacing: 8’ – 0”.

J-10.21
Note 18, was – “When service cabinet is installed within right of way fence, see Standard Plan J-10.22 for details.” Is revised to read; “When service cabinet is installed within right of way fence, or the meter base is mounted on the exterior of the cabinet, see Standard Plan J-10.22 for details.”

J-10.22
Key Note 1, was – “Meter base per serving utility requirements~ as a minimum, the meter base shall be safety socket box with factory-installed test bypass facility that meets the requirements of EUSERC drawing 305.” Is revised to read; “Meter base per serving utility requirements~ as a minimum, the meter base shall be safety socket box with factory-installed bypass facility that meets the requirements of EUSERC drawing 305. When the utility requires meter base to be mounted on the side or back of the service cabinet, the meter base enclosure shall be fabricated from type 304 stainless steel.”
Key Note 14, was – “Hinged dead front with ¼ turn fasteners or slide latch.” Is revised to read; “Hinged dead front with ¼ turn fasteners or slide latch. ~ Dead front panel bolts shall not extend into the vertical limits of the breaker array(s).”
Key Note 15, was – “Cabinet Main Bonding Jumper. Buss shall be 4 lug tinned copper. See Cabinet Main bonding Jumper detail, Standard Plan J-3b.” is revised to read; “Cabinet Main Bonding Jumper Assembly ~ Buss shall be 4 lug tinned copper ~ See Standard Plan J-10.20 for Cabinet Main Bonding Jumper Assembly details.”
Note 1, was – “…socket box mounting detail, see Standard Plan J-3b.” is revised to read: “…socket box mounting detail, see Standard Plan J-10.20.”
Note 6, was – “…See door hinge detail, Standard Plan J-3b.” is revised to read: “…See door hinge detail, Standard Plan J-10.20.”

J-20.10
Add Note 5, “5. One accessible pedestrian signal assembly per pedestrian pushbutton post.”

J-20.11
Sheet 2, Foundation Detail, Elevation, callout – “Type 1 Signal Pole” is revised to read: “Type PS or Type 1 Signal Pole”
Sheet 2, Foundation Detail, Elevation, add note below Title, “(Type 1 Signal Pole Shown)”
Add Note 6, “6. One accessible pedestrian signal assembly per pedestrian pushbutton post.”

J-20.26
Add Note 1, “1. One accessible pedestrian pushbutton station per pedestrian pushbutton post.”

J-20.16
View A, callout, was – LOCK NIPPLE, is revised to read; CHASE NIPPLE

J-21.10
Sheet 1, Elevation View, Round Concrete Foundation Detail, callout – “ANCHOR BOLTS ~ ¾” (IN) x 30” (IN) FULL THREAD ~ THREE REQ’D. PER ASSEMBLY” IS REVISED TO READ: “ANCHOR BOLTS ~ ¾” (IN) x 30” (IN) FULL THREAD ~ FOUR REQ’D. PER ASSEMBLY”

Sheet 1 of 2, Elevation view (Round), add dimension depicting the distance from the top of the foundation to find 2 #4 reinforcing bar shown, to read; 3” CLR. Delete “(TYP.)” from the 2 ½” CLR. dimension, depicting the distance from the bottom of the foundation to find 2 #4 reinf. Bar.

Sheet 1 of 2, Elevation view (Square), add dimension depicting the distance from the top of the foundation to find 1 #4 reinforcing bar shown, to read; 3” CLR. Delete “(TYP.)” from the 2 ½” CLR. dimension, depicting the distance from the bottom of the foundation to find 1 #4 reinf. Bar.

Sheet 2 of 2, Elevation view (Round), add dimension depicting the distance from the top of the foundation to find 2 #4 reinforcing bar shown, to read; 3” CLR. Delete “(TYP.)” from the 2 ½” CLR. dimension, depicting the distance from the bottom of the foundation to find 2 #4 reinf. Bar.

Sheet 2 of 2, Elevation view (Square), add dimension depicting the distance from the top of the foundation to find 1 #4 reinforcing bar shown, to read; 3” CLR. Delete “(TYP.)” from the 2 ½” CLR. dimension, depicting the distance from the bottom of the foundation to find 1 #4 reinf. Bar.

Detail F, callout, “Heavy Hex Clamping Bolt (TYP.) ~ 3/4” (IN) Diam. Torque Clamping Bolts (see Note 3)” is revised to read; “Heavy Hex Clamping Bolt (TYP.) ~ 3/4” (IN) Diam. Torque Clamping Bolts (see Note 1)”

Detail F, callout, “3/4” (IN) x 2’ – 6” Anchor Bolt (TYP.) ~ Four Required (See Note 4)” is revised to read; “3/4” (IN) x 2’ – 6” Anchor Bolt (TYP.) ~ Three Required (See Note 2)”

J-21.15
Partial View, callout, was – LOCK NIPPLE ~ 1 ½” DIAM., is revised to read; CHASE NIPPLE ~ 1 ½” (IN) DIAM.

J-21.16
Detail A, callout, was – LOCK NIPPLE, is revised to read; CHASE NIPPLE

J-22.15
Ramp Meter Signal Standard, elevation, dimension 4’ - 6” is revised to read; 6’-0” (2x) Detail A, callout, was – LOCK NIPPLE ~ 1 ½” DIAM. is revised to read; CHASE NIPPLE ~ 1 ½” (IN) DIAM.

J-40.10
Sheet 2 of 2, Detail F, callout, “12 – 13 x 1 ½” S.S. PENTA HEAD BOLT AND 12” S. S. FLAT WASHER” is revised to read; “12 – 13 x 1 ½” S.S. PENTA HEAD BOLT AND 1/2” (IN) S. S. FLAT WASHER”

J-60.14
All references to J-16b (6x) are revised to read; J-60.11

K-80.30
In the NARROW BASE, END view, the reference to Std. Plan C-8e is revised to Std. Plan K-80.35

Plan Title, was “ALTERNATIVE TEMPORARY CONC. BARRIER (F-SHAPE)” is revised to read: “CONCRETE BARRIER TYPE F”
The following are the Standard Plan numbers applicable at the time this project was advertised. The date shown with each plan number is the publication approval date shown in the lower right-hand corner of that plan. Standard Plans showing different dates shall not be used in this contract.

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City of Pacific
SPECIAL PROVISIONS
SCADA / Telemetry Upgrade Project

March 019

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END OF STANDARD PLANS
V. Technical Specifications
SECTION 16010
ELECTRICAL GENERAL

PART 1 GENERAL

1.1 SCOPE:
A. This section specifies general requirements for electrical work. Detailed requirements for specific electrical items are specified in other sections but are subject to the general requirements of this section. The electrical drawings and schedules included in this project manual are functional in nature and do not specify exact locations of equipment or equipment terminations.

1.2 DEFINITIONS:
A. The word “provide” shall be interpreted to mean furnish and install.
B. “Owner”. City of Pacific
C. “Contractor” is the party who furnishes and installs all materials and equipment. This includes the Prime Contractor, Electrical Contractor, Control System Integrator, and all other Contractors and Sub Contractors.
D. “Control System Integrator” also referred to as the System Integrator or Integrator or control system manufacturer is the Party that furnishes all control components including motor controls, VFDs and motor control centers and designs the detailed control wiring diagrams plus the layout and assembly of the custom control panels.
E. “Control System” includes all equipment, instruments, computers and wiring for control and monitoring of all operating pumps and equipment. This includes custom control panels, motor control center, packaged control panels, and control equipment furnished with other systems and mechanical equipment. All sensing, transmitting, indicating, control and recording of all functions as specified and shown are also included in the control system.
F. “System Programmer” – Provides all programming and related service – has been pre-selected for this project to be Evolution Controls, Snohomish WA. Contact Al Friedli at 425-359-5322/

1.3 GENERAL DESCRIPTION OF WORK:
A. The Contractor shall:
   1. Provide all labor, material, tools, equipment and services required to complete the furnishing, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical equipment, devices and components as indicated and implied by the plans and these specifications.
2. Provide identification (nameplates and wire tags) of all electrical equipment and wiring.

3. Complete the wiring to, connection to, adjustment and calibration of, testing of equipment having electric motors and/or built-in or furnished electrical components. Install electrical components that are furnished with mechanical equipment.

4. Complete the procurement, installation, wiring, connection, calibration, adjustment, testing and operation of all electrical devices, components, accessories and equipment which is not shown or specified but which is nonetheless required to make the systems shown and specified function properly.

5. Provide the size, type and rating of motor control devices, equipment and wiring necessary to match the ratings of motors furnished with mechanical equipment.

6. Provide adequate space for the electrical installation, including but not limited to, determination of access-ways and doorways, shipping sections, wall and floor space, and space occupied by mechanical equipment. Provide electrical equipment that fits in the areas shown on the drawings. All equipment shall be readily accessible for maintenance, shall have electrical clearances in accordance with NEC and shall be installed in locations that will provide adequate cooling.

7. Provide detailed wiring diagrams showing all equipment and instrumentation connections and terminations.

8. Check electrical equipment prior to installation so that defective equipment is not installed. $ Acceptance testing for electrical equipment shall be performed as discussed in Sections 16920 & 16921.

9. Provide start-up, follow-up and training of the Owner's personnel for electrical systems. Make all corrective measures required during start-up. See specific requirements for training and start-up in other specification sections.

10. Provide field services of qualified technicians to supervise and check out the installation of the equipment, to supervise and check out interconnecting wiring, to conduct start-up of operation of the equipment, and to correct any problems, which occur during start-up.

11. Provide demolition of existing equipment per the plans.

12. The Electrical Equipment Cabinets, RTU's, control panels, and instrumentation shall be supplied through the Control System Integrator and shop tested in the integrator's shop.

1.4 EQUIPMENT COORDINATION

A. The Contractor is responsible to coordinate the equipment supplied from other manufacturers. This includes but is not limited to:

1. Obtaining specific information on equipment ratings and sizes and verifying the electrical components supplied meet, or match the requirements such as voltage, phase, frequency, starter types, etc.

2. Verifying the equipment supplied will fit within the space allocated.
3. Coordination of equipment and the electrical power and control requirements. Provided in all sections of the specifications and drawings.

4. Providing power and control equipment, wiring, and raceways to meet the requirements of the mechanical equipment supplied.

5. Providing all necessary control wiring and components for any special requirements from an equipment manufacturer.

B. The Contractor shall verify as a minimum:
   1. Correct voltage, phase and frequency
   2. Size and space requirements
   3. Mounting requirements
   4. Correct motor starter type
   5. Proper coordination with the controls and control system Integrator.

C. Any discrepancies between the electrical and other equipment shall be brought to the immediate attention of the Engineer.

D. The Contractor shall take precautions to minimize instrumentation or control interferences that are created by the variable frequency drives (VFD’s) or power wiring. The Contractor shall coordinate with the VFD manufacturer to provide necessary separation of conductors or shielding and/or filtering equipment as required by the VFD manufacturer. All power wiring shall be separated from instrumentation and control wiring by a minimum of 12” and 18” to any VFD power wiring.

1.5 PROJECT DESCRIPTION:

A. In general the project consists of upgrading the existing SCADA/Telemetry system for the City of Pacific.

B. There are a total of 7 existing sites, Headquarters (HQ), 4 waste water lift stations and 2 water sites:
   1. Public Works Office (PWO) – Headquarters (HQ)

WATER
   2. Reservoir site – 750K gal Reservoir, 5 booster pumps, generator, MCP-100
   3. Well site – 3 well pumps, NaOH system, chlorination system, generator, MCP-200

WASTEWATER
   4. Tacoma WWPS – Duplex wetwell/drywell underground. Future above grade vacuum priming pump station
   5. Cedar Glen WWPS – Duplex submersible pumps. Future above grade vacuum priming pump station
   6. Alder WWPS - Duplex above grade vacuum priming pump station.
   7. Thornton WWPS - – Duplex submersible pumps, generator, ATS
1.5.1 **SITE 1 - HEADQUARTERS (HQ) – CONTROL Rm.**
1. Provide Master Telemetry Unit (MTU)
2. Provide a 120v circuit and breaker from the existing panel to the MTU
3. Provide Autodialer
4. Provide Fiberoptic communications to the Reservoir Site (MCP-100)
5. Install owner furnished SCADA monitors
6. Provide wire and raceways for all equipment power, communications and control circuits.

1.5.2 **SITE 2 - RESERVOIR SITE**
1. Replace the existing PLC in MCP-100 with new Compactlogix PLC
2. Replace the operator interface, ethernet switch, etc. as shown on the plans in MCP-100.
3. Provide Radio in MCP-100 with cable to the antenna to be mounted on the existing antenna tower.
4. Remove the existing radio, antenna and cable.
5. Provide wire and raceways for all equipment power, communications and control circuits.

1.5.3 **SITE 3 - WELL SITE**
1. Replace the existing PLC in MCP-200 with new Compactlogix PLC
2. Replace the operator interface, ethernet switch, etc. as shown on the plans in MCP-200.
3. Provide Radio in MCP-200 with cable to the antenna to be mounted on the existing antenna tower.
4. Remove the existing radio, antenna and cable.
5. Provide three new instruments: pressure, water temperature and well level transmitters and interface to the MCP.
6. Provide wire and raceways for all equipment power, communications and control circuits.

1.5.4 **SITE 4 - TACOMA WWPS**
1. Provide RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station and the future vacuum prime pump station.
2. Provide Electrical Equipment Cabinet (EEC) for utility service, ATS, generator plug and power distribution equipment.
3. RTU and EEC shall be supplied by the system integrator.
4. Provide light pole with site light, telemetry antenna and provisions for future security camera.
5. Provide interface in the existing control panel (relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.
6. Provide raceways for future interface to the future pump station.
7. Provide new utility power service and maintain the existing service.
8. Provide wire and raceways for all equipment power, communications and control circuits.
9. Provide raceways for future wiring connections as shown on the plans.

1.5.5 SITE 5 – CEDAR GLEN WWPS
1. Provide RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station and the future vacuum prime pump station.
2. Provide Electrical Equipment Cabinet (EEC) for utility service, ATS, generator plug and power distribution equipment.
3. RTU and EEC shall be supplied by the system integrator.
4. Provide light pole with site light, telemetry antenna and provisions for future security camera.
5. Provide new utility power service, and demo the existing service.
6. Provide interface in the existing control panel (relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.
7. Provide raceways for future interface to the future pump station.
8. Provide wire and raceways for all equipment power, communications and control circuits.
9. Provide raceways for future wiring connections as shown on the plans.

1.5.6 SITE 6 - ALDER WWPS
1. Provide RTU (Remote Telemetry Unit) for monitoring and alarming the existing vacuum prime pump station.
2. Provide Electrical Equipment Cabinet (EEC) for utility service, ATS, generator plug and power distribution equipment.
3. RTU and EEC shall be supplied by the system integrator.
4. Provide light pole with site light, telemetry antenna and provisions for future security camera.
5. Provide interface in the existing control panel (relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.
6. Provide raceways for future interface to the future pump station.
7. Provide new utility power service, and demo the existing service.
8. Provide wire and raceways for all equipment power, communications and control circuits.
9. Provide raceways for future wiring connections as shown on the plans.

1.5.7 SITE 7 - THORNTON WWPS
1. Provide RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station.
2. Provide 120v circuit and breaker for RTU power.
3. Provide cable to the antenna to be mounted on the existing antenna tower.
4. Provide interface: (relays, wire, terminals, etc.) for monitoring the existing controls.
5. Provide interface in the existing control panel (relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.
6. Provide wire and raceways for all equipment power, communications and control circuits.
7. Provide raceways for future wiring connections as shown on the plans.

1.6 TEMPORARY OPERATION AND CONSTRUCTION POWER:

1.6.1 FACILITY OPERATION POWER:

A. If necessary, provide temporary power service for facility operation during construction. Provide power and control systems, circuits and components, and connections for all motors and equipment that remains in operation during construction. The Contractor shall pay for all coordination with the utility and associated construction costs for temporary facility power.

B. Any necessary modifications to the existing electrical system for construction power shall be coordinated and paid for by the Contractor.

C. The Owner shall pay for the energy costs as billed by the utility and these costs shall not be included in the Contractors bid price.

1.6.2 CONSTRUCTION POWER:

A. If the existing service is adequate for facility operation and construction power, then the existing service may be used for construction power and the Owner shall pay all energy costs as billed by the utility on the existing meter.

B. Any necessary modifications to the existing electrical system for construction power shall be coordinated and paid for by the Contractor.

1.7 STANDARDS AND CODES:

A. Permits, licenses, approvals and other arrangements for work shall be obtained and paid for by the Contractor and included in the bid price.

B. Electrical work shall be executed in strict accordance with the latest edition of the National Electrical Code and local ordinances and regulations.

C. All electrical equipment, materials, construction methods, tests and definitions shall be in strict conformity with the established standards of the following in their latest adopted revision:

1. Underwriters’ Laboratories, Inc. (UL)
2. National Electrical Manufacturers Association (NEMA)
3. Canadian Standards Association (CSA)
4. Electrical Testing Laboratories (ETL)
5. Factory Mutual (FM)
6. All applicable $Washington State Codes and local City Codes.
D. All materials and equipment specified herein shall, within the scope of UL Examination Services, be approved by the Underwriter’s Laboratories for the purpose for which they are used and shall bear the UL label.

E. All materials shall be new, free from defects, of current manufacture, of quality specified or shown. Each type of material shall be of the same manufacturer throughout the work.

1.8 CONTRACT DOCUMENTS:

A. The electrical layouts are generally diagrammatic. The location of equipment is approximate unless dimensioned. Exact locations and routing of conduits shall be governed by structural conditions and physical interference’s and by locations of electrical terminations on equipment.

1.9 REFERENCE DOCUMENTS:

A. The Contractor shall refer to the drawings, project data and shop drawings of other trades for additional details, which affect the proper installation of the work. Diagrams and symbols showing electrical connections are diagrammatic only, and so do not necessarily show the exact physical arrangement of the equipment.

1.10 SITE FAMILIARIZATION:

A. Before submitting a bid, the Electrical Contractor shall become familiar with all features of the site, which may affect the execution of the work. The Contractor shall take all field measurements necessary for the work and shall assume full responsibility for their accuracy. The Contractor shall take full responsibility for locating and avoiding all substructures. Any damage to existing equipment shall be repaired or replaced by the Contractor at a cost negotiated with the Owner.

1.11 GROUND SYSTEM

A. Provide grounding and ground system per the NEC.

B. Provide a minimum of two 10 foot x ¾” copper coated steel ground rods or more if required by the drawings. Use pressure type connectors for underground connections and bolted type for exposed.

C. Construct metallic raceways to provide a continuous ground path

D. Connect all electrical equipment enclosures to the ground system.

E. Nonelectrical equipment with metallic enclosures and metallic piping shall be connected to the grounding system as required by NEC.

F. Ground system shall be tested per IEEE standard 81. If greater than 2 ohms then additional ground rods shall be added and paid for as extra work

G. Bond ground system to metallic piping as required by NEC.
H. Bond ground system to building steel in at least one location and at other locations as shown on the drawings.
   
   a)

1.12 SUBMITTALS:

   A. Project data shall be submitted in accordance with the general requirements and the following:

   B. In the front of each submittal document, provide a list of any deviations to the contract documents: materials/products, or installation method that are different than specified.

   C. Submittal documents shall be submitted via E-mail in PDF format. Separate Submittal e-mails shall be provided for each spec section. All products for each spec section shall be included in a single PDF document including the cover sheet and index in one single document. Submittals shall be indexed and identified as follows:

      1. Email subject line shall be “project name, EI&C submittal submittal #, spec section# - description.”

      2. Cover sheet with:
         a) The project name and submittal #
         b) Contractor's and sub-contractor’s name, phone number, and email address.
         c) Index sheet showing each product being submitted.

      3. PDF index tabs per the electrical specifications by section and paragraph or equipment name e.g. provide a minimum of one tab section for each piece of equipment in all of the PART 2 PRODUCT Sections 2.01 - 2.*.

      4. Label each equipment submittal sheet with equipment name and number. Indicate location where each item of equipment submitted will be used on the job. Use equipment numbers when available.

      5. Identify specific options and cross hatch out any information that is not a part of the specific information for the submitted component.

   D. Submittals shall include the manufacturer’s name, address, trade name, catalog model or number, nameplate data, size, layout dimensions, capacity, project specification and paragraph reference. Include other information necessary to establish contract compliance of each item proposed to furnish.

   E. Long lead items may be submitted separately – if pre-approved by the Engineer.

   F. Each item shall be clearly marked and provided with adequate sales and technical information to clearly show conformance with all aspects of the specification. Packages not provided as described above or largely incomplete shall be returned to the Contractor, without comment.

   G. I&C (Instrument & Control) submittals shall be provided with a Bill of Materials showing quantity, manufacturer's name, catalog number, and supplier name and phone number.
H. Certify on all submittals that the material being proposed conforms to the contract requirements. In the event of any variance, state specifically which portions vary and request a variance in writing.

I. Certify that all furnished equipment is able to be installed in the allocated spaces by stating on each item: “This equipment will be able to be installed in the spaces allocated”

J. Shop Drawings shall be provided on 11” x 17” sheets maximum size, and shall be scaled using standard engineering or architectural scales. Wiring diagrams shall identify circuit terminals, and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment.

K. NOTE: submittals received that do not meet the requirements outlined above and in the individual spec sections will be returned without review.

L. Contractor should anticipate in the schedule that submittals will take a minimum of 4 weeks for comments to return.

M. The engineer will have a minimum of 2 weeks to review submittals and a minimum of 3 weeks to review I&C submittals.

PART 2 PRODUCTS

2.1 NAMEPLATES:

A. Nameplates shall be provided on all electrical devices, (including but not limited to motor control equipment, MCC cubicles, control stations, junction boxes, panels, motors, instruments, solenoids, switches, indicating lights, meters, and all electrical equipment enclosures.)

B. Nameplates shall also be provided on all electrical panel interior equipment, including but not limited to: relays, circuit breakers, power supplies, terminals, contactors, and other devices.)

C. All nameplates shall include the equipment name and number (circuit number and function, if applicable).

D. Nameplates of all powered equipment (including instruments, motors, control panels, HVAC, etc.) and all switches, disconnects, and receptacles shall have included on the nameplate the power source (circuit and panel number, MCP/control pnl and circuit #, or MCC and unit number, etc.) that the equipment is fed from.

E. Nameplates on light switches and receptacles shall include the panel and circuit and also include application such as outdoor lights, computer receptacle, etc. if relevant. Nameplates on switches and receptacles can be printed thermal tape.

F. All motors shall have nameplates secured to the terminal box with 1/2” lettering or larger.
G. Nameplates shall be made of 1/16" thick machine engraved laminated phenolic having black letters not less than 3/16" high on white background or as shown on the drawings or other sections of the specifications. Nameplates on the interior of panels and on light switches and receptacles shall be White Polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; TYTON 822 or equal.

H. All nameplates shall include the equipment name and number (and function, and circuit number if applicable).

I. Provide warning nameplates on all panels and equipment, which contain multiple power sources. Lettering shall be white on red background.

J. Provide information or warning nameplates as required by the NEC or electrical inspector for identification of service disconnects, multiple service disconnects etc

K. Nameplates shall be secured to equipment with stainless steel screws/fasteners/straps. Epoxy glue may be used where fasteners are not practical if first approved by the Engineer.

2.2 WIRE MARKERS

A. Each power and control conductor shall be identified at each terminal to which it is connected. Conductors size No. 10 AWG or smaller shall have identification sleeves. Conductors shall be identified in accordance with Section 16145.

B. The letters and numbers that identify each wire shall be machine printed on sleeves with permanent black ink. The figures shall be 1/8 inch high. Sleeves shall be white tubing, sized to fit the conductor insulation. The sleeves shall be shrunk to fit the conductor with hot air after installation.

C. Wire markers shall be TMS Thermofit Marker System by Raychem Co., sleeve style wire marking system by W. H. Brady Co., or equal. Adhesive strips are not acceptable. Conductors No. 8 AWG and larger shall use cable markers of the locking tab type. Tabs shall be white plastic with conductor identification number permanently embossed.

2.3 RACEWAY MARKERS

A. Raceway markers shall be non metallic with raceway number stamped in 3/16-inch minimum height characters. Tags shall be attached to the raceway with 316 stainless steel wire.

2.4 THERMAL (TEMPERATURE) RATINGS OF EQUIPMENT TERMINATIONS:

A. Wiring and circuit breakers on this project are designed for 75°C operation above 30 amperes; 60°C for 30 amperes and below.

B. All products furnished on this project shall have electrical terminations rated for 60°C for ampacities of 30 amperes or less and rated for 75°C for ampacities above 30 amperes.
PART 3 EXECUTION

3.1 STORAGE AND INSTALLATION ENVIRONMENT:

A. All electrical equipment shall be stored in a dry environment free from dust, moisture, sprays or vapors, which may be detrimental to their new condition. After installation of equipment, care shall be taken to protect all equipment from all dust, moisture, paint and other spray, harmful vapors, etc. until final acceptance and certificates of occupancy have been obtained.

B. Equipment shall not be installed in indoor areas until the area is covered, dry and finished to the point that other work will not create dust, vapors, or moisture. Equipment with integral heaters and fans shall not be installed until power is available at the location and the heater and fan shall be energized within 6 hours of the equipment being installed.

3.2 SITE INSPECTIONS

A. Prior to final acceptance the Engineer will perform one or more site observation trips to develop a “punch list” of items deemed incomplete

B. Each punch list item shall be completed by the Contractor and checked off of the list. When all of the items on the list are completed or commented on, the list shall be signed by the Contractor and returned to the Engineer for verification.

3.3 FINAL ACCEPTANCE:

A. When all work is complete, the Contractor shall call the Engineer for the final acceptance testing inspections. The Electrical Contractor and System Integrator shall be present while these inspections are taking place and shall be available for opening cabinets and operating and adjusting the system as is necessary for the Engineer to verify all equipment is installed and operates to the requirements of the contract documents.

B. The contractor shall anticipate a minimum of $8 hours to complete the final acceptance testing.

C. Prior to the Contractor calling for this observation, the Contractor shall have completed all items of work, including wire markers, nameplates, final tests and final test reports. All equipment shall be checked for proper operation and all signals verified for correct calibration and wiring.

D. Final acceptance will not be given until:
   1. All work is complete
   2. All “site inspection” punch-lists are checked off and returned to the Engineer
   3. All test reports are received
   4. All O&M manuals are received
   5. All spare parts are received
6. All instrument test forms are received
7. All project record drawings are received.

3.4 PROJECT RECORD DRAWINGS:
A. A set of drawings shall be maintained at the job site (by the Electrical Contractor) showing any deviations in the electrical systems from the original design.
B. This set of drawings shall be readily available for inspection by the Engineer at all times.
C. Another complete set of drawings shall be marked up in the office showing the changes made on the field set of drawings. All changes shall be clearly marked in red on the drawings. Drawings shall be submitted to the Engineer at the completion of the project.
D. A set of electrical drawings marked in red to indicate the routing of conduit runs, shall be submitted to the Engineer for review at the completion of conduit rough-in and prior to cover or pouring of concrete.

3.5 GUARANTEE:
A. The Contractor shall guarantee his work and all components thereof, excluding fuses, incandescent and fluorescent lamps for a period of 1 year from date of acceptance of the installation. The Contractor shall remedy any defects in workmanship and repair or replace any faulty equipment that shall appear within the guarantee period without additional cost to the Owner.

3.6 CLEANUP:
A. The premises must be kept free of accumulated materials, rubbish and debris at all times. Surplus material, tools and equipment must not be stored at the job site. At the completion of the job, all equipment and fixtures shall be left clean and in proper condition for their intended use.
B. All motor control equipment and control panels shall be cleaned inside and out at the completion of the project.

3.7 TESTS:
A. Testing for installed feeder cables and motors is required as specified in other Sections. Test reports shall be submitted to the Engineer prior to final acceptance. All tests shall be performed in accordance with the applicable sections of NETA.
B. Where specified in the individual product specification section, factory tests shall be performed at the place of fabrication and performed on completion of manufacture or assembly. The costs of factory tests shall included in the contract price.
3.8 MAINTAINED OPERATION REQUIREMENTS:

A. These facilities and pump stations are all existing and operating. The pump stations and facilities must remain operational during construction. The Contractor is responsible to maintain operation of the pump stations and facilities during construction.

B. The Contractor shall submit a detailed plan with timelines and dates for the transition of equipment at each pump station and site.

C. All changes in pump stations operations shall be directly coordinated with the Owner. All power outages shall be coordinated with the Owner and the Utility.

3.9 OPERATION AND MAINTENANCE MANUALS:

A. The Contractor shall prepare and assemble detailed operation and maintenance manuals. The manuals shall be bound in a PDF document and tabbed with an index, in general the O&M manual format shall meet that of the submittal data in this section. The manuals shall include, but not be limited to, the following:
   1. Catalog data and complete parts list for all equipment and devices
   2. All cut sheets of equipment and components.
   3. Preventative maintenance procedures
   4. Trouble-shooting
   5. Calibration
   6. Testing
   7. Replacement of components
   8. Automatic mode operation
   9. Manual mode operation
   10. System schematics / shop drawings and record drawings.
   11. As-built wiring diagrams of cabinet and enclosure contained assemblies
   12. As-built wiring diagrams of overall system
   13. Listing of recommended spare parts
   14. Listing of recommended maintenance tools and equipment.

3.10 TRAINING:

A. Training shall be provided per the specific requirements in other Sections of these specifications. The Contractor shall conduct specifically organized training sessions in the overall operation and maintenance of the electrical system for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in operations and maintenance of all components of the electrical system outside the training requirements in the other Sections. Training shall include, but not be limited to, the following:
   1. Preventative maintenance procedures
2. Trouble-shootig
3. Calibration
4. Testing
5. Replacement of components
6. Equipment operation

END OF SECTION
SECTION 16145
MISCELLANEOUS ELECTRICAL

PART 1  GENERAL

1.1  DESCRIPTION OF WORK:
A. This section covers furnishing and installing miscellaneous electrical devices and equipment and other wiring devices indicated on the drawings.

1.2  STANDARDS AND CODES:
A. All materials and equipment specified herein shall within the scope of UL Examination Services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.
B. All materials and equipment specified herein shall conform to all applicable NEMA, ANSI and IEEE standards.
C. All materials and equipment specified herein and their installation methods shall conform to the latest published version of the National Electric Code, N.E.C.

1.3  COORDINATION
A. The Contractor is responsible for coordination of mechanical equipment, fans, louvers, heaters, motors, starters, etc. and the electrical power and control requirements. Provided in this section and other sections of the specifications and drawings.
B. The Contractor shall provide power and control equipment, wiring, and raceways to meet the requirements of the mechanical equipment supplied.
C. The Contractor shall verify as a minimum:
   1. Correct voltage, phase and frequency
   2. Correct motor starter type
   3. Proper coordination with the controls and control system Integrator.
D. The Contractor shall provide all necessary control wiring and components for any special requirements from an equipment manufacturer.
E. Any discrepancies between the electrical and mechanical equipment shall be brought to the immediate attention of the Engineer.
1.4 SUBMITTALS:

A. In accordance with the "submittals" requirements in Section 16010, submit catalog data showing material information and conformance with specifications. The intended use of each item shall be indicated.

B. Submittal documents shall be submitted via E-mail in PDF format. Separate Submittal e-mails shall be provided for each spec section. All products for each spec section shall be included in a single PDF document including the cover sheet and index in one single document. Submittals shall be indexed and identified as follows:

1. Email subject line shall be “project name, EI&C submittal submittal #, spec section# - description.”

2. Cover sheet with:
   a) The project name and submittal #
   b) Contractor’s and sub-contractor’s name, phone number, and email address.
   c) Index sheet showing each product being submitted.

3. PDF index tabs per the electrical specifications by section and paragraph or equipment name e.g. provide a minimum of one tab section for each piece of equipment in all of the PART 2 PRODUCT Sections 2.01 - 2.*.

C. A copy of this specification section, with addendum updates included, and all referenced and applicable sections, with addendum updates included, with each paragraph check-marked to indicate specification compliance or marked to indicate requested deviations from specification requirements. Check marks (√) shall denote full compliance with a paragraph as a whole. If deviations from the specifications are indicated, and therefore requested by the Contractor, each deviation shall be underlined and denoted by a number in the margin to the right of the identified paragraph, referenced to a detailed written explanation of the reasons for requesting the deviation. The Engineer shall be the final authority for determining acceptability of requested deviations. The remaining portions of the paragraph not underlined will signify compliance on the part of the Contractor with the specifications. Failure to include a copy of the marked-up specification sections, along with justification(s) for any requested deviations to the specification requirements, with the submittal shall be sufficient cause for rejection of the entire submittal with no further consideration.

D. For motors on VFDs submit verification that the installation is approved by both the VFD and motor manufacturer – submit on any line terminators or filters that the manufacturer’s recommend for the application.

E. Provide all electrical information – wire diagrams, terminal information and numbering and electrical / power data.

F. Submit verification that stainless steel hardware will be used as required by this specification.
PART 2 PRODUCTS

2.1 RACEWAYS

2.1.1 GENERAL

A. All wiring shall be installed in raceways

B. Ground Conductor:
   1. All raceways shall contain a minimum of one continuous copper equipment grounding conductor sized in accordance with the N.E.C.

2.1.2 AREA CLASSIFICATIONS:

A. The following classification of areas shall be used as a reference in determining application of material covered by this Section unless specifically shown otherwise on the drawings. Areas which fall under two or more of the following classifications shall conform to the minimum requirements of all of the area classifications listed for that area.

B. Hazardous area classifications shall be defined by:
   - NEC Article 500
   - NFPA 820 for all waste water facilities.

C. Hazardous Areas:
   1. Waste water wet wells and vaults
      a) Hazardous areas shall have electrical installations which conform to Class and Division as shown on the drawings or as defined by the NEC and NFPA 820. Provide seal fittings per NEC requirements.
      b) Raceway shall be PVC coated GRC or 316 stainless steel.
      c) Enclosure and support material shall be determined by area requirements. All hardware shall be 316 stainless steel.
      d) Equipment and products used shall be provided and installed in conformance to the applicable sections of NEC Chapter 5.

D. Outdoor and Damp Areas:
   1. All outdoor areas, pump rooms, dry wells.
      a) Raceway shall be rigid galvanized steel (GRS), Intermediate Metal Conduit (IMC) or Aluminum. Conduit entrances shall be threaded and fittings shall have gasketed covers.
      b) Threaded fastening hardware and rods shall be 316 stainless steel. Raceway supports such as channel, clamps, and brackets shall be 316 stainless steel or aluminum or non-metallic.
      c) Panels and boxes shall be NEMA 3R - aluminum, stainless steel or non-metallic (or as shown on the drawings). Device boxes shall be cast, copper free aluminum.

E. Corrosive Areas:
1. Wastewater wet wells and vaults
   a) Raceway shall be PVC coated GRC, 316 stainless steel or Aluminum.
   b) Raceway supports such as channel, clamps and brackets shall be non-metallic nylon PVC coated aluminum. Threaded fastening hardware and rods shall be 316 stainless steel.
   c) Enclosures shall be NEMA 4X 316 stainless steel, aluminum or non-metallic (or as shown on the drawings).

2.1.3 Raceway Application:

A. Unless otherwise shown on the drawings, ABOVE GRADE CONDUITS shall meet the requirements of the “area classification” listed above and shall be:
   a) GRC, IMC, Stainless Steel, PVC coated GRC, or aluminum for power and control wiring
   b) GRC, PVC coated GRC, Stainless Steel or aluminum for signal & communications wiring.
   c) GRC, PVC coated GRC, Stainless Steel or aluminum for motor leads from VFD’s.
   d) Above grade conduits in chemical rooms shall be schedule 80 PVC.

B. Unless otherwise shown on the drawings, CONDUITS BELOW GRADE shall be:
   a) Schedule 40 PVC for power and control wiring - GRC, PVC coated GRC or Stainless Steel as listed below:
      • Sweeps and risers for transition of PVC from below grade to above grade shall be GRC.
      • Conduits entering and inside of wet wells, vaults or other corrosive areas shall transition to stainless steel or PVC coated GRC a minimum of 2 feet outside the structure.
   b) GRC, PVC coated GRC, Stainless Steel or aluminum for signal and communications wiring
   c) GRC, PVC coated GRC, Stainless Steel, or aluminum for motor leads from VFD’s

C. All CONNECTIONS TO VIBRATING EQUIPMENT or motors shall be:
   a) Liquidtight flexible metallic conduit for indoor, non corrosive areas and all motor leads from VFD’s.
   b) Connections to equipment outdoors or in corrosive areas shall be with non metallic liquidtight flexible conduit (except for motor leads from VFD’s shall be flexible metallic.)
   c) Connections to motors and equipment in hazardous areas shall be with explosion proof stainless steel flex or flex rated for the area classification.

D. All raceways materials, sizes, etc. for UTILITY SERVICE shall be per the serving utilities requirements.

2.1.4 Conduit:
A. Galvanized Rigid Steel Conduit (GRC):
   1. Rigid conduit shall be steel, galvanized. Terminations shall be by means of threaded hubs or double locknuts and insulating grounding type bushings.

B. Intermediate metal conduit (IMC):
   1. Intermediate metal conduit shall be of steel and shall be galvanized. Fittings shall be threaded.

C. Flexible Conduit (LFS):
   1. Flexible conduit shall be interlocking single strip, galvanized and shall have a polyvinyl chloride jacket extruded over the outside to form a flexible watertight raceway. Non-metallic flexible conduit shall have non metallic threaded fittings.

D. Nonmetallic Conduit(PVC):
   1. Nonmetallic conduit shall be rigid PVC, Schedule 40 or 80. PVC installed above grade shall be UV resistant schedule 80. Fittings shall be of the same material as the raceway and installed with solvent per the manufacturer’s instructions. Conduit, fittings and solvent shall all be manufactured by the same manufacturer.

E. PVC Coated Rigid Steel Conduit (PGRC):
   1. Coating: A Polyvinyl Chloride (PVC) coating shall be bonded to the galvanized outer surface of rigid steel conduit. The bond between the PVC coating and the conduit surface shall be greater than the tensile strength of the plastic. The thickness of the PVC coating shall be a minimum of .035" (35 mil) (40 mil nominal).

F. Aluminum Conduit:
   1. Shall be rigid aluminum conduit: ANSI C80.5; aluminum, threaded.

2.1.5 BOXES AND FITTINGS:

A. General
   1. Materials for fittings shall be chosen to satisfy the requirements of - Area Classification described above.
   2. Junction boxes, terminal boxes, device boxes, fixture support boxes, oblong, round and rectangular conduit fittings (condulets) shall be of the same material as required by the Area Classification for the raceway.
   3. Boxes larger than 9”x9” shall be hinged.
   4. Cast fittings and boxes shall be:
      a) zinc electroplated cast ferrous alloy:
      b) Integrally cast threaded hubs or bosses shall be provided for all conduit entrances and shall provide for full 5 thread contact on tightening. Drilling and threading shall be done before finishing.
      c) The cover plate shall be of similar cast ferrous alloy material and finish. A full body neoprene gasket shall be provided with the cover. Stainless steel screws shall be provided for all covers.
5. All screws, nuts, bolts, straps, rods and other hardware used with supports, fittings and boxes shall be 316 stainless steel.

2.1.6 **HANDHOLES AND VAULTS:**

A. **Handholes and vaults** shall be 24” X 36” X 36” deep minimum size or minimum dimensions as shown on drawings. All handholes and vaults shall be minimum 3000 psi pre-cast, reinforced concrete construction and shall have concrete bottoms with sumps.

B. Walls shall be provided with boxouts with waterstops on all sides of each boxout. Boxouts shall be sized to accommodate the penetrating underground duct banks.

C. **Covers** shall be hinged diamond plate galvanized steel with H20 loading and latch and lifting handles. Covers shall open 180 degrees. Utility Vault 3030-P, 2436-P or equal.

D. **Wire Racks** – Provide wire racks for all wiring inside handholes and vaults so that all wiring is supported above the bottom of the handhole.

E. Handholes and vaults and covers shall constructed per standards and quality of Utility Vault Company 233-LA, 444 LA or approved equal. Covers shall be chosen to fit the handhole or vault provided.

F. Wiring of different classes or that must be in separate raceway systems (in accordance with the NEC) in the same handhole shall be separated by continuing raceways inside the handhole and installing a non-metallic NEMA 4X pull box in the handhole.

2.1.7 **CONDUIT & CABLE SUPPORTS:**

A. Rivet-type or Zamac fasteners are not allowed. All fasteners between channel, strut, etc. and walls shall be removable with a screwdriver.

B. Support materials in general purpose areas may be hot-dip or electro-galvanized. All support materials used in damp areas, pump rooms, or outdoor, or corrosive areas shall be NEMA 4x Aluminum, Stainless steel, or non-metallic.

C. All screws, nuts, bolts and other hardware used with conduit and cable supports shall be 316 stainless steel.

2.2 **CONDUCTORS:**

A. All conductors shall be stranded copper. Insulation shall be THW, THWN, or THHN, chosen to satisfy environmental conditions. Conductors used for power circuits shall not be smaller than No. 12. Control conductors may be No. 14.

2.3 **SHIELDED SIGNAL CABLE:**

A. Signal conductor cable shall be AWG #16 individually twisted, shielded pairs. BELDEN #8719, or equal. Conductors shall be tinned copper with color coded 90 degrees C PVC insulation and individual conductor jacket of nylon. Shielding shall
be aluminum polyester 100% shield coverage with drain wire. The cable shall have an overall PVC jacket. The insulation system shall be rated for 300 volts.

B. For applications where 600 volt insulation is required, use
   1. BELDEN 1120A
   2. #16 TWSP, stranded wire.

C. 600 volt insulated signal wire shall only be used where required by Code.

2.4 CONNECTORS

A. All wiring shall be continuous from point to point – no splices of any kind are allowed. All control and signal wire shall land on numbered terminals.

B. Ideal Industries "Wing Nut" or 3M Company "SCOTCHLOCK" pre-insulated connectors may be used for general purpose lighting and receptacle circuits for splices and taps in conductors No. 10 AWG and smaller. For No. 8 AWG and larger conductors, utilize T&B compression connectors. Compress using recommended die and tools.

C. For connections of wire to cord to removable equipment provided with integral cords (such as floats, transmitters, limit switches, aerators, submersible pump motors, etc.) Provide junction box with terminals and spade/lug type terminations and coat with liquid insulation – Performix Liquid Tape or equal.

D. For connections of wire to cord to Submersible motors of all size wire use a water proof motor stub insulator. Thomas and Betts multi splice insulator MSLT112-4 or equal.

2.5 SPLICE INSULATION:

A. Splice insulation shall be equal to the conductor utilized.

B. Insulate all permanent splices that are underground or in damp or corrosive environments with cast epoxy type insulation which covers the jacket of all cords and the insulation on all wire. Epoxy splice shall be Scotch #3570 or equal.

2.6 MOTOR TERMINAL SPLICE INSULATION:

A. Provide motor terminal splice insulation in the motor connection box that will withstand constant vibration and abrasion without degrading the insulation of the splice. A product shall be used that is specifically designed for the purpose of motor terminations.

2.7 WIRE MARKERS:

A. Field installed wire markers shall be pre-printed, heat shrink type sleeves, Thomas&Betts Type HVM, Tyton Type THS or approved equal. See paragraph below for marking requirements.
2.8 SWITCHES AND RECEPTACLES:

A. Standard wall switches shall be single-pole, or double-pole, three-way, as shown on the drawings or as required for the application. Switches shall be AC quiet type rated 20 amp, 125/277 volt with screw terminals. Wiring devices shall be ivory colored for general use office areas, and black when installed in mechanical rooms or when mounted on dark walls. Receptacles on emergency or backup power shall be labeled or color coded. ARROW HART, BRYANT, HUBBELL, P&S or equal.

B. Weather proof switches for use in damp, corrosive or outdoor applications shall be:
   - Die cast aluminum housing with lever type switch CROUSE-HINDS, DS185
   - or non metallic, UL marine listed, CARLON, E98TSC or equal.

C. Weather proof receptacles for use in damp, corrosive or outdoor applications shall be:
   - Die cast aluminum with spring and gasketed covers CROUSE-HINDS, WL series
   - or non metallic, CARLON or equal.

D. Provide GFI receptacles where required by the NEC.

E. Per the nameplate requirements, provide circuit and panel data labels on all switches and receptacles and label all light switches with function.

2.8.2 RECEPTACLES AND PLUGS & GENERATOR CONNECTION:

A. Receptacles shall be suitable for voltage and phase as shown on the drawings with ampere ratings as specified. Receptacles and plugs shall be designed so that the grounding pole is permanently connected to the housing. The grounding pole shall make contact before the line poles are engaged when the plug is connected to the receptacle housing. The plug sleeve shall also make contact with the receptacle housing before the line and load poles make contact. Receptacles shall be provided complete with cast back box, angle adapter, gaskets, and a gasketed screw-type, weathertight cap with chain fastener. Each receptacle shall be provided with one plug. Receptacles shall be Crouse-Hinds "Arktite," Appleton "Powertite," or equal.

B. Plugs and Receptacles for Generator receptacles/plugs shall be provided per the requirements of the plans and coordinated with the Owner for specific type and rating prior to purchase.

2.8.3 PLATES:

A. Scope: Provide plate for each wiring device, for each signal or communication outlet.

B. Device plates on flush devices, in general, shall be satin finish stainless steel Sierra 302 stainless steel line or approved equal, modern classic design, corrosion resistant. Special finish plates shall be provided to match special paneled walls as directed by Architect.
C. Device plates for switches and receptacles in outdoor areas shall have weatherproof plates with hinged cover and stainless steel screws. Sierra Electric WP series or equal.

D. Plates on exposed wiring shall be of metal, of the same manufacture as the conduit fittings; specifically suited for device and fitting used.

E. Blank, Bushed or Special Outlet Plates: Provide for all signal communication system outlets as required.

2.8.4 **SPECIAL ACCESSORIES**

1. Provide accessories such as junction boxes, outlet boxes, etc. necessary to mount switches and receptacles in a proper and approved method.

2.9 **ATS – AUTOMATIC TRANSFER SWITCHES**

A. The System Integrator shall provide ATS’s where shown on the plans for transfer between the generator plugs and the utility service. Provide voltage and phase as shown on the plans.

B. The transfer switches for this project are designed around the features and space requirements of ONAN. The transfer switch shall be manufactured by one of the following acceptable manufacturers:

1. ONAN Corporation
2. ASCO

C. Transfer switch shall be well documented with clear wiring diagrams and submittals shall include wiring diagram showing clearly all connections for field wiring with terminal numbering.

D. Transfer switches produced by other manufacturers will not be accepted.

E. Transfer switches mounted outdoors or in damp areas shall be provided with thermostat controlled space heaters for condensation control.

F. The transfer switches shall be equipped with three poles for normal and emergency service of (voltage a and phase as shown on the plans). The transfer switches shall be rated 125 amperes.

G. The transfer switch shall be mechanically and electrically held and rated to 600 volts for all classes of load and continuous inductive duty.

H. The transfer switch shall conform to UL 1008 Revision 4 provisions for Withstand Current Ratings and Closing Ratings. The calculated fault current available is a minimum of 25,000 amperes RMS symmetrical or as shown on the drawings.

I. The switch shall be capable of enduring 6000 cycles of complete opening and closing at rated current and voltage at a rate of 6 cycles per minute without failure.

J. The switch shall be double throw inherently interlocked mechanically and electrically to prevent supplying the load from both sources simultaneously. The operating current shall be obtained from the source to which the load is to be transferred. The
transfer mechanism shall be of the double break design with solid silver cadmium surface contacts and individual heat resistant arc chambers.

K. Single break contacts will also be acceptable if arc barriers and magnetic blow out coils are used. The contacts shall be capable of carrying 20 times the continuous rating for interrupting current.

L. All contacts, coils, etc. shall be readily accessible for replacement from front of panel without major disassembly of associated parts.

M. The transfer switch shall have UL 1008 label and listing.

N. The transfer switch shall be mounted in the Electrical Equipment Cabinets by the System Integrator

2.9.2 CONTROLS HARDWARE

A. All relays shall be provided with indicating LED lights for energized position indication.

B. Time delay relays shall be provided with timing and timed out LED indicators

C. Panel front Indication lights shall be push-to-test or the switch shall have a push to test feature for indication lights, unless lights are LED.

D. All fuses shall be provided with “blown fuse” indicators.

E. All wiring shall be numbered at each end with basic wiring numbering scheme.

F. All terminals shall be clearly labeled

G. All internal equipment shall be labeled

H. All external devices shall be clearly labeled

I. Provide nameplate on transfer switch as shown on the drawings

J. Provide transfer switch with solid state logic, ONAN -POWER SENTRY CONTROL or equal.

2.9.3 CONTROLS FEATURES

A. Provide for control, monitoring and alarming as shown on the wire diagrams.

B. The transfer switch shall include the following accessories:
   1. Undervoltage Sensor: Adjustable solid state low voltage sensing relays (pick up at 85 to 98 percent of normal voltage - set at 98%; drop out at 75 to 100 percent - set at 90% of pickup setting). Provide for each phase.
   2. Time Delay Start and Stop on Drop Out: Solid state adjustable time delay on start (0 to 15 seconds). Set start delay for 15 seconds. Timer will send start signal to gen. set CP, where louver timer will allow 15 second delay for louvers to open prior to starting genset.
3. Time Delay Stop: Solid state adjustable time delay (0 to 10 minutes) to allow generator cool down after normal power is restored and retransfer occurs. Set at 5 minutes.

4. Time Delay Transfer & Retransfer: Solid state time delay relay adjustable 2 to 120 seconds for transfer to emergency and 0 to 30 minutes for retransfer to normal. Set at 5 minutes for retransfer to normal. Set at 3 seconds for transfer to emergency.

5. With or Without Load Selector Switch: Switch to select exercise with or without load.

6. Normal-Test Switch: Switch such that in the "Normal" mode the transfer switch will operate automatically and in the "Test" mode the generator will start for test purposes. This switch shall work in conjunction with the "With" or "Without" load switch. An extra contact block shall be provided on the normal-test switch for wiring to the Programmable Controller, if one is required.

7. Exercise Clock: An exerciser clock shall be provided which shall be programmable to exercise the generator set. The exerciser shall be adjustable from 15 to 60 minutes once each week. The exercise shall be either with or without load. If power fails during the exercise cycle, the load shall automatically pick up.

8. Programmed Transition: The load transfer control shall be capable of remaining in the neutral position for an adjustable time of .5 to 60 seconds when transferring from one line power source to the other to allow residual voltages to decay before application of the source. Set to 3 seconds for less than 50 hp loads.

C. Provide the following dry contacts each with terminals for field connection, 2 amp rated at 120 VAC.

1. Two separate normally open dry auxiliary contacts, one indicating transfer switch is in NORMAL position and one indicating switch is in EMERGENCY position,

2. Four separate normally open dry contacts two indicating "commercial power / normal power" available and two indicating generator / emergency power available.

3. Normally open dry contact indicating generator called to run.

D. Position lights for normal and emergency position indication

E. Two indication lights, one for emergency power available and one for normal power available

F. Note: provide push to test type lights or push to test feature for all indication lights.

2.10 SURGE SUPPRESSION:

1. Where surge suppressor (SPD or TVSS) is specified or shown on the drawings, provide integral surge suppression device with the following minimum characteristics:

   a) Surge Current per phase – 120,000kA
b) Surge Current L – N  60,000kA

c) IEEE C3 Wave (10kA) – 9,000

2. Unit shall have overcurrent protection, infrared and thermal detection - Include diagnostic package, surge counter, and direct bus bar connection and 10 year warranty – Joslyn, Cutler Hammer SPD or equal.

2.11 DRY TYPE TRANSFORMERS

A. Dry type transformers shall be constructed of heavy gauge sheet steel. Coil and terminal chamber shall be constructed with guarded opening for ventilation and convection cooling. Transformer shall be connected for the application. Unless otherwise shown or required for the application, primary coil shall be delta connected, secondary coil wye connected.

B. Separate primary and secondary windings shall have Class H insulation and shall be rated for continuous operation at rated kVA with temperature rise of not over 150 degrees C above a 40 degree C ambient, with a maximum hot spot temperature of 220 degrees C. Windings, core and coil assembly shall be treated and built to resist the effects of dirt and moisture.

C. Unless otherwise noted or shown, transformers shall be provided with a minimum of four full capacity taps, minimum of two 2-1/2 percent above and two 2-1/2 percent below normal (rated) primary voltage.

D. Transformers furnished shall have a continuous rating of not less than the size noted on the drawings.

E. The secondary neutral terminal on three-phase K-rated transformers shall be sized for 200% of secondary phase current.

F. Provisions for external connections shall be made by means of a terminal board employing lugs compatible for the external conductors to be installed.

G. The core of the transformer shall be grounded to the enclosure by means of a flexible grounding conductor sized in accordance with applicable NEMA, IEEE ANSI standards.

H. Provide grounding per NEC.

I. Provide enclosures per the requirements of the area installed – NEMA 3R for outdoor and damp areas, NEMA 12 for indoor areas

J. Acceptable manufacturers for dry type transformers shall be General Electric, Cutler Hammer, Square D, Heavy Duty and approved equals.

2.12 PANELBOARDS/LOAD CENTERS

A. Panelboards shall be rated at proper voltage and current for intended use with bus bars of tin plated copper or aluminum. Panels shall have phases, voltage and current ratings as shown on the drawings. Panels shall have 100 percent neutral, with equipment ground bar, unless noted otherwise. Panelboards shall be dead front.
B. Panels shall have as a minimum the number of circuits shown on the panel schedules on the drawings.

C. The following interrupting capacity shall be considered minimum. Other ratings shall be as specified on the drawings.
   1. 240V and 208Y/120V – sub-fed Panelboards 10,000 AIC symmetrical
   2. 240V and 208Y/120V – Service Panelboards 20,000 AIC symmetrical
   3. 480V Panelboards 30,000 AIC symmetrical

D. Provide enclosures per the requirements of the area installed – NEMA 3R for outdoor and damp areas, NEMA 12 for indoor areas or as shown on the drawings.

E. Mount breakers in all panelboards so that breaker handles operate in a horizontal plane. Circuit breakers shall be bolt-type only. Provide common trip on all multiple pole breakers.

F. Where noted, provide spare breakers, complete for future connection of wiring circuits. Where "Space Only" is indicated for breakers, provide all bussing and breaker mounting hardware in the panelboard; provide steel knockouts in dead front metal closure of unused part of panel. If any steel knockouts are removed, provide breakers in such spaces or approved cover plates. Open spaces are not permitted.

G. Panelboards shall be flush or surface as indicated; tight closing doors without play when latched. Where two cabinets are located adjacent to each other in finished areas, provide matching trim of the same height.

H. Provide cabinets of sufficient dimensions to allow for future expansion and addition of circuit breakers within the panelboards as indicated on drawings.

I. Provide lock for each cabinet door. All Electrical distribution equipment locks to be keyed identically.

J. Fasten panelboard with machine screws with oval countersunk heads, finish hardware quality, with escutcheons or approved trim clamps. Clamps accessible only when dead front door is open are acceptable. Surface mounted panelboards with fronts greater than 48 inches vertical dimension shall have trim hinged at right side in addition to hinged door over dead front.

K. Provide factory standard lacquer or enamel finish, ASA #49 gray.

L. Provide Surge arrestors, with indicators, where shown on the one-line diagrams to protect against overvoltage transients. JOSLYN J9200 series with protective capacitor GE model 9L18 or equal. Select proper components for the application as shown on the drawings.

M. Numbering and buss arrangement shall be as shown on the Panel Schedules on the drawings.

N. Provide a type written circuit directory card for each panelboard with the load name, number, location and kVA.
O. Provide engraved (color layer - engraved through outer layer) plastic name plate with 1/2 inch high characters for panel identification (for panel name); attached with stainless steel screws to each panelboard front. Emergency system - white on red; Normal system - black letters on white. Include voltage, phase and wire (i.e., 208Y/120V, 3 phase, 4 wire ) in 3/8 inch characters.

P. Secure in place with top of cabinet at 6' - 6", unless otherwise noted. Top of cabinet and trim shall be level.

Q. For each branch circuit panelboard: Provide neatly type written as-built information for each panelboard by circuit with its proper load designation. Mount the panelboard circuit directory inside the door of each panelboard in a clear plastic sleeve. Provide one spare blank card for each card used.

R. Close all openings in dead front with closures manufactured for the purpose or install spare breakers.

2.13 FUSES:

A. Fuses shall be of the type and amperage indicated on the drawings. The voltage rating shall be appropriate for the application indicated. The fuse types indicated on the drawings imply a certain set of fuse characteristics. No substitutions of fuse types will be allowed without written approval from the Engineer.

B. All fuses used on the project shall be provided with “blown fuse” indicators.

C. Where fuses in motor circuits are indicated but not sized, provide Manufacturer's recommended fuse size based on actual motor installed.

D. Provide in-line or integrally-mounted fuse clips on control power or low-voltage transformer.

E. Provide fuse puller or pullers for fuse sizes used.

F. Provide surface mounted cabinet, sized to store required spare fuses at location coordinated with Owners Representative.

G. Provide a minimum of two spare fuses for each fuse used.

H. Acceptable Manufacturers:
   1. BUSSMAN
   2. GOULD SHAWMUT
   3. LITTLEFUSE
   4. RELIANCE

2.14 MOLDED CASE CIRCUIT BREAKERS:

A. Molded case circuit breakers shall be quick-make and quick-break type. They shall have wiping type contacts. Each shall be provided with arc chutes and individual trip mechanisms on each pole consisting of both thermal and magnetic trip elements. Two and three pole breakers shall be common trip. All breakers shall be calibrated
for operation in an ambient temperature of 40 degrees C. Molded case circuit breakers shall be trip-free. Each breaker shall have trip indication independent of the ON or OFF positions.

B. Breakers shall have lugs UL listed for both copper and aluminum.

C. Circuit breakers shall be capable of accepting the cable shown on the drawings. Circuit breakers not capable of accepting the cable shown shall not be acceptable.

D. Breakers shall have the interrupting rating and trip rating indicated on the drawings.

E. All breakers that serve motor loads shall be provided with disconnect handle mechanism to lock out the circuit in the open position.

2.15 DISCONNECTS:

A. Provide local equipment disconnects only if required by the manufacturer or NEC.

B. Disconnect’s rating shall be chosen by the Contractor to meet the requirements of the equipment served.

C. Switch shall be heavy duty type, shall be quick-make quick-break and shall be horsepower rated. Switch shall have blades as required to open all ungrounded conductors and shall be single throw unless noted.

D. Enclosure shall be suitable for location in which mounted.
   1. Enclosures located outdoors or in damp or corrosive areas shall be NEMA 4X, aluminum or stainless steel.

E. Fusible disconnects shall be as above with addition of fuse space and clips to accept Class R fuses. Use only where required by equipment manufacturer to meet UL installation requirements.

F. Disconnects for motor loads shall be lockable in the open position.

2.16 HARDWARE

A. The Contractor shall provide any necessary hardware for mounting equipment and devices. The mounting hardware shall be made of materials suitable for the environment installed. Provide materials made from aluminum, non-metallic, or stainless steel in outdoor, damp, or corrosive areas.

PART 3 EXECUTION

3.1 GENERAL

A. Provide services of an authorized representative of manufacturer to visit site of work and inspect, check, adjust if necessary, and approve equipment installation.

B. Assure that equipment manufacturer’s representative is present when equipment is placed in operation.
C. Verify that equipment representative revisits job site as often as necessary until all trouble is corrected and equipment installation and operation are satisfactory, in opinion of Engineer.

D. Verify that motor overcurrent protection is in accordance with the N.E.C.

E. Verify the motor protection and control is in accordance with the equipment manufacturers requirements.

3.2 WIRE & RACEWAY SIZING

A. The contractor shall size wire per NEC for the load being served. Raceways shall be sized per NEC for the wire or cables installed. Scheduled raceways and wire sizes are minimum size and contractor shall upsize if required for installation per the NEC.

B. Size pull and terminal boxes per NEC. Pull box sizes, if shown on the drawings, are minimum size and the contractor shall upsize if required by NEC.

3.3 OUTLETS AND SWITCHES:

3.3.1 GENERAL

A. For all receptacles, switches, and other related devices of the lighting and receptacle system, provide all necessary raceway and wire for a complete installation.

B. Center all outlets with regard to building lines, furring and trim. Symmetrically arrange outlets in the room. Satisfactorily correct outlets improperly located or installed.

C. Set outlets plumb and extend flush outlets to the finished surface of the wall, ceiling or floor without projecting beyond same.

D. Install symmetrically all receptacles, switches and outlets shown on the trim and where necessary, set the long dimension of the plate horizontal or gang in tandem.

E. Outlets in outdoor areas or wet areas shall be GFI – provide GFI outlets in other areas as required by Code.

3.3.2 MOUNTING HEIGHTS:

A. Unless otherwise noted, wall mounted outlet devices shall generally be 24 inches above the floor, 18" in architecturally treated areas. In basement, underground or in areas subject to flooding, outlets shall be 36" above the floor.

B. Switches shall be mounted 48 inches above the floor.

C. Outlets mounted over work tables, desks and counters shall be 2"- 6” above the work surface.
3.4 GENERATOR RECEPTACLES

A. Where receptacles or plugs are called out for portable generator connections, coordinate the exact type and mounting location with the owner prior to purchase and installation.

B. Provide covers for all generator receptacles/plugs.

3.5 RACEWAYS

3.5.1 GENERAL

A. Not all conduits/raceways are scheduled. Wire diagrams and oneline diagrams show wiring requirements. Provide all necessary raceways for wiring as shown on the drawings.

B. For all power and control equipment, provide all necessary raceways and wire per plans and specifications even if not specifically shown on the plans.

C. Raceway routing shown on plans is general in nature, unless otherwise indicated on the drawings, the Contractor shall be responsible for determining conduit routing that conforms to the installation requirements required by the plans and specifications.

D. The number of directional changes of a conduit shall be limited to 270 degrees in any run between pull boxes.

E. Conduit runs shall be limited to a maximum of 400 feet, less 100 feet or fraction thereof, for every 90 degrees of change in direction.

F. In general, conduit inside structures shall be exposed unless otherwise specified or indicated on the drawings. No conduit shall be exposed in water chambers unless so indicated on the drawings.

G. Provide raceways/conduits per the conduit and wire schedule and additional as necessary to meet the requirements of the wiring.

H. Scheduled conduit sizes are minimum. Contractor shall upsize conduits if necessary or if required by the NEC.

I. Non scheduled conduits shall be a minimum of ¾” or sized per the NEC for the wiring installed plus 20%.

J. Conduit across structural joints where structural movement is allowed shall have an O-Z “Type DX” or Crouse-Hinds “Type XD,” bonded, weathertight expansion and deflection fitting of that conduit size.

K. Separate conduits of different voltages by a minimum of 2” – separate signal wire conduits from all other types of conduits by a minimum of 6”.

L. All conduits shall be a minimum of 3/4”.

M. Conduits entering underground structures shall be made water tight – see “handholes and Vaults” for more requirements.
3.5.2 Sealing of Conduit:

A. Conduits passing from a hazardous or corrosive area into a nonhazardous or noncorrosive area, or between Class 1, Division 1 area and Class 1, Division 2 area shall be provided with a sealing fitting which shall be located at the boundary in accordance with NEC.

B. Seal fittings for conduit systems in hazardous atmosphere locations shall be hot-dip galvanized cast ferrous alloy or PVC coated GRC if area is corrosive. Sealing compound shall be hard type, UL listed for explosionproof sealing fittings. Sealing compound shall be nonhardening type for corrosive areas. Seal fitting and sealing compound shall be as manufactured by Appleton, Crouse-Hinds, or equal.

3.5.3 Handholes and Vaults:

A. Sizes of handholes and vaults shown on the drawings are minimum sizes. If space allows the Contractor may upsize the structures for ease of pulling or if required by the NEC.

B. Conduits entering energized equipment shall have both conduit ends sealed with a waterproof duct sealing compound - WATERGUARD Industrial Encapsulant or equal. Where conduits enter through sides of handholes the penetration shall be made watertight.

C. Provide a minimum of 12 inches deep of ¾ to 1” drainage gravel under entire surface and extending 12 inches beyond the outside edge of the structure in all directions - of all vaults and handholes.

D. All wire installed in handholes and vaults shall be neatly bundled and racked to the handhole or vault side walls.

E. Provide welded stainless steel nameplate on each handhole and vault cover with the tag number and contents (480v, 120v, power, control, signal, etc.) clearly indicated.

F. Before final inspection, all vaults and handholes shall be cleaned and washed out with high pressure water to remove all dirt and debris and sumps shall be knocked out.

G. Provide drains from water tight lids to nearest sump, wet well, or provide a 3’ cubic drain area filled with drain gravel for draining handhole/vault covers.

H. Conduits entering substructures that contain electrical equipment shall first enter a Non Metallic junction box near the bottom of the box and then continue out of the top of the box to create a water break to stop water from entering electrical equipment – drill a ¼” weep hole in the junction box to drain away water.

3.6 Wire and Cable Installation

A. Splices in power and control and signal wires or cables is not allowed. All wire transitions shall be done on terminals.
B. Keep all conductors within the allowable tension limits during installation. Lubricants for wire pulling, if used, shall be approved for the insulation and raceway material. Observe cable manufacturer’s and industry standard cable bending radius recommendations.

3.7 WIRE AND CABLE TERMINATION:

3.7.1 GENERAL

A. Power conductors, No. 8 AWG and larger may be terminated directly in box-type lugs.

B. Solid conductors (when allowed for lighting and receptacle circuits) of #10 and #12 may be directly terminated to screw terminals.

C. For any power, control, or signal wire terminating on screw type terminals; provide spade or ring tongue type terminations.

D. Stranded control conductors may be directly terminated in box type terminals at control panels. Insulated terminals shall be used also on all stranded instrumentation wiring.

E. Terminal boxes shall be provided at instrument cable splices. If cable is buried or in raceway below grade at splice, an instrument stand shall be provided as specified with terminal box mounted approximately 3 feet above grade.

F. Special instrumentation cables shall be terminated in accordance with the recommendations of the manufacturer of the equipment and subject to review by the Engineer.

G. No splices shall be used in power, control and/or signal wiring. The wiring shall be continuous from point-to-point. Extending existing cables will not be allowed except where shown on the drawings.

3.7.2 TERMINAL MARKING:

A. All terminals in instrument and relay compartments, motor control centers, in control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment shall have reference number and letter in accordance to the following:

- \( h = \text{Control power hot (usually 120v or 24v)} \)
- \( n = \text{neutral} \)
- \( g = \text{ground} \)
- \( c = \text{control (use if none of the above letters apply)} \)
- \( p = \text{power (usually 480v)} \)
- \( s = \text{signal (usually 4-20ma or 1-5v ) (use if none of the above letters apply)} \)
- \( B = \text{DC + and –} \)
B. PLC input or output (S=slot number and I = card input number: for example slot 3 input 7 = 3-07)

3.7.3 WIRE MARKING:

A. All power and control conductors shall be tagged; including conductors in instrument and relay compartments of motor control centers, in control panels, instrument panels, field panels and control stations, as well as connections to mechanical equipment, shall be tagged at each end with legible, permanently coded tight fitting wire-marking sleeve showing the complete wire designation.

B. Wire marking lettering shall be bold and type written.

C. Wiring within a single enclosure shall be marked with the basic wire and terminal number at each end.

D. Control and signal wires that interface to PLC I/O shall be marked so that the number relates to the PLC slot and I/O number – this is the same number as the terminal number.

E. All field wiring shall have wire labels at each end. The labels shall be marked with the output terminal number at the original equipment (control panel, MCP, RCP, LCP or MCC) or remote device terminal # (if applicable).

F. For wire that terminates in at a control panel at both ends or a control panel and an MCC, the priority for the numbering shall be as follows

1. MCP
2. RCP
3. MCC
4. LCP

END OF SECTION

ATTACHMENT: ELECTRICAL SYSTEM TEST REPORTS
### ELECTRICAL SYSTEM DESCRIPTION DATA

**SERVICE DESCRIPTION:**
nominal voltage, phase to phase  
phase to neutral - single or three phase-  
number of conductors  

**SERVICE CONDUCTORS:**  
phase size and insulation type  
neutral size and insulation type  
ground size and insulation type  

**SERVICE DISCONNECT DESCRIPTION:**  
circuit breaker or disconnect switch  
size (amps)  
fuse (amps)  

### MEASURED CONDITIONS DATA

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<th>( V_{bc} )</th>
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<td>( V_{an} )</td>
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Conductor Insulation Resistance (record the indicated measurement for each of the following circuits:)

1. Service Feeder  
2. Pump Feeders
16145 - MOTOR DATA AND TEST REPORT

EQUIPMENT NAME AND NUMBER: ____________________________

EQUIPMENT SPECIFICATION SECTION: ____________________________

MOTOR STARTER LOCATION ____________________________

CONTRACTORS REPRESENTATIVE DATE ____________________________

MOTOR NAMEPLATE DATA

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MOTOR STARTER INFORMATION

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* RECORDED FULL LOAD DATA

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* VOLTAGE & CURRENT READINGS SHALL BE TAKEN AT THE CLOSEST ACCESSIBLE POINT TO THE LOAD

END OF SECTION
PART 1 GENERAL

Description of Work:

A. Work consists of installation of three new services:
   1. Tacoma PS – 208V, 3 phase, 125 amps
   2. Alder PS – 240V, 1 phase, 125 amps
   3. Cedar Glen PS – 240V, 1 phase 125 amps

B. Also includes the removal of the existing services to the existing pump stations after the new electrical equipment is fully installed, tested and commissioned.

1.2 SCHEDULING WORK WITH THE UTILITY COMPANY:

A. The Contractor shall be responsible for all scheduling and coordination with the utility company. The Contractor shall coordinate and schedule power outages, power service for operation and construction, and power service as may be required by the facility prior to Certificate of Occupancy.

B. The Contractor shall make all necessary applications for service with the utility, and shall notify the owner in writing of any obligations that the owner must fulfill for service to be started, installed, or modified.

1.3 CONTRACTOR/UTILITY INTERFACE RESPONSIBILITIES:

A. The requirements shown on the drawings for power services to the sites is general in nature and the Contractor shall meet all of the serving utilities requirement to deliver a complete electric services.

B. The contractor shall coordinate and provide all required work and equipment to provide service to the site as required by the serving utility.

C. UTILITY CHARGES

   1. All direct serving utility charges for the permanent service will be paid for by the Owner and shall not be included in the Contractor’s bid price.

   2. The Contractor is required to coordinate work with the power utility and other utilities as necessary for installation of new service and service entrance requirements.

   3. Utility charges, including all costs associated with utility meter and/or transformer changes, for permanent service shall be paid directly by the Owner. Contractor is to submit Utility invoices for such work, without markup, to the Owner.

1.4 QUALITY ASSURANCE

A. Comply with all serving utility company standards and requirements.
1.5 STANDARDS AND CODES
A. Work involving service installation shall be done in accordance with the serving utility’s standards and the National Electric Code.
B. Service equipment shall be listed and labeled by UL as "suitable for use as service equipment".

1.6 SUBMITTALS
A. In conformance with the submittal requirements of Section 16010, submit catalog data showing material information and conformance with specifications on the following:
B. Prior to submittal to the Engineer, the Contractor shall submit all equipment and construction details (such as size, mounting height, materials, location of equipment, etc.) to the serving utility for verification of compliance to the utility's requirements.

PART 2 PRODUCTS

2.1 METER ENCLOSURE
A. Meter enclosure shall be as required to meet the requirements of the serving utility. Installation shall be per the utility requirements.
B. Contractor shall coordinate with Utility on type of metering required and shall provide all labor and material necessary to meet Utility requirements.
C. Provide disconnect ahead of the meter if required by the Utility. Disconnect shall meet Utility standards.

2.2 C.T. ENCLOSURE
A. Utility metering CT enclosures shall meet all requirements of the serving Utility and shall be located as shown on the drawings.

PART 3 EXECUTION

3.1 GROUND ELECTRODE SYSTEM
A. The grounded conductor and ground bus shall be connected to the grounding electrode system, via the grounding electrode conductor as indicated on system one-line diagram.
B. The system shall be as indicated in Article 250-81 of the National Electrical Code.

3.2 SERVICE COMPONENTS
A. Install all service components (service raceways, transformers, primary raceways, conductors, handholes, vaults, etc.) in accordance with the utility requirements, the NEC, and section 16145.
B. Provide service handholes and vaults as required by the serving utility even if not shown on the plans.

3.3 UTILITY REQUIREMENT VERIFICATION

A. The contractor shall coordinate and submit all equipment, materials, etc. related to the utility work to the serving utility to verify conformance to the Utility’s requirements for service. The contractor shall also submit any plans for the installation of the primary and secondary service for approval by the Utility prior to excavation. Any discrepancy between the Utility requirements and the Contract documents shall be brought to the immediate attention of the Owner & Engineer.

B. Contractor shall obtain permit and obtain L&I inspection prior to connection of power.

END OF SECTION
SECTION 16921
INSTRUMENTATION AND CONTROLS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

A. This spec section is intended to specify the components of the instrumentation and control system including: control panel(s) and the general requirements for the construction and arrangement of the associated equipment and field instrumentation.

B. Work and materials specified in this section include:
   1. PLC control cabinet(s) (RTUs, EECs, MCPs), I/O, and associated equipment and instrumentation.
   2. Power equipment (ATSSs, load centers, power distribution) – Electrical Equipment Cabinets – (See also section 16145).
   3. Field Instrumentation, installation and calibration requirements
   4. Shop and field testing, and calibration of power & control system components and equipment.
   5. Shop drawings and wire diagrams for the RTUs and MCPs at all of the sites.
   6. Radios and communications equipment (antennas, cables).

1.2 SYSTEM DESCRIPTION

1.1.1 SITE 1 - HEADQUARTERS (HQ) – CONTROL RM.

A. Integrator’s work at the HQ includes:
   1. Furnish the Master Telemetry Unit (MTU)
   2. Furnish the Autodialer
   3. Furnish the fiber optic cable and all related components.
   4. Provide detailed shop drawings of the system.

1.1.2 SITE 2 - RESERVOIR SITE

1. Provide field investigations of the existing equipment.
2. Furnish all components and detailed shop drawings and a complete set of detailed wire diagrams for the replacement of the existing PLC in MCP-100 with new Compactlogix PLC. Coordinate the work with the programmer.
3. Furnish the operator interface, ethernet switch, etc. as shown on the plans in MCP-100.
4. Furnish the radio in MCP-100, cable and the antenna
1.1.2 SITE 3 - WELL SITE
1. Provide field investigations of the existing equipment.
2. Furnish all components and detailed shop drawings and a complete set of detailed wire diagrams for the replacement of the existing PLC in MCP-200 with new Compactlogix PLC. Coordinate the work with the programmer.
3. Furnish the operator interface, ethernet switch, etc. as shown on the plans in MCP-100.
4. Furnish the radio in MCP-200, cable and the antenna
5. Furnish the three new instruments: pressure, water temperature and well level transmitters and include wire diagrams for interface to the MCP.

1.1.2 SITE 4 - TACOMA WWPS
1. Provide field investigations of the existing equipment.
2. Furnish all components and detailed shop drawings and a complete set of detailed wire diagrams for the interface of the monitoring circuits in the existing control panel as shown on the plans. Coordinate the work with the programmer.
3. Furnish the RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station and the future vacuum prime pump station.
4. Furnish the Electrical Equipment Cabinet (EEC) for utility service, ATS, generator plug and power distribution equipment.
5. Furnish the telemetry antenna, radio, antenna cable and related components.
6. Furnish all components as necessary for the interface to the existing control panel (panel, relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.

1.1.3 SITE 5 – CEDAR GLEN WWPS
1. Provide field investigations of the existing equipment.
2. Furnish all components and detailed shop drawings and a complete set of detailed wire diagrams for the interface of the monitoring circuits in the existing control panel as shown on the plans. Coordinate the work with the programmer.
3. Furnish the RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station and the future vacuum prime pump station.
4. Furnish the Electrical Equipment Cabinet (EEC) for utility service, ATS, generator plug and power distribution equipment.
5. Furnish the telemetry antenna, radio, antenna cable and related components.
6. Furnish all components as necessary for the interface to the existing control panel (panel, relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.

1.1.4 SITE 6 - ALDER WWPS
1. Provide field investigations of the existing equipment.
2. Furnish all components and detailed shop drawings and a complete set of detailed wire diagrams for the interface of the monitoring circuits in the existing
control panel as shown on the plans. Coordinate the work with the programmer.

3. Furnish the RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station.

4. Furnish the Electrical Equipment Cabinet (EEC) for utility service, ATS, generator plug and power distribution equipment.

5. Furnish the telemetry antenna, radio, antenna cable and related components.

6. Furnish all components as necessary for the interface to the existing control panel (panel, relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.

1.1.5 SITE 7 - THORNTON WWPS

1. Provide field investigations of the existing equipment.

2. Furnish all components and detailed shop drawings and a complete set of detailed wire diagrams for the interface of the monitoring circuits in the existing control panel as shown on the plans. Coordinate the work with the programmer.

3. Furnish the RTU (Remote Telemetry Unit) for monitoring and alarming the existing pump station.


5. Furnish the telemetry antenna, radio, antenna cable and related components.

6. Furnish all components as necessary for the interface to the existing control panel (relays, wire, terminals, etc.) for monitoring the existing controls through the RTU.

1.3 SYSTEM INTEGRATOR

A. The System Integrator shall be responsible for the final design and assembly of the instrumentation and control system and control panels.

B. All programming of the SCADA, PLCs and operator interfaces shall be by the City’s pre-selected programmer – Evolution Controls.

C. The System Integrator shall be responsible for the final design and assembly of the entire I&C system. The system shall be designed to provide the control capabilities and functions indicated and implied by the plans and these specifications and to provide trouble-free operation with minimum maintenance. The system shall readily enable manual operation of any and all functions in the event of failure of any one component.

D. Only pre-approved integrators shall provide equipment under this contract

E. The following are pre-approved System Integrators for this project

1. Quality Controls - Lynwood, Washington


3. Evolution Controls – Snohomish, Washington
1.4 STANDARDS AND CODES

A. All equipment and materials shall conform to the latest revised editions of applicable standards published by the following organizations:
   2. Institute of Electrical and Electronic Engineers (IEEE).
   3. National Electrical Manufacturer’s Association (NEMA)
   4. Underwriters' Laboratories (U/L).
   5. Instrument Society of America (ISA).

B. All electrical equipment and materials, and the design, construction, installation, and application thereof shall comply with all applicable provisions of the National Electrical Code (NEC), the Occupational Safety and Health Act (OSHA), and any applicable Federal, State, and local ordinances, rules and regulations.

C. All materials and equipment specified herein shall within the scope of UL examination services, be approved by the Underwriter's Laboratories for the purpose for which they are used and shall bear the UL label.

D. All control panels shall bear a label by UL or by an approved testing authority for the completed assembled panel.

1.5 SHOP DRAWINGS

A. The System Integrator shall develop any shop drawings required for design, fabrication, assembly and installation of the power and control panels. Shop drawings shall include all drawings required in manufacture of specialized components and for assembly and installation of them. Shop drawings shall include detailed “end-to-end” control wiring diagrams showing all interface of field equipment and instrumentation. In addition the following drawings shall be provided:

B. CONTROL CABINET LAYOUT DRAWINGS
   1. The System Integrator shall develop shop drawings for the control cabinets and wiring and terminals within the control cabinets to show all details of the control system. Drawings shall include scaled drawings of both interior and exterior elevation views. All components shall be identified by both the nameplate information and also the component number related to the bill of materials.

C. EQUIPMENT AND INSTRUMENT WIRING DIAGRAMS (LOOP DWGS)
   1. The System Integrator shall provide individual wiring diagrams (one drawing) for each field instrument and for each controlled motor load. All wiring interface for each instrument or equipment shall be shown on a single drawing* and the drawing shall be titled with the equipment or instrument name and number. Each drawing shall include field devices, PLC I/O and motor control, etc. associated with that instrument or equipment Include all terminals – terminal numbers, wire numbers (both internal and field), PLC I/O and memory address, and equipment TAG number. See example drawings.
* for instruments of the same type - if space allows then more than one instrument of the same exact type may be shown on a single drawing. This exception applies for instruments only, not for equipment.

D. CARD DRAWINGS

1. The System Integrator shall provide the information for each input and each output of the PLC on “PLC Card drawings”. All details of each card must be shown on a single drawing – one I/O card per drawing*. Example drawings are included at the end of this section. Each I/O point shall be designated with the memory address, point id tag number, point description and wiring diagram reference drawing number

* cards of the same type – if space allows, then more than one card of the same exact type may be shown on a single drawing.

E. TERMINAL ARRANGEMENT DRAWINGS

1. Provide terminal layout drawings that show the layout of all terminals in the cabinet.

F. Shop drawings shall be drawn in AutoCAD 2008 or earlier version and include the following:

1. Technical data sheets for all components with the complete part number of the component clearly designated with all required options.

2. Arrangement drawings of all cabinet front-mounted and internal-mounted instruments, switches, devices, and equipment indicated. Show all panel mounting details required. Include outer dimensions of all panels on the drawing. Deviations from approved arrangements require resubmittal and approval prior to installation.

3. Arrangement drawings shall be drawn to scale using standard Architectural or Engineering scales.

4. Shop drawings shall be provided on 11” X 17”. Shop drawings shall include specific product detail such as rating, size, and number of contacts, etc. Wiring diagrams shall be included for all components in the system including control equipment supplied with mechanical devices.

5. For shop drawing packages provide the drawings in a separate 11” X 17” binder with an index for the drawings at the front.

G. Installation details shall include the size, number, type and location of interconnecting wiring and conduit, installation of cabinets and enclosures, installation of sensors, instruments, limit switches, and other installation requirements. Shop drawings shall be submitted to Engineer for review and approval.

1.6 SUBMITTALS

1.6.1 Submittal Requirements

A. Submittal documents shall be submitted via E-mail in PDF format.

B. I&C submittals shall be provided in two complete separate documents one with all product data and a second with all shop drawings as follows:

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a.
1. All products shall be included in a single PDF document including the cover sheet and index and bill of materials (BOM) in one single document. – Index the PDF document to show each individual product in the index column.

2. Shop drawings shall be included in a single PDF document including the cover sheet and index in one single document.

C. Submittals shall be indexed and identified as follows:

   1. Email subject line shall be “project name, EI&C submittal submittal #, spec section# - description.”

   2. Cover sheet with:

      a) the project name and submittal #
      b) Contractor's and sub-contractor's name, phone number, and email address.
      c) BOM bill of materials showing each product being submitted.
      d) List of deviations from specified components

3. PDF index tabs per the electrical specifications by section and paragraph or equipment name e.g. provide a minimum of one tab section for each piece of equipment in all of the PART 2 PRODUCT Sections 2.01 - 2.**

D. Per the general submittal requirements in other sections of this specification and the following. The System Integrator shall develop and shall submit to the Engineer the following project data:

   1. A detailed project schedule relating specifically to I&C - showing submittals, review time, long lead equipment, panel fabrication, expected site delivery date - startup, etc. highlight any anticipated critical path tasks. Provide a copy with the submittal and e-mail in PDF.

   2. All shop drawings: (provide an electronic copy, in AutoCAD of all shop drawings on CD ROM to the Engineer with the submittals, revised submittals, and with final as-built drawings).

   3. Cut sheets for all products with a BOM - Bill of materials showing quantity, Manufacturer, catalog number, and the supplier name and phone number and relevant spec. paragraph number. Number each item in the bill of materials and relate the bill of materials to the submitted product index.

   4. I/O checklist that verifies that all control and status/indicating points in the control panels both implemented and spare have been tested. One copy of the I/O Checklist shall be submitted for the start of the Factory Test. One copy of the I/O Checklist shall be submitted prior to the Control system startup. The PLC Card drawings shall be used for this purpose.

E. Provide reference numbering on all cut sheets to relate them to the bill of materials. Provide same reference numbering by the equipment shown on the shop drawings.

F. Provide a listing of all spare parts to be provided.

G. NOTE; submittals received by the Engineer that are incomplete or not organized or do not conform to the specifications or do not have complete drawings as specified shall REJECTED and returned without review. Contractor should
anticipate that submittals and re-submittals can take up to 3 weeks from the date mailed to the date returned with review comments if using standard submittal procedures.

1.7 COORDINATION WITH OTHER EQUIPMENT

A. The System Integrator shall be responsible for obtaining all necessary information/product data (wiring diagrams, load data, etc.) for other equipment and instrumentation used in the project that requires integration into the power and control system – even for equipment and instrumentation outside the System Integrator’s scope of supply. This may include, but is not limited to (standby generator, ATS, flow transmitters and other instrumentation, control valves, motor data, etc.)

B. System wiring diagrams shall include information from other equipment.

C. See PART 4 of this specification for additional requirements

1.8 NAMEPLATES

A. Nameplates shall be provided on all electrical devices – (equipment, instruments, boxes, etc.)

B. Nameplates shall also be provided on all electrical panel interior and exterior equipment (including but not limited to: relays, I/O cards, circuit breakers, power supplies, terminals, contactors, switches, indicating lights, buttons, meters, and other devices.)

C. Equipment nameplates shall have both the equipment name and number and equipment circuit number (if applicable).

D. INSTRUMENT NAMEPLATES: Provide nameplates for all instruments with instrument name, number, and the ckt breaker, or fuse location for the power source. – for nameplates that cannot be attached to the instrument provide a stainless steel cable ring to attach it to the instrument.

E. Nameplates shall be made of 1/16” thick machine engraved laminated phenolic having black letters not less than 3/16” high on white background or as shown on the drawings or other sections of the specifications. Nameplates on the interior of panels shall be White Polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; TYTON 822 or approved equal. All nameplates shall include the equipment name and number (and function, if applicable).

F. Relays shall be provided with 2 nameplates, one on the backpan by the relay base and one on the face of the relay.

G. Provide warning nameplates on all panels and equipment which contain multiple power sources. Provide nameplates describing locations of power sources and disconnects. Provide any other warning or information nameplates as required by NEC or UL.
H. Nameplates shall be secured to equipment with stainless steel screws/fasteners. Epoxy glue or other quality adhesive may be used where fasteners are not practical if first approved by the Engineer.

PART 2  PRODUCTS

2.1  GENERAL

2.1.1  DESIGN AND ASSEMBLY

A. All equipment and materials utilized in the system shall be the products of reputable, experienced manufacturers with at least five (5) years experience in the manufacture of similar equipment. Similar items in the system shall be the products of the same manufacturer.

B. All equipment shall be of industrial grade and of standard construction, shall be capable of long, reliable, trouble-free service, and shall be specifically intended for control and monitoring of operation of motor-driven pumps and equipment.

C. All equipment shall be of modular design to facilitate interchangeability of parts and to assure ease of servicing. All equipment, where practical, shall be of solid state, integrated circuit design.

D. The system shall be completely assembled in the shop by the System Integrator. All components and equipment shall be prewired to the maximum extent possible.

E. All components, including both internally and face-mounted instruments and devices, shall be clearly identified with phenolic nameplates of black background with white letters. Nameplates on the interior of panels shall be White Polyester with printed thermal transfer lettering and permanent pressure sensitive acrylic; TYTON 822 or approved equal.

2.1.2  INTERCONNECTING WIRING/TERMINALS

A. All conductors shall be stranded wire with thermoplastic insulation and shall be cabled to groups and supported so as to prevent breaking and to present an orderly arrangement and neat appearance. All outgoing wiring shall be terminated on a marked terminal strip capable of connection of at least 2 No. 14 wires and all terminal connections shall be numbered throughout the system.

B. TERMINAL NUMBERING –
   1. All field terminals shall have UNIQUE TERMINAL NUMBERS. This also includes NEUTRAL and LINE terminals shall be individually identified. (example NU1, NU2 ..etc. for UPS neutrals N1, N2 etc for normal power neutral terminals.

   2. Terminal numbers and wire numbers shall relate to the equipment or component number or drawing number.

C. In general: all field control wiring shall be #14 AWG. Internal wiring may be smaller #16 or #18 is acceptable as long as it is sized for the load and circuit
protection. PLC I/O wiring between the PLC cards and the terminal strips shall be pre manufactured bundled cables wire size shall be #18 - #22.

D. WIREWAYS
1. Provide wire ways as necessary in the enclosure to contain all internal wiring and all field wiring that exists on this contract with consideration given to future space and the future wiring. Size wireways such that there is ample room for the numbers of wires that will be wired to the terminals or terminal space in the cabinet plus room for an additional 30% future wire.
2. Provide corner wireways in the cabinet corners or as shown on the drawings
3. Low voltage DC control and signal conductors shall be bundled separately from alternating current circuits. Separate raceways and wire gutters shall be dedicated for AC and DC wiring, and labeled as such on the shop drawings. Wiring may cross at right angles if necessary. Special caution shall be used for PLC I/O card wiring and field terminations to accommodate the separation of AC and DC circuits. Intrinsically safe wiring shall be physically separated from non intrinsically safe wiring.
4. Internal wiring shall be in separate wireways from the field wiring.

E. All wiring and tubing crossing hinges shall be installed in a manner to prevent chafing. Bundles of similar conductors shall be clamped securely to the door and to the panel, and the bundles shall run parallel to the hinge for at least 12 inches. Spiral nylon cable wrap shall be provided in the hinge section of the bundle to fully protect the conductors or tubing against chafing.

2.2 PROGRAMMABLE CONTROL EQUIPMENT

2.2.1 PROGRAMMABLE LOGIC CONTROLLER (PLC)
A. The PLCs shall be Allen-Bradley CompactLogix. Selection shall be based on the number of I/O required.
B. Provide PLC processors with on board Ethernet communications.
C. Provide all PLCs with EEPROMS
D. PLC rack w/ spare slots – if applicable
E. 24VDC digital input cards
F. 24VDC digital output cards. All digital outputs shall interface with the output relay terminals
G. Analog input cards with individually isolated points
H. Analog output cards with individually isolated points
I. Note combination cards are not allowed except with special permission from the Engineer
J. Provide power supplies as required and recommended by the manufacturer.
K. Spare and empty slots in the PLC rack shall be covered with a blank slot filler.
L. Provide all necessary power supplies as required and recommended by the manufacturer.

M. Provide isolated fused circuit for power to PLC

N. Spare and empty slots in the PLC rack shall be covered with a blank slot filler.

2.2.2 I/O CARDS FOR PLC REPLACEMENT

A. For the existing PLCs, provide replacement cards to match with the existing cards that are being replaced.

2.2.3 ADDITIONAL I/O

A. System Integrator shall provide all I/O necessary for the operations of the equipment and instrumentation for the project and as shown on the wire diagrams and the plans or as required by the existing I/O in MCP-100 and MCP-200. The System Integrator shall provide additional I/O for the equipment and instrumentation that is outside of the System Integrators scope of supply, but still needs to interface with the control panel as described in PART 4 of this specification. Include the additional I/O when calculating the required spare I/O below.

2.2.4 SPARE AND FUTURE I/O

A. INSTALLED SPARE: Provide all necessary analog and digital I/O for the project plus 15% installed spare, (round up to the nearest whole number) in each cabinet. Provide terminals for all installed PLC I/O cards (including spares) to match the number of points in the card. For all spare I/O provide interface wiring to terminals.

B. Provide 1 spare fused disconnect for every 4 spare digital input terminals.

C. Spare digital outputs shall all be provided with interposing relays with one form C output wired to two terminals for a normally open contact interface.

D. For each spare analog input provide one fused, and two non fused wired for a loop powered instrument input. Provide one shield ground terminal for every two spare analog inputs.

E. FUTURE: Provide spare space to the right of the PLC for at least three additional I/O cards in each PLC cabinet. Provide spare din rail for the additional terminals associated with the additional I/O cards (minimum of 12” for digital and 12” for analog terminals) and also account for the additional room in the wireways for the future wire.

2.3 COMMUNICATIONS EQUIPMENT

2.3.1 ETHERNET COMMUNICATION MODULE

A. Provide Ethernet communications on the PLC processor for communications.

2.3.2 ETHERNET COMMUNICATIONS SWITCH
1. All Ethernet switches used for this project shall be made by the same manufacturer.

2. Provide an Ethernet switch with ports as required as shown on the drawings plus a minimum of 1 spare port. Ethernet switches shall be din rail mountable. The switch ports shall be configurable for either 10 or 100 base T. Siemens, Allen-Bradley, Hirschmann or N-Tron, or equal. Provide mounting and power circuits as required for the equipment.

2.3.3 ETHERNET / RECEPTACLE INTERFACE MODULE.

1. Provide a combination Ethernet port/ 120V receptacle unit mounted with clear plastic hinged cover on the front door of each control cabinet with a PLC. So that the programmer can plug in without opening the cabinet door.

2.3.4 RADIO EQUIPMENT

A. Provide one Radio in each RTU and MCP. Data-Link Radio SRM6230 no equal. See Data-Linc Radio Study report for additional details and components necessary for the radio communications system.

B. Provide radio antenna’s at each site in accordance with the Data-Link radio study:
   1. Omni antenna at sites 1/2
   2. Yagi antenna at sites 3,4,5,6,7
   3. Provide one spare Omni and one spare Yagi antenna.

C. Provide separate power supply rated for the radio requirements.

D. Provide antenna to match with the radio, mount as shown on the plans

E. Provide Antenna Cable wired to surge protected bulk head on the top of the cabinet.
   1. Provide communications cables for interface to the Radio and PLC and Operator Interface.
   2. Provide Coax cable to extend from the Radio in the RTU and MCP to the Antenna (location shown on the plans). Cable shall be Times Microwave Systems - LMR-400DB or equal cable must be less than 2.7dB loss per 100 ft at 450 MHz or as shown on the radio path study documents.
   3. Provide all necessary fittings, bulkhead fittings, etc. for a complete Radio/antenna installation.
   4. Provide cable lightning arrestor and any other components as recommended by the radio manufacturer.
   5. Configure radio for communications to the SCADA system.
   6. The system Integrator shall provide all necessary coordination, testing and troubleshooting for the telemetry system and all sites to communicate to headquarters.

2.4 PROGRAMMING OF PROGRAMMABLE CONTROLLER

2.4.1 GENERAL
A. The programmable controller equipment shall be programmed by Evolution Controls and the programming cost shall not be included in the bid.

2.5 AUTODIALER
A. Provide one 16 point autodialer – Raco Verbatim – no equal – provide phone service connection, power and wiring for 16 data points to PLC outputs and configuration for 16 alarms.
  1. Provide coordination with the owners selected cell phone provider to provide the necessary cell service components.
B. Configure for automatic call out for loss of input power

2.6 SUPPORT EQUIPMENT AND SOFTWARE
A. Provide one copy of current version of PLC programming software to the Owner. For software registration information please contact the owner to insure the correct name and address information is used.
B. Provide one PLC to PC programming cable to the Software Owner
C. Provide one copy of current version of operator Interface development software to the Owner.

2.7 EQUIPMENT ENCLOSURES

2.7.1 CABINET SIZE
A. Sizes of enclosures for the power and control cabinets shall be chosen by the System Integrator to provide ample space for the installed components and still fit within the given space in the structure.
B. The enclosures minimum size shall be as shown on the drawings. With Engineer’s approval, the Integrator shall upsize the cabinets if necessary to fit in the components.
C. Provide a minimum of 24” of open, unused din rail space in all cabinets with PLCs or as shown on the plans, whichever is the greater amount.

2.7.2 CONTROL CABINETS
A. Indoor Control cabinets shall be NEMA 12 – powder coated steel construction with a drip shield.
B. Outdoor Cabinets shall be NEMA 3R – Stainless Steel, or Aluminum – with Stainless steel hinge pins and door handles.
C. Control cabinets in corrosive areas or chemical rooms shall be stainless steel or non- metallic.
D. Provide all control cabinets with a drip shield.
E. Cabinets shall be hinged with stainless steel pins.
F. Cabinets shall be provided with a stainless steel 3 point latch.
G. Provide all control cabinets with a data pocket and insert the cabinet drawings in the pocket when shipped to the site.

H. Provide all control cabinets which house PLC equipment with a 12x12” folding shelf HOFFMAN A-CSHELF12 or approved equal. Also provide an Ethernet port and 120V receptacle with a hinged clear cover for laptop interface on the outside of control panel door.

I. Provide corrosion inhibitors in all control cabinets prior to shipping. Amount of inhibitor shall be provided for the volume of the enclosure for one year. HOFFMAN AHC series or approved equal.

J. Enclosure shall be manufactured by Hoffman Products, Inc. or approved equal.

2.7.3 DOUBLE ENCLOSURES FOR OUTDOOR AREAS

A. The exterior panel shall be NEMA 3R made of aluminum (.125” thick minimum) or 316 Stainless Steel with double flanged door frame on all four sides. All exterior seams shall be continuously welded or sealed. Provide enclosure with louver vents, vent fan and thermostat, heater, and thermostat. Exterior enclosure shall be Hennessy Products, Inc. or Hoffman free standing enclosure or equal with minimum size as shown on drawings.

B. The interior enclosure shall be NEMA 12 aluminum or powder coated steel construction equal to Hoffman standards and quality of manufacture. Enclosure sizes shall be a minimum of that shown on the drawings. Provide inner enclosure with vents, heater, and thermostat. Provide outer enclosure with outdoor rated vents with covers and filter, fan and thermostat.

2.7.4 ENCLOSURE DOOR LATCHES

A. Door latches on all enclosures shall be fast operating type 3-point latch stainless steel lockable door handle.

B. NEMA 4 and 4X shall also have stainless steel 3-point latch if possible, but where a 3-point latch will not meet rating requirements and also for all types of enclosures that are too small for a 3 point latch use fast operating clamp assemblies. Hoffman Bulletin A-80 or equal. The latch handle shall operate toward the center of the panel to open the door, and be pointing down when closed.

C. Small boxes and control stations shall have 2 stainless steel screw driver or hand operated latches.

2.7.5 FOLDING SHELF / DOOR STOP

A. Provide a 12”x12” folding shelf on the door to all cabinets with remote I/O or PLC’s for supporting a laptop computer. Hoffman A-CSHELF12 or approved equal.

1. Mount the shelf so that when the cabinet is installed, the shelf will be 36” – 40” above the floor.

B. On all cabinet doors with a folding shelf, provide a doorstop, Hoffman A-DSTOPK ALGSTOP-2 or approved equal.
2.7.6 **Wireways**

A. Provide molded plastic wireways, slotted for wire connections for all wiring in the panels. They shall be complete with covers. Wireways shall be manufactured by Panduit or Taylor, or approved equal.

2.7.7 **Forced Air Heater**

A. Provide a fan-driven resistance heater (or as shown on plans) with 120 VAC line thermostat in each control enclosure which houses instruments, relays, PLC’s, starters, or other solid state devices; located outdoors or in moist environments. The thermostat shall be adjustable between 40°F. and 80°F. Provide correct wattage and voltage for the required application. Heater shall be Hoffman bulletin D-85 D-AH series or approved equal.

2.7.8 **Panel Light, Switch and Convenience Outlet**

A. Provide two LED lights with manual switch in control panels that contain a PLC rack, relays, or other equipment that would require troubleshooting or operator access for normal operation. Provide a simplex outlet, 120VAC 15A, in all panels that require a computer or other maintenance tools that may need a power source. These shall be on a separate dedicated circuit.

2.8 **Terminals**

2.8.1 **General**

A. Provide terminals blocks arranged per the examples drawings and as described in this specification.

B. PLC card – I/O terminal blocks shall be grouped together to match the terminal arrangement of the PLC card that they are connected to.

C. **Terminal Numbering**
   1. Provide unique terminal numbers for all field wired terminals.
   2. Terminal numbers and wire numbers shall relate to the shop drawing number.
   3. Provide clear references on all wires that connect between drawings or are shown on more than one drawing.

D. Provide terminals for all wire connections to field wiring and internal power distribution. For all terminals (including line voltage and neutral terminals) that are used for wiring out to field devices provide unique terminal numbers.

E. Provide spare din rail space and spare terminals as indicated by the drawings or these specifications.

F. For all energized circuits (power and control) powered from the panel and extend outside of the panel provide an individual fused terminal with appropriate fast blow fuse (1/2 amp for PLC inputs) and “blown fuse” indicator light for each circuit and unique terminal number.

G. For all signal circuits that extend outside of the panel provide an individual fused terminal with appropriate fusing and integral blown fuse indication. All 4 to 20 mA
circuits shall be individually fused with a 1/16 amp fast blow fuse; and blown fuse indicator.

H. For all energized circuits powered outside of the panel which extend into the panel, provide a disconnecting terminal to isolate each individual circuit.

I. Provide fusing of all DC circuits with appropriately sized fuses and blown fuse indicators.

J. Analog loops that are 24 VDC powered shall have a knife switch to disable the loop.

K. Connections shall have compression terminals capable of terminating 2 #14 AWG stranded wires. Terminals shall be DIN rail strip mounted. Provide number strips for terminal blocks that are referenced by the wire marker. Provide bridge bars for jumpering between terminal blocks. Provide end clamps to separate and terminate terminal block groups. Provide end covers for groups of terminal blocks in sets to match the number points associated with individual I/O cards in the PLC rack.

L. Provide Separation Plates on each side of terminals that are at a different potential or polarity than surrounding terminals.

M. Provide clear plastic DIN rail mounted nametag stanchions for each block of terminations. Each nametag shall hold a preprinted label designating the PLC rack and PLC card (slot) that terminates to that set of terminals.

N. Terminals shall be mounted such that there is a minimum of 2 inches of clear space on both sides of the terminal (between the terminals and the wireway); for ease of wiring and so that the entire wire tag will be visible outside the wireway.

O. Mount all terminals strips on 2” standoffs from backpan.

P. Provide wired terminals to match the number of points supplied on each I/O card in a cabinet.

### 2.8.1 General Purpose and Digital Input Terminals

A. Terminal Blocks for general purpose and digital input terminations shall be Phoenix Contact UK 5, or equal. Provide UKK5 Double Hi, or equal, if space is limited.

### 2.8.2 Analog Input Terminals

A. Terminal Blocks for use in analog input terminations shall be knife disconnect type, Phoenix UK 5-MTK, or equal.

B. Provide one ground terminal for every two analog inputs for grounding the shield.

C. Provide a fused terminal with a ¼ amp fuse and blown fuse indicator for all analog inputs for loop power.

### 2.8.3 Analog Output Terminals

A. **UKK 5** Terminal blocks for analog outputs shall be fused, double hi with a separate ground terminal, or equal.
2.8.4 **DIGITAL OUTPUT RELAY TERMINALS**

A. Provide interface/interposing relays for all digital outputs that extend out of the control panel and for all spare and future digital outputs. Relays shall be individual form C relays, or equal. Interface to digital output cards or relays as required to interface I/O module to DIN rail mounted relays, or equal.

B. Relay output cards are not to be used unless specifically allowed by the Engineer. All digital outputs shall interface with individual output relays. Panel mounted devices may be directly powered by the output card if approved by the Engineer.

C. Provide relays to match the number of points supplied on each digital output card in a cabinet.

D. Provide two descriptive labels for all relays. – One label on the backpan and one label on the relay.

2.8.5 **FUSED TERMINALS**

A. Fuse terminal blocks shall be hinged disconnect level type with “blown fuse” indicators. PHOENIX CONTACT UK 5 HESI series, or equal

2.8.6 **TEST AND CALIBRATION**

A. Provide 1 set for each Cabinet supplied plus 1 spare set consisting of:
   1. Short Circuit Plug, 1 pair of Reducing Plugs, 1 pair of Test Adapters.

2.9 **FIBEROPTIC CABLES**

A. Provide fiberoptic cables and patch cables as shown on the plans. Cables shall be rated for the use and environment installed. Cable installed outdoors or underground shall be loose tube, heavy-duty, double jacket cable. Belden FSxH00 or equal.

2.10 **OPERATOR INTERFACE DEVICES**

A. All operator interface devices mounted on the panel front shall be rated for the environment in which they will be located. In general, devices mounted on indoor panels shall be NEMA 13 rated. Operator devices mounted outdoors, or in wet or corrosive environments shall be NEMA 4X rated.

2.10.2 **ALARM BEACONS**

A. Alarm Beacons shall be heavy duty industrial, Marine Rated, high intensity strobe with minimum 800K peak candle power – Edwards 105 series w/ 8 joule high intensity strobe. Provide mounting bases and attachments as required for the application.

2.10.3 **SELECTOR SWITCHES**

A. Selector switches shall be for use on 120 volt control circuits. Contacts shall have a continuous current rating of 10 amperes both inductive and resistive. Selector switches shall be of the heavy duty oil tight type. Allen Bradley 800T, 800H, GE CR104P, Square D Type K or approved equal.
2.10.4 PUSH BUTTONS
A. Push buttons and illuminated push buttons shall be for use on 120 volt control circuits, and shall have continuous current rating of 10 amperes both inductive and resistive. Pushbuttons for "emergency" "help" applications shall have maintained contacts and red mushroom head operators. Allen Bradley Bulletin 800T, 800H or approved equal.

2.10.5 INDICATING LIGHTS
A. Indicating lights shall be push-to-test LED type. Illuminated pushbutton type with the pushbutton wired for the push-to-test function required. Appropriate lens caps shall be provided as shown.

2.10.6 OPERATOR INTERFACE
A. Provide an operator interface. provide a minimum 10” inch color graphic display and resistive touch screen. Interface shall be capable of color graphic displays. Software shall be RS View Studio Machine. Provide with Ethernet communications module. Operator Interface shall be Allen-Bradley panelview plus 1000.

B. Provide all necessary software and hardware for a complete system.

C. Programming of the operator interface shall be done by others.

2.11 CABINET POWER DISTRIBUTION

2.11.1 CONTROL PANEL CIRCUIT BREAKERS
A. Control panel circuit breakers shall be thermal-magnetic type, supplementary overcurrent devices. Circuit breakers shall be snap mountable on rails. Circuit breakers shall be sized for actual circuit load, or as shown on the drawings.

1. Provide 2 spare installed 5amp circuit breakers or the number of spares shown on the drawings, whichever is greater. Wire breakers out to terminals and provide number of spare neutral terminals to match number of hot terminals.

2. Provide 2 spare “hot” terminals wired to the output of each spare breaker and 3 spare neutral terminals wired to the appropriate neutral.

B. Control panel circuit breakers shall be Allen-Bradley 1492-CB, or equal.

C. In all control panels, provide a laminated drawing of the panel power distribution circuit breakers for referencing all circuit breakers in the panel.

2.11.2 GROUNDING
A. Provide 3 spare ground terminals in each cabinet

B. Provide a ground bus in each cabinet – minimum 6” long with screw terminals for grounding equipment and instrumentation.

2.11.3 FUSES
A. Provide, fuse pullers; (one for each type of fuse), for removal of fuses.
B. Provide blown fuse indicators on all fuses.

### 2.11.4 POWER SUPPLIES – REDUNDANT PAIR

A. Power supplies shall be switching type, voltage, & sized to be able to supply the demand. Units shall be closed frame DIN rail type and have overvoltage and overcurrent protection. Units shall have LED power on light and 2 sets of output terminals. Power supplies shall be sized for the load plus an additional 30% IDEC, SOLA Power Supply or equal.

B. Power supplies shall be installed as a redundant pair. Provide one supervised power supply fail contact input for each power supply to the PLC for alarming.

C. Provide one fused and one non-fused terminal for all DC circuits that extend outside the cabinet. Provide spare DC terminals for a minimum of 2 additional DC circuits or 20% whichever is the greater amount.

D. Provide one redundant pair of power supplies at 14VDC for the radio and one redundant pair at 24VDC for the instrumentation and I/O power.

E. Provide redundancy module for true power supply redundancy / sharing of load between the redundant pair – SOLA or equal.

### 2.11.5 24VDC UNINTERRUPTIBLE POWER SUPPLY (UPS)

A. 24VDC uninterruptible power supply (UPS) shall be a continuously on-line. Unit shall be 24VDC and maintain on battery backup for a minimum of 10 minutes. Unit shall be din rail mounted wired to control system power. The UPS capacity/rating shall be chosen by the System Integrator for the load being served plus 20%.

B. PULS, Allen-Bradley 1606.XLS series, size chosen for the application or equal.

C. Provide UPS alarm module and provide all necessary wiring and relays for connection to the UPS to provide 2 normally closed contacts which open upon loss of power for the PLC digital inputs for: a) loss of input power to the UPS and b) for a battery alarm.

D. Provide labeling to differentiate UPS power circuits vs. non UPS powered circuits by adding a “U” suffix on the terminal name.
   1. Provide 2 spare installed 5amp UPS circuit breakers or the number of spares shown on the drawings, whichever is greater.
   2. Provide 3 spare “hot” terminals wired to the output of each spare UPS breaker and the same number of spare neutral terminals wired to the appropriate neutral.

E. UPS INSTALLATION: The unit shall be din rail mounted

### 2.12 RELAYS

#### 2.12.1 RELAY LABELS
A. Provide two labels for all relays one label on the backpan and one label on the front surface of the relay.

2.12.2 RELAYS FOR GENERAL PURPOSE
A. Relays for general purpose shall have appropriate coil voltage for the application, contacts (amp and voltage) shall be rated for the application, minimum 2 amps. All relays shall have an integral indicating light to show if there is coil voltage present. They shall have pin/blade base and matching socket. Units shall be Allen-Bradley 700 type HA, HB, or equal.

B. Appropriate relay (coil voltage and contact load ratings) shall be selected based on application from the control wiring diagrams and load served.

2.12.3 TIME DELAY RELAYS
A. Time delay relays shall be multi-function, multi-range with plug-in base, pin style terminations timing and timed out LED indicators, and calibrated scales. Relays shall have minimum 0.5 seconds to 60 minutes, 8 selectable timing ranges, 5 amp contacts. Select coil voltage for the application. Minimum accuracy requirements (plus or minus) shall be as follows: 1) Repeat accuracy 1/2% 2) Timing change over full voltage range 1/2% change over full temperature range 2% 3) Scale tolerance 5%. Allen-Bradley Bulletin 700 type HR series; or equal.

2.12.4 DIGITAL OUTPUT RELAYS
A. All digital outputs shall be provided with interposing relays wired out to terminals - including spares. Relays shall be group mounted with connecting cable to the PLC output card. Output relays can be single pole, N.O. or N.C. for the application – all Spare DO relays shall be form C with the N.O. contact wired to terminals.

2.12.5 INTRINSICALLY SAFE REPEATER RELAYS (ISR)
A. Intrinsically safe repeater relays shall be provided with N.O. and/or N.C. contacts as required. Acceptable manufacturers are IMO GEMS SAFE-PAK or R. STAHL INTRINSIC Safety Repeater Relays No. 9230 or equal. Provide enclosures or barriers as required.

2.12.6 INTRINSICALLY SAFE BARRIERS (ISB)
A. Intrinsically safe barriers shall be chosen by the integrator to match and be compatible with the instrument being protected. GEMS “SAFE-PAK” ZENER Barrier 54800 series or equal.

2.13 INSTRUMENTATION

2.13.1 GENERAL REQUIREMENTS OF INSTRUMENTATION
A. All Instruments, switches and control sensors shall be rated for the environment in which they will be located. In general, devices mounted indoors shall be NEMA 12 rated. Devices mounted outdoors, or in wet or corrosive environments shall be NEMA 4X rated.
B. Devices mounted in hazardous areas shall be rated for the classification of the area that they are located.
   1. Provide barriers, intrinsically safe relays, explosion proof boxes, or other equipment, if necessary to rate equipment for the environment installed.
   2. Provide seal fittings per NEC

C. Transmitters shall be indicating type when available and shall have local or direct reading indicators, unless otherwise shown.
   1. Provide a pressure gauge for every pressure switch and transmitter.

D. Select range of instruments for the application.

E. Transmitter input power shall be 24VDC or 120VAC 60HZ unless otherwise shown, output shall be 4-20 mA into a minimum 500 ohm load.

F. For each instrument that has a separate power source, provide a power disconnect switch (rated for the environment and the application) mounted next to each instrument.

G. Transmitters located outdoors shall be provided in an enclosure with a heater or provided with thermostat controlled heaters in their enclosure.

H. Instruments shall automatically reset and resume normal operation after power interruption with out manual resetting.

I. Instrument cords (for example: cords between the sensor and the transmitter) shall be provided:
   1. With length sufficient for the application
   2. With rating for the environment installed.

J. Terminate all wiring on terminal strips, splicing wiring is not acceptable.

K. Wire that terminates on screw type terminals shall be provided with a spade or loop type end connector.

L. For all Indicating transmitters that are mounted inside enclosures, provide a window in the enclosure so that the display can be viewed without opening the enclosure.

M. Instrumentation supplier shall provide installation inspection, calibration and training as required for proper installation.

2.13.2 **DOOR / HATCH-SWITCHES**

A. Provide door security switches at locations indicated on the plan drawings. Switches shall be limit switches with lever arm as required for the application Square D class 9007 or approved equal. Install such that the switch contacts are closed when the door is closed.
   1. Provide XP rated switches in hazardous areas or provide intrinsic safe circuiting.
B. Magnetic type with contacts normally open held closed when door is closed. Switches shall have anodized finish and be furnished with 3 foot stainless steel armored cable. Sentrol 2500 series or equal.

2.13.3 LIMIT SWITCHES

A. Limit switches shall be heavy duty oiltight Square D Class 9007 Type T, or approved equal with lever arm required for the application. Submit details of installation for review prior to field construction.

B. Provide XP rated switches in hazardous areas.

2.13.4 PRESSURE TRANSMITTERS

A. Unit shall be pipe or wall-mounted, with weatherproof/dusttight (NEMA 4X) housing transmitting a proportional 4-20 mA signal with zero and span adjustments and adjustable damping.

B. Housing- Epoxy-coated cast aluminum. Wetted Parts 316SS. Accuracy shall be 0.2% or better of set span. Long term stability of 0.1% or better. Adjustable measuring range with TD 10:1.

C. Provide with integral 4 digit indicator calibrated in PSI for pressure applications and feet for level applications. Foxboro IGP10/20, OMEGA- PX764, Endress-Hauser CERABAR M or equal.

D. Provide a differential pressure unit if the device is measuring water level or if applicable for the application Foxboro IGP20, Endress-Hauser CERABAR D or equal.

E. Provide all pressure transmitters with an isolation valve and TEE fitting with a test port for calibration.

F. Provide a 4” Gauge mounted next to each pressure transmitter.

2.13.5 PRESSURE SWITCH/TRANSMITTERS – TEST & ISOLATION VALVE

A. For each pressure switch and transmitter supplied, provide one Test & Isolation valve assembly. Assembly shall include an isolation valve and test valve and shall be included in the supply (BOM) with each pressure switch and each pressure transmitter.

2.13.6 PRESSURE GAUGES (FOR PRESSURE TRANSMITTERS)

A. Provide a pressure gauge for each pressure switch and transmitter. Mount gauge near sensor or as shown on the drawings. Pressure gauges shall be provided with a range and working rating for the application. Gauges shall be stainless steel with 4” face and minimum 1% accuracy. Select range and units for the application Noshok or equal.

2.13.7 WATER LEVEL SUBMERSIBLE TRANSMITTERS

A. The level sensor shall consist of a submersible level transmitter suspended on a cable. The sensor shall be suspended via an integral unspliced cable consisting of a 2 conductor #24 AWG shielded cable with polyurethane outer jacket, Kevlar
strength member and nylon vent tube. The sensor shall be 24 VDC powered with an output signal of 4-20mA DC.

B. The unit shall be able to measure in feet of water, range shall be selected for the application. Sensor shall be supplied with cable of sufficient length to meet the requirements of the application plus additional 10 feet.

1. For clean water applications provide PMC VL 4500 series or Druck PTX1830 series or equal

C. ACCESSORIES:

1. Provide all submersible level sensors with vent tube moisture protection termination box PMC-TE10 or equal.
2. Provide cable support hanger PMC-CH10 or equal.

D. Coordinate type of transmitter provided with pressure range required for the application and physical size of the sensor tube and the manufacturer’s recommendations.

2.13.8 WATER TEMPERATURE TRANSMITTERS

A. The temperature transmitter shall be chosen by the System Integrator for the application. The sensor shall be 24 VDC powered with an output signal of 4-20mA DC.

B. Provide all ancillary components for a complete installation.

2.14 CIRCUIT BREAKERS

A. Circuit breakers shall be molded case thermal-magnetic type. Circuit breakers other than those mounted in the panelboard shall be capable of being padlocked in the open position. Circuit breakers shall be quick-make and quick-break type. They shall have wiping type contacts. Each shall be provided with arc chutes, individual trip mechanisms on each pole. Two and three pole breakers shall be common trip. All breakers shall be calibrated for operation in an ambient temperature of 40°C. Molded case circuit breakers shall be trip-free. Each breaker shall have separate trip indication independent of the ON or OFF positions.

1. Breakers shall have lugs UL listed for both copper and aluminum.
2. Breakers shall have the interrupting rating and trip rating indicated on the drawings.
3. All breakers for motor starters shall include auxiliary contacts which open when the breaker in the OFF position.
4. Provide service entrance rated breakers if required for the application by NEC.

B. Provide interface options for control, monitoring, and alarming as shown on the drawings and the wire diagrams. Manufacturer shall select the size and rating as required for the application.
2.15 DRY TYPE TRANSFORMERS
   A. Provide dry type transformers in accordance to applicable requirements of Section 16145 or 16460.
   B. Where the one-line diagram calls out for isolation transformers; provide noise suppresser isolation transformers, Square D/Topaz Class 7610 or equal.

2.16 SURGE ARRESTORS
   A. Provide Surge arrestors, with indicators, where shown on the one-line diagrams to protect against overvoltage transients. JOSLYN J9200 series with protective capacitor GE model 9L18 or equal. Select proper components for the application as shown on the drawings.

2.17 OPERATING MECHANISMS / MOTOR LOCKOUT
   A. The main disconnect/circuit breaker/fuse shall be provided with a lockable external "thru-the-door" operating handle with bypass. Square D Class 9422 or equal.
   B. Each Individual motor circuit breaker or disconnect shall be provided with a lockable external "thru-the-door" operating handle with bypass. mechanism for locking in the open position to meet the lockout/tagout requirements per the NEC.

2.18 WIRE MARKERS:
   A. Field installed wire markers shall be T&B, SHRINK-KON HVM or approved equal.

2.19 SPARE PARTS STORAGE BOX
   A. Provide one portable spare parts storage box for each of the remote sites – total of six. (approx. 21"x12"x13") Heavy duty, non-metallic. DEWALT Tough System DS 300 Large Storage Unit or equal.

2.20 SPARE PARTS
   A. In addition to spare parts mentioned elsewhere in this section, the Contractor shall supply the following spare parts for use by the Owner: All spare parts shall be shipped with the equipment.
      1. Qty 2 spare PLC processors to match, complete with Ethernet communications and all other options.
      2. Qty. 1 spare (non installed) PLC input and output card of each type used.
      3. Qty 1 spare power supply of each type and rating used.
      4. Qty 1 Relay of each type used or 10 % whichever is the greater amount.
      5. One spare Ethernet switch of each type used
      6. One spare Yagi and one spare Omni antenna
      7. One spare Data-Link Radio

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16921-23
425-765-6304
8. Qty 10 lamps of each type used or 100% whichever is the greater amount.
9. Qty 200% spare fuses (two spare fuses for each fuse supplied).
10. Provide 10 spare nameplates 3” square or less with 20 letters 1/2” or less to be specified by the owner.

PART 3 EXECUTION

3.1 INSTALLATION

3.1.1 GENERAL
A. The instrumentation and control system shall be installed, in accordance with the contract drawings, installation details, and also instructions prepared by the System Integrator, and per special instruction from equipment or instrumentation Manufacturers.
B. The Integrator shall provide detailed installation drawings and wiring diagrams for this purpose.
C. Installation shall include all elements and components of the I&C system and all conduit and interconnecting wiring between all elements, components, and sensors.
D. Provide instrument calibration sheets for all instruments to verify function, range, setpoints etc.
   1. For analog instruments include range information and test at 0, 25%, 50%, 75% and 100%. Unless otherwise shown set displays as follows – for level measurement in FEET, for pressure in PSI, for flow GPM.
   2. For switches verify operation and check setpoint for correct operation – for floats verify trip level, pressure switch settings, etc.

3.1.2 WIRE AND CABLE TERMINATION:
A. Stranded control conductors may be directly terminated using compression type terminals at control panels. Special instrumentation cables shall be terminated in accordance with the recommendations of the Manufacturer of the equipment and subject to review by the Engineer.
B. No splices shall be used in power, control and/or signal wiring. The wiring shall be continuous from point-to-point.
C. Terminals and connectors shall be installed with the compression tool recommended by the terminal Manufacturer.
D. Any control or signal wire landing on a screw terminal shall be terminated with a spade or loop connector.
E. All wire and cable shall be provided with a wire tag at each termination in accordance with the wire tagging requirements in the specification.
F. Terminals shall be installed such that there is a minimum of 2" clear space between the terminal strip and the wireway on both sides of the terminal; for ease of wiring.

3.2 CONTROL PANEL DESIGN & FABRICATION

3.2.1 GENERAL

A. Panels shall not be fabricated until Engineer has reviewed and approved the submittals or the integrator has written authorization from the Engineer to construct the panels. It shall be the integrator’s responsibility to inform the Engineer in writing if there are limited time constraints that need to be met to start the panel fabrication to meet contract deadlines.

3.2.2 GENERAL LAYOUT

A. Provide separate wire ways for field wiring and for internal wiring. Provide separate wireways for 120V and DC circuits. Mount PLC at top of control section, Mount digital input and output wireways and terminals on the left hand side and analog I/O terminals and wireways on the right side with power distribution down the middle of the control area. See drawings.

B. For control panels that contain motor control power equipment: In general the power distribution shall be located toward the left side of the cabinet and the PLC and other control components shall be separate and located in the right side of the cabinet. If power and controls are in the same cabinet, then provide at least 4" of separation between any 480V power wiring or components and the signal wireway, or provide a steel barrier between the power and controls sections.

C. If panel has intrinsic safe component area – provide space below the UPS in the center of the cabinet at the bottom.

3.2.3 OPERATING DEVICE LOCATION

A. Operating devices shall be mounted no higher than 6'- 4" and no lower than 4' - 0" above finished floor when panel is installed unless otherwise approved by the Engineer. Operating devices with displays (such as PLC interface, VFD interface, and power monitoring devices) shall be mounted so that the center of the display is between 4'-6" and 5'-0" above finished floor unless otherwise approved by the Engineer.

3.2.4 POWER COMPONENTS

1. Provide lockable breakers for all motor load circuits to meet NEC lockout tagout requirements.

2. Provide cabinet power disconnect / door interlocking mechanism as required by UL, NEC, and any other authority.

3. Provide service entrance rated breaker if required for the application.

4. Provide all individual motor starters and VFDs with their own electrically isolated 120V control power transformer (CPT) or 120V control power circuit derived from the load side of the motor starter circuit breaker. Control power
circuit for hand control shall be from the CPT so that motor load can be run manually when auto control power circuits have failed.

3.2.5 CONTROL CABINETS

1. Install PLC I/O card to terminal interface wiring with pre-manufactured, multi-conductor or bundled wire.
2. Install all terminals on 2” standoffs.
3. Terminals shall be installed to allow a minimum of 2” of clear space between the terminal and the wireway or any other components.
4. Coordinate terminals and wireway locations to account for the location of the conduit entrances into the cabinet.
5. Wire ways shall be 3” deep, width shall be chosen for the application.
6. Provide separate wire ways for internal and field wiring.
7. The UPS shall be din rail or shelf mounted – maintain at least 2” space between the bottom of the UPS and the bottom of the cabinet for field wiring.
8. Provide right angle connectors on cables if the cable connection prevents closing of access doors on equipment within the cabinet or on the control cabinet itself.

3.3 FACTORY TESTING & INSPECTION

A. Prior to delivery to the site, the power and control equipment: (control panels, MCCs, motor starters, VFDs etc.) shall be tested by the System Integrator, all control devices shall be operated and the cabinet shall be powered with rated incoming voltage for at least 2 days. Simulating equipment shall be provided and wired into the control cabinet system for this testing. The entire control system shall be interconnected as it will be installed in the field if the actual equipment is not available, then simulation equipment shall be provided to fully demonstrate the functionality of the system. The System Integrator shall test all functionality of the system and verify proper operation of the hardware and software.

B. Following the System Integrators testing, the power & control equipment shall be tested and inspected by the Design Engineer prior to shipment to the project site. The testing shall include, but not be limited to, operation of all input and output (I/O) points, control devices and motor controllers and demonstration of all control functions with the actual equipment or via a simulation. The System Integrator shall revise, modify, adjust the system as required by the Engineer during the testing period. The System Integrator shall inform and coordinate the time of the testing with the Engineer at least 4 weeks prior to the testing date.

C. The System Integrator shall provide working space, a 6 foot table and 2 office/desk chairs for the test Engineers.

3.4 RADIO PATH STUDY

A. City of Pacific radio path study is attached with the plans for reference information.
B. The system integrator shall provide a modified path study for the sites and antenna heights shown on the plans. Sites that show questionable results shall be tested with demo equipment prior to installation. Provide compass bearing direction for pointing each of the Yagi antennas.

C. The Integrator shall visually evaluate each site for obstructions such as tree clusters and buildings that may cause LOS issues and confirm antenna mount locations and antenna height above ground and coax length needed from modem to antenna.

D. The Integrator shall coordinate all mounting locations for antenna masts with the owner prior to installation and make suggestions for modifications.

3.5 STARTUP AND TESTING

A. All components of the control system shall be calibrated by the Manufacturer’s rep and the Integrator after completion of installation. Each component shall be adjusted to be within the Manufacturer’s required range and for the specific application.

B. Components that cannot be properly calibrated or that are found to exceed the Manufacturer's specified range or accuracy shall be removed and replaced at no additional cost to the Owner.

C. The control system shall be placed into operation by the Contractor and System Integrator.

D. All components shall be tested and recorded on check-off forms and shall be witnessed by the Engineer.

3.6 FIELD TESTING OF THE CONTROL SYSTEM

3.6.1 GENERAL

A. When the installation is substantially complete, the Contractor shall commence field testing of the control system. This shall determine that all system components connect up correctly to each other so that the system works as designed.

B. Field testing of the control system shall take place in 4 phases.
   1. Continuity Testing,
   2. I/O Testing,
   3. Program Testing

3.6.2 CONTINUITY TESTING

A. As equipment wiring is completed, the Contractor and Hardware Integrator shall perform a continuity test for every control to determine terminal to terminal continuity and verify all control and signal wiring is installed in accordance to the Hardware Integrators wiring diagrams.
3.6.3 I/O TESTING

A. The entire I&C system shall be I/O tested.

B. Prior to calling for I/O testing the Contractor shall:
   1. Complete the continuity testing.
   2. Label all wire at both ends.
   3. Submit all associated test and calibration forms (Instrument, motor, wire, etc.)
   4. Run all motors (in HAND) to verify correct operation and rotation
   5. Provide all equipment and instrument labels per spec.
   6. Test operation of “packaged sub systems”

C. Prior to any equipment to be put into automatic operation, every digital and analog input and output shall be tested for correct operation and witnessed by the Electrical Engineer. The contractor shall provide a set of the PLC Card drawings and instrument and control wiring diagrams on 81/2x11” sheets for a check-off list of all inputs and outputs. If a point cannot be verified within 5 minutes of starting the check that point shall be noted as a punch list item to be corrected and re-tested at a later time.

D. Definition: Successfully I/O Tested. A piece of equipment of system shall be considered “successfully I/O tested” when all of the I/O for that equipment has been tested and verified by both the programmer and the Electrical Engineer and checked off of the wiring diagrams or PLC I/O card drawings. Note: The Electrical Engineer must witness and verify all I/O testing.

E. Once all I/O associated with a piece of equipment of system has been successfully tested, then the equipment or system will be deemed ready for program testing.

F. INPUTS:
   1. The Contractor shall simulate an actual field condition whenever possible to provide both the digital and analog signal inputs into the PLC and these will be verified by the programmers. Where an actual field simulation is not practical, then the Contractor shall jumper the digital inputs at a point closest to the field device as possible and shall use an analog loop simulator for analog inputs.
   2. Analog inputs shall be tested at 0, 25%, 50%, and 100% of full range.

G. OUTPUTS:
   1. The programmer will simulate outputs from the PLC and the Contractor shall verify the field operation of the output. The field operation verification shall be by actual operation of equipment when possible. When actual field operation of equipment is not practical for verification, then the Contractor shall use volt and amp metering to verify digital and signal outputs.
   2. Analog outputs shall be tested at 0, 25%, 50%, and 100% of full range.

3.6.4 PROGRAM TESTING

A. The Contractor and Integrator shall provide field support to the programmer for testing of the program. The Contractor shall provide field simulation of equipment
as needed by the programmer to test all monitoring and alarm functions of the programming. The Contractor and Integrator shall anticipate that the program testing will require up to a total of 24 hours of field support time for this project. The cost for this time shall be included in the bid.

3.6.5 **SYSTEM VALIDATION TESTING**

A. After the program testing is complete, validation testing shall be by the Hardware and Software Engineer and Contractor, with the Owner and Engineer present. Validation testing shall include operation and verification of all control components and features of the entire control system.

B. The Contractor shall simulate various field conditions to test all control operations, monitoring and alarms for all systems and equipment.

C. The Contractor shall inform the Engineer of the testing schedule at least one week prior to the commencement of testing. Validation testing shall be considered complete when the Owner and Engineer have determined that all of the original system requirements have been met.

D. The System Integrator shall revise, modify, adjust the system as required during and following start-up to provide the operation required by the contract documents.

E. Note: the Engineer shall not be called out by the Contractor for validation testing on equipment until all components are installed, all wiring points have been checked, and operation has been tested and verified by the Contractor.

3.7 **COMMISSIONING**

A. Once all systems have passed validation testing, then the facility will be operated for 2 weeks or time period as determined in the documents to verify all component and system operations prior to final acceptance.

3.8 **SYSTEM MAINTENANCE**

A. The System Integrator shall be responsible for maintenance of the system from time of start-up to the date of acceptance, by formal action of the Owner, of all work under the contract. The System Integrator shall correct deficiencies and defects and make any and all repairs, replacements, modifications, and adjustments as malfunctions or failures occur. The System Integrator shall perform all such work required or considered to be required by the Owner to cause and maintain proper operation of the system and to properly maintain the system.

3.9 **SERVICES OF SYSTEM INTEGRATOR**

A. General: An authorized service representative of the control panel System Integrator shall be present at the Site for 6 days to furnish the services listed below. For the purpose of this paragraph, a Day is defined as a 5 hour period excluding travel time.
B. Inspection, Startup, Field Adjustment: The authorized service representative shall supervise the following and certify the equipment and controls have been properly installed, aligned, and readied for operation.

1. Installation of the equipment
2. Inspection, checking, and adjusting the equipment
3. Startup and field testing for proper operation
4. Performing field adjustments such that the equipment installation and operation comply with requirements.

C. Instruction of Owner’s Personnel: The authorized representative shall instruct the Owner’s personnel in the operation and maintenance of the equipment, including step by step troubleshooting with test equipment. Instruction shall be specific to the equipment models provided. Training shall be scheduled a minimum of 2 weeks in advance of the first session. Training shall include individual two sessions for 2 shifts of plant personnel (2 hours for each session).

D. Proposed training materials shall be submitted for review, and comments shall be incorporated. Training materials shall remain with the trainees. The Owner may videotape the training for later use with the Owner’s personnel. The Hardware Integrator shall conduct specifically organized training sessions in operation and maintenance of the control system for personnel employed by the Owner. The training sessions shall be conducted to educate and train the personnel in maintenance and operation of all components of the control system. Training shall include, but not be limited to, the following:

1. Preventative maintenance procedures
2. Trouble-shooting
3. Calibration
4. Testing
5. Replacement of components
6. Automatic mode operation
7. Manual mode operation

3.10 OPERATION AND MAINTENANCE DATA

A. The System Integrator shall prepare and assemble detailed operation and maintenance manuals in accordance with the project general requirements. The manuals shall include, but not be limited to, the following:

1. Preventative maintenance procedures
2. Trouble-shooting
3. Calibration
4. Testing
5. Replacement of components
6. Automatic mode operation
7. Manual mode operation
8. System schematics / shop drawings
9. Electronic copy on CD ROM of all shop drawings in AutoCAD version 2000 or newer
10. As-built wiring diagrams of cabinet and enclosure contained assemblies
11. Catalog data and complete parts list for all equipment and control devices
12. Listing of recommended spare parts
13. Listing of recommended maintenance tools and equipment.

B. 2 copies of the entire O&M manual shall be provided.
C. 6 copies of the entire O&M manual shall be provided in electronic PDF format on CD ROMs.

3.11 RECORD DRAWINGS

A. The System Integrator shall be responsible to provide a clean and neatly marked up set of record drawings showing any changes from the submittal and contract drawings. These drawings shall be provided prior to final approval of the project and release of the retainage.

PART 4  WIRING DIAGRAM EXAMPLES

4.1 GENERAL

A. The wiring diagrams shall be drawn and submitted in accordance with the following example drawings. These drawings are for drawing formatting reference only and do not necessarily have any actual application to the facility control system.

4.2 EQUIPMENT WIRING DIAGRAMS (LOOP DWGS)

A. Provide one page wiring diagram for each motor / equipment load showing all of the control wiring associated with that load. Drawing shall show the motor control center wiring, field wiring, PLC I/O, and control panel wiring all on one sheet; complete with terminal numbers and wire numbers. Include PLC Card information rack and slot and I/O designation for each point.

4.3 INSTRUMENT WIRING DIAGRAMS (LOOP DWGS)

A. Show all wiring associated with each instrument on one page – including power supply location and signal wiring. Show all terminals numbers and wire numbers. Designate boundaries between field and control panels and etc.

4.4 NETWORK DIAGRAM

A. Provide detailed drawings showing all of the components of the communications network – include all terminals and wire numbering. Designate equipment locations.
4.5 PLC I/O CARD DRAWINGS

A. Provide I/O card drawings for all PLC I/O cards per the example drawing. Drawings shall show details specific to each I/O card, name of each input or output, reference drawing number for associated EQUIPMENT AND INSTRUMENT WIRING DIAGRAM, card number, slot number, control panel terminal and wire numbers, etc.

END OF SECTION

ATTACHMENT: EXAMPLE DRAWINGS #1 TO 7
**Figure 1: Detail Wiring Diagrams**

**Example PIC CARO**

- **NOTE:** This diagram is for illustrative purposes only. Actual wiring and connections will vary. Always refer to the manufacturer's specifications for correct installation.

---

**Detailed Notes:**

- **Input/Output Channel Address:**
  - **Plc Slot:**
    - **XX:**

- **Internal Transformer Connections:**
  - **Primary:**
  - **Secondary:**

- **Terminal Configuration:**
  - **Port A:**
  - **Port B:**

- **Typical Connections:**
  - **Connection 1:**
  - **Connection 2:**

---

**Revision History:**

- **Version 1.0:** Initial release
- **Version 1.1:** Updated connections

---

**Technical Specifications:**

- **Model:**
- **Serial Number:**
- **Manufacturer:**

---

**Contact Information:**

- **Customer Support:**
- **Technical Support:**

---

**Disclaimer:**

This diagram is for illustrative purposes only. Actual wiring and connections will vary. Always refer to the manufacturer's specifications for correct installation.
Contract Drawings
HEADQUARTERS OPERATIONS
CONTROL RM

SCADA UPS

NOTES:
1. SCADA (TELEMETRY PANEL) AUTOMETER, CELL ANTENNAS, ARE
   MOUNTED BY THE CONTRACTOR AND SHALL INCLUDE ALL WIRING
   AND CONNECTORS AND CABLES. THE SCADA MONITOR IS INCLUDED AND
   MOUNTED IN PLACE AND PLACED IN A POWER AND
   COMMUNICATIONS PANEL AND RACKAGE.
2. WALL MOUNT (2) 120V POWER CIRCUIT SELECTED FOR DISPLAY OF
   SIGNALS/ALERTS AND THE SCADA MONITOR AS WILL BE ALIGNED
   ALONG THE WALL. NOTE: ALL ELECTRICAL MOUNTING HARDWARE
   AND CONDUIT FOR ADHERES.
3. PROVIDE WAVE SYSTEM FOR CABLES. SNAKE RAY (M-607-3-8) OR
   90.
4. WALL MOUNT POWERED 110V WAVE CIRCUIT. EXTEND CIRCUIT
   ON PLATE TO MOUNT IN SCADA.
5. INSTALL AUTOMETER WITH POWER CIRCUIT TO THE SCADA UPS
   AND CONTROL ROOM TO THE MONITOR.
NOTES:
- PROVIDE RELAY OUTPUT CARD IN THE MTU AT THE HEADQUARTERS. PROVIDE TERMINALS FOR 10 RELAY OUTPUTS FOR INTERFACES TO AUTODIALER.
- AUTODIALER IS PT CALL BASED - RACK MOUNTED - WALL MOUNTED SEPARATELY FROM THE MTU.
- CONFIGURE AUTODIALER TO DIAL AN ALARM UPON LOSS OF INPUT POWER.

MASTER TELEMETRY PANEL - AUTODIALER
GENERAL NOTES:

1. REPLACE THE EXISTING AN ALG. DAS PLS AND ALL U/V CARS WITH AN IN-MOUNT LINER TEE. INSTALLING ALL U/V WITH THE SYSTEM PRODUCED.

2. PROVIDE A 1/2 RINGS IN THE NEW PLS TO MATCH ALL OF THE EXISTING. PROVIDE SPACE TO NOT AT MOUNT AN ADDITIONAL SIZE SHOWN IN CARS.

3. REPLACE THE EXISTING PLC, PANEL, SHEET, PANEL, RELAY, ANTENNA, ANVAN MAIN, PREFERENCES, AND ALL ASSOCIATED BOXES AND CABLES. THE EXISTING PLC/UTO M-match ONLY MAY BE RELOCATED IF IT WILL MATCH TO THE NEW U/UTO CARS TERMINALS.

4. USE WHEN I/C INSTALLS SUB MODULES AS NECESSARY TO MAINTAIN SLOT ADDRESSING CONFIGURATION / U/UTO ADDRESSING.

FOLLETT ENGINEERING

100 3RD AVE SE, PACIFIC WA 98847

MARCH 2019

WELL SITE MCP-200

NETWORK DIAGRAM
<table>
<thead>
<tr>
<th>LOAD DESCRIPTION</th>
<th>No.</th>
<th>KVA</th>
<th>No.</th>
<th>KVA</th>
<th>No.</th>
<th>KVA</th>
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**TOTAL**

**KVA SUB-TOTAL:** 11 KVA 12 KVA 11

**AMPS @ 240V, 1P:** 46 AMPS 50 AMPS 46

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<th>No.</th>
<th>KVA</th>
<th>No.</th>
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**TOTAL**

**KVA SUB-TOTAL:** 17 KVA 19 KVA 17

**AMPS @ 240V, 1P:** 71 AMPS 78 AMPS 71

**SERVICE LOAD GENERATOR LOAD**

**DESIGN TOTAL GEN TOTAL**

**LOAD CALCULATIONS (CURRENT)**

**TRIP**

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</table>

**FOLLETT ENGINEERING TOTAL KVA = 1.7**

**AMPS @ 240V, 1 PHASE = 7.1**
GENERAL NOTES:
1. LAYOUT OF COFFERED ROOM IS GENERAL IN NATURE - SUBJECT TO BE ADJUSTED TO FIT THE ACTUAL CONDITIONS. THE CURTAIN WALL SCREENS ARE TO BE A MINIMUM OF 30" IN LINEAR SIZE. LUMINARIES SHALL FOLLOW THE CURTAINlichkeit TO FIRE MINIMUM SIZE.
2. GUTTER EXCLUDER SHALL BE A COMBINATION OF STAINLESS STEEL OR ALUMINUM, STAINLESS STEEL GUTTER. GUTTER EXCLUDER SHALL BE A MINIMUM OF 30" IN LINEAR SIZE, STAINLESS STEEL GUTTER. GUTTER EXCLUDER SHALL BE A MINIMUM OF 30" IN LINEAR SIZE, STAINLESS STEEL GUTTER.
3. PROVIDE EXCLUDER SHALL BE A COMBINATION OF STAINLESS STEEL OR ALUMINUM, STAINLESS STEEL GUTTER. GUTTER EXCLUDER SHALL BE A MINIMUM OF 30" IN LINEAR SIZE, STAINLESS STEEL GUTTER.
4. PROVIDE RACKS AND RODS ARE SUPPLY PUMP WITH THERMOSTAT. SUPPLY PUMP SHALL BE CAPABLE OF A JOURNAL OF 12 AIR STAGES PER HOUR.
5. PROVIDE SHOP TEST OF HYDRAULIC SYSTEM FOLLOWING REQUIREMENTS.

CEMAD GLEN
ELECTRICAL EQUIPMENT CABINET (EEC)
EXTERNAL VIEW NTS
**DUTY HP KVA DUTY LOAD DESCRIPTION NO. KVA NO. KVA NO. KVA**

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**TOTAL**

KVA SUB-TOTAL 11 KVA 12 KVA 11

AMPS @ 240V, 1P 46 AMPS 50 AMPS 46

---

**SERVICE LOAD GENERATOR LOAD**

<table>
<thead>
<tr>
<th>LOAD DESCRIPTION</th>
<th>NO. LOAD DESCRIPTION</th>
<th>TRIP</th>
<th>AMPS</th>
</tr>
</thead>
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<td>SPACE</td>
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<tr>
<td>SPARE</td>
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<td>SPACE</td>
</tr>
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**FOLLETT ENGINEERING**

TOTAL KVA = 1.7

425-765-6304 AMPS @ 240V, 1 PHASE = 7.1

---

**PANEL SCHEDULE**

<table>
<thead>
<tr>
<th>PANEL NO.</th>
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<th>DESCRIPTION</th>
<th>AMP @ 240V, 1 PHASE</th>
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<td>A</td>
<td>NEW PUMP STATION</td>
<td>240/120V, 1PHASE WITH 60AMP MAIN BREAKER</td>
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</table>

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**NOTES:**

1. Use recommended starter equipment, etc. as per manufacturer recommendations and NEC.
2. Use standard breakers for equipment and installation. Consider the equipment's current requirements and NEC.
3. Provide water seal on any raceways for 240v, 1 phase equipment. Ensure water seals around all cable terminations.
4. Wet well and valve vault are hazardous areas. Provide ventilation and proper sealing in accordance with the NEC.
5. Do not connect any equipment into wet well of valve vault. Use only steel.
CONSTRUCTION NOTES:

1. PROVIDE ONE 5 AMP FUSE FOR EACH INPUT TO THE FUSIBLE TERMINAL BLOCKS FOR EACH GEAR AND EACH FUSE BLOCK, PLUS ONE 5 AMP FUSE FOR EACH OUTPUT TO THE FUSIBLE TERMINAL BLOCKS FOR EACH GEAR AND EACH FUSE BLOCK.

2. PROVIDE ONE 5 AMP FUSE FOR EACH FUSE BLOCK PLUS ONE 5 AMP FUSE FOR EACH OUTPUT TO THE FUSIBLE TERMINAL BLOCKS FOR EACH GEAR AND EACH FUSE BLOCK.

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49. PROVIDE ONE 5 AMP FUSE FOR EACH FUSE BLOCK PLUS ONE 5 AMP FUSE FOR EACH OUTPUT TO THE FUSIBLE TERMINAL BLOCKS FOR EACH GEAR AND EACH FUSE BLOCK.

50. PROVIDE ONE 5 AMP FUSE FOR EACH FUSE BLOCK PLUS ONE 5 AMP FUSE FOR EACH OUTPUT TO THE FUSIBLE TERMINAL BLOCKS FOR EACH GEAR AND EACH FUSE BLOCK.
**Key Notes:**

1. **Power Fail shall be a supervised circuit - contact power fail field on panel for service.**
2. **Power Fail from telemetry panel for the leak transmitter.**
3. **Leak transmitter on man level float to pump.**
4. **System shall be capable of initiating the system at any level alarm during a steady power failure.**
5. **Do not use the same ground for the Fleming and auxiliary control panel.**
6. **System shall be capable of initiating the system at any level alarm during a steady power failure.**
7. **Preferred relay in an intermediate relay panel.**
8. **Preferred control relay control panel for the dry contact.**
9. **Preferred control panel as shown.**
10. **All panels shall be labeled and marked as necessary for the functioning panel system.**
GENERAL NOTES:
1. Layout of control panel is general in nature; specific layout to be determined by the system integrator and detail of all elements shown. The control panel is 32" high x 24" wide. Information shall specify the cabinet if necessary to fit the required components.
2. Cover enclosure shall be fabricated from stainless steel or aluminum, stainless steel preferred. Mfg's may utilize galvanized steel for all covers (except 50/50 SS/AL) in order to maintain aesthetics.
3. Cover enclosure shall be made of aluminum or pressurized steel, with epoxy paint.
4. Provide heater and forced air supply fan with thermostat. Supply fan shall be capable of a minimum of 20 CFM changed per hour.
5. Provide dump test of entire system including telemetry.

THORNTON
ELECTRICAL CONTROL PANEL (FCP)
EXTERNAL VIEW INTS

FOLLETT ENGINEERING
ELECTRICAL ENGINEERING & CONSULTING
100 3RD AVE SE, PACIFIC WA 98047
MARCH 2019

CITY OF PACIFIC
SCADA / TELEMETRY UPGRADE
THORNTON PS
EPC ELEVATION & DETAILS

DESIGNER
DRAFTSPERSON
CHECKED
DRAWN
DATE
PROJECT
REV
PAGE

CITY OF PACIFIC
100 3RD AVE SE, PACIFIC WA 98047
Appendix A:

Washington State

Prevailing Wage Rates
# Prevailing Wage Rates for King County

<table>
<thead>
<tr>
<th>County</th>
<th>Trade</th>
<th>Job Classification</th>
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<th>Overtime</th>
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<tr>
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<td>Electronic Technicians</td>
<td>Journey Level</td>
<td>$50.57</td>
<td>7E</td>
<td>1E</td>
<td></td>
</tr>
</tbody>
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Appendix B:

Record Drawings and Project Photos
SITE 3 - RECORD DRAWING
EXISTING WELL SITE
MCP-200

NOTES:
1. SIZE DRAWING 1-2 FOR CONTROL SYSTEM AND COMMUNICATIONS PANEL.
2. MCP EXTERIOR AND INTERIOR MOUNTED DEVICES ARE NOT TO SCALE.
EXISTING WATER SITE PLCs

NOTES:
- Place 1746-12D cards into each blank slot.

REMOVE THE EXISTING PLC & I/O CARDS AT THE BOOSTER STATION AND REPLACE WITH COMPACT LOGIX PLC.

REM Exhaust the EXISTING PLC & I/O CARDS AT THE WELL FIELD SITE AND REPLACE WITH COMPACT LOGIX PLC.

SITES 2 & 3 - RECORD DRAWING MCP-100, MCP-200
EXISTING ALLEN BRADLEY SLC 5/05 IN MCP-100

RESERVOIR SITE
EXISTING ALLEN BRADLEY SLC 5/05 IN MCP-200

WELL SITE

WELL SITE - MCP-200
Existing Control Panel

Wet well with submersible pumps

Fence to be relocated by the City to make space for the EEC

Pacif, Washington

Google, Inc.

Street View - May 2012

SITE 5
CEDAR GLEN PS

https://www.google.com/maps/@47.2588518,-122.2530093,3a,34.8y,171.81h,73.79t/data=!3m6!1e1!3m4!1sTC2SnpC64232p1574qw5Qw!2e0!7i13312!8i6656