SECTION 00 01 01

PROJECT TITLE PAGE

PORT OF TACOMA
TACOMA, WASHINGTON
NORTH LEAD RAIL IMPROVEMENTS

PROJECT NO. 092938
CONTRACT NO. 070164

Thais Howard, P.E.

Director, Engineering

Carol Rhodes

Senior Project Manager

END OF PROJECT TITLE PAGE

PORT OF TACOMA NORTH LEAD RAIL

The undersigned Engineer of Record hereby certifies that the Technical Specifications for the following portions of this project for the Bid Submittal of the Port of Tacoma North Lead Rail Project were written by me, or under my direct supervision, and that I am duly registered under the laws of the State of Washington, and hereby affix my Professional Seal and signature. Those sections prepared under my direct supervision and being certified by my seal and signature below are as follows:

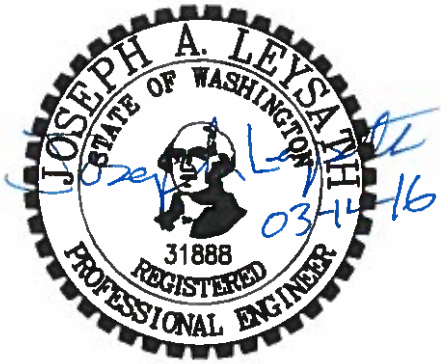
- Section 02 41 13 Selective Site Demolition
- Section 03 11 00 Concrete Forming
- Section 03 20 00 Concrete Reinforcing
- Section 03 30 00 Cast in Place Concrete
- Section 31 00 00 Earthwork
- Section 31 23 19 Dewatering
- Section 31 23 33 Trenching and Backfilling
- Section 31 41 00 Shoring and Underpinning
- Section 32 11 23 Aggregate Base Courses
- Section 32 11 24 Aggregate Recycled Base Courses
- Section 32 12 16 Asphalt Paving
- Section 32 31 13 Chain Link Fence and Gates
- Section 33 40 00 Storm Drainage Utilities
- Section 33 44 19 Storm Water Treatment
- Section 34 05 17 Railroad Work
- Section 34 11 16 Field Welding
- Section 34 11 23 Special Trackwork
- Section 34 11 32 Timber Ties

The undersigned hereby certifies that the Division 22 Technical Specifications in this Project Manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my "Professional Seal".

Wood Harbinger, Inc.
Steven A. Grayson, PE

The undersigned hereby certifies that the Division 26 Technical Specifications in this Project Manual were prepared by me or under my direct supervision, and that I am duly registered under the laws of the State of Washington and hereby affix my "Professional Seal".

Wood Harbinger, Inc.
Joseph A. Leysath, PE



END OF DOCUMENT

PROCUREMENT AND CONTRACTING REQUIREMENTS

SPECIFICATIONS

END OF SECTION

THE PORT OF TACOMA IS CURRENTLY ACCEPTING SEALED BIDS FOR CONSTRUCTION OF THE FOLLOWING:

NORTH LEAD RAIL IMPROVEMENTS

PROJECT NO. 092938 | CONTRACT NO. 070164

Scope of Work: The work required for this project includes reconfiguration of the rail yard and construction of 2 long interrmodal tracks including 12,300 feet of track, 9 cross-overs and 25 turnouts. Work includes select demolition, earthwork, asphalt paving, relocation of electrical and communication utilities, light relocations, fencing, installation of an arch culvert, storm drainage, storm filter catch basins and modular wetland treatment systems.

Bid Estimate: The Engineers estimate is $8,100,000 – $9,000,000, plus Washington State Sales Tax (WSST).

Sealed Bid Date/Time/ Location: Bids will be received at the Front Reception Desk, Port Administration Office, One Sitcum Plaza, Tacoma, Washington until **2:00 P.M. on May 12, 2016,** at which time they will be publicly opened and read aloud.

Pre-bid Conference and Site Tour: A pre-bid conference and site visit have been set for **April 26, 2016 at 10:00 AM**. The site visit will convene at the Port's Administrative building, located at One Sitcum Plaza.

Bidding Security: Each bid must be accompanied by a Certified Check or Bid Security Bond in an amount equal to five (5%) percent of the bid.

Contact Information: All questions are to be put into writing to the Port at procurement@portoftacoma.com. No oral answers will be binding by the Port.

Bidding Documents: Plans, Specifications, Addenda, and Plan Holders List for this project are available on-line through The Port of Tacoma's Website http://portoftacoma.com/. Click on "Contracts"; "Procurement", and then the Procurement Number (070164). Bidders must subscribe to the Holder's List on the right hand side of the screen in order to receive automatic email notification of future addenda and to be placed on the Holder's List.

Contact Jana Prince at procurement@portoftacoma.com with questions. Holders Lists will be updated regularly. Additional Instructions available in 00 21 00 - Instructions to Bidders.

END OF SECTION

PART 1 - SUMMARY

1.01 DEFINITIONS

All definitions set forth in the Agreement, the General Conditions of the Contract for Construction and in other Contract Documents are applicable to the Bidding Documents.

A. "Addenda" are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections. The contents of an Addendum are issued in no particular order and therefore should be carefully and completely reviewed.

B. "Award" means the formal decision by the Port of Tacoma (“Port”) notifying a Responsible Bidder with the lowest responsive Bid of the Port’s acceptance of the Bid and intent to enter into a Contract with the Bidder.

C. The “Award Requirements” include the statutory requirements as a condition precedent to Award.

D. The “Base Bid” is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base to which work may be added or from which work may be deleted for sums stated in Alternate Bids.

E. A “Bid” is a complete and properly signed proposal to do the Work, submitted in accordance with the Bidding Documents, for the sums therein stipulated and supported by any data called for by the Bidding Documents.

F. The “Bid Date” is the day and hour specified in the Bidding Documents, as may be changed through an Addendum, by which Bidders are required to submit Bids to the Port.

G. The “Bid Form” is the form(s) included with the Bidding Documents, with Specification Section 00 41 00, through which a Bidder submits a Bid.

H. A “Bidder” is a person or entity who submits a Bid.

I. The “Bidding Documents” include the Advertisement or Invitation to Bid, Instructions to Bidders, the Bid Form, any other sample bidding and contract forms, the Bid Bond, and the proposed Contract Documents, including any Addenda issued prior to the Bid Date.

J. The “Contract Documents” proposed for the Work consist of the Agreement, the General Conditions of the Contract (as well as any Supplemental, Special or other Conditions included in the project manual), the Drawings, the Specifications, and all Addenda issued prior to, and all modifications issued after, execution of the Contract.

K. The “Schedule of Unit Prices” is a separate schedule on the Bid Form for Unit Pricing as an all-inclusive price per unit of measurement for materials, equipment or services as described in the Bidding Documents or in the proposed Contract Documents for the optional use of the Port. Quantities are not predictions of amounts anticipated. The Port may but is not obligated to accept a Schedule of Unit Price if it accepts the Base Bid .The Schedule of Unit Prices are not factored into the evaluation of determining the low bid amount and are not included as part of the bid award amount.

L. A “Sub-Bidder” is a person or entity of any tier who submits a bid or proposal to or through the Bidder for materials, equipment or labor for a portion of the Work.

1.02 BIDDER’S REPRESENTATIONS

By making its Bid, each Bidder represents that:

A. BIDDING DOCUMENTS. The Bidder has read and understands the Bidding Documents, and its Bid is made in accordance with them.

B. PRE-BID MEETING. The Bidder has attended pre-Bid meeting(s) required by the Bidding Documents. Attendance at a mandatory meeting or training session means that, in the sole opinion of the Port, a Project representative of a prospective Bidder has attended all or substantially all of such meeting or session.

C. BASIS. Its Bid is based upon the materials, systems, services, and equipment required by the Bidding Documents, and is made without exception.

D. EXAMINATION. The Bidder has carefully examined and understands the Bidding Documents, the Contract Documents (including, but not limited to, any liquidated damages and insurance provisions), and the Project site, including any existing buildings, it has familiarized itself with the local conditions under which the Work is to be performed and has correlated its observations with the requirements of the proposed Contract Documents and it has satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished, and all other requirements of the Contract Documents. The Bidder has also satisfied itself as to the conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof, including but not limited to those conditions and matters affecting: transportation, access, disposal, handling and storage of materials, equipment and other items; availability and quality of labor, water, electric power and utilities; availability and condition of roads; climatic conditions and seasons; physical conditions at the Project site and the surrounding locality; topography and ground surface conditions; and equipment and facilities needed preliminary to and at all times during the performance of the Work. The failure of the Bidder fully to acquaint itself with any applicable condition or matter shall not in any way relieve the Bidder from the responsibility for performing the Work in accordance with, and for the Contract Sum and within the Contract Time provided for in, the Contract Documents.

E. PROJECT MANUAL. The Bidder has checked its copies of the project manual (if any) with the table of contents bound therein to ensure the project manual is complete.

F. SEPARATE WORK. The Bidder has examined and coordinated all Drawings, Contract Documents, and Specifications with any other contracts to be awarded separately from, but in connection with, the Work being Bid upon, so that the Bidder is fully informed as to conditions affecting the Work under the Contract being Bid upon.

G. LICENSE REQUIREMENTS. Bidders and Sub-Bidders shall be registered and shall hold such licenses as may be required by the laws of Washington, including a certificate of registration in compliance with RCW 18.27, for the performance of the Work specified in the Contract Documents.

H. NO EXCEPTIONS. Bids must be based upon the materials, systems and equipment described and required by the Bidding Documents, without exception.

1.03 BIDDING DOCUMENTS

A. COPIES

1. Bidding Documents. Bidders may obtain complete sets of the Bidding Documents from the Port's website at www.portoftacoma.com then 'Contracts' 'Procurement' and then find the project number and title.

2. **Holder's List**. Subscribe to the Holder's List for this procurement by clicking on the 'Holder's List' icon then typing in the contact email address to receive updates and clicking 'Submit'. Following the Submit, a screen will come up to verify subscription. From there, select 'Subscriber Preferences' and then 'Questions' (the 3rd tab). Fill out all information in the questions section and the select 'Submit' and this will complete the registration to the Port's Holder's List for this procurement. Step by Step directions are available at: http://portoftacoma.com/contracts/procurement.

3. Complete Sets. Bidders shall use complete sets of Bidding Documents in preparing Bids and are solely responsible for obtaining updated information. The Port does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete and/or superseded sets of Bidding Documents.

4. Conditions. The Port makes copies of the Bidding Documents available only for the purpose of obtaining Bids on the Work and does not confer a license or grant permission for any other use.

5. Legible Documents. To the extent any Drawings, Specifications, or other Bidding Documents are not legible, it is the Bidder's responsibility to obtain legible documents.

B. INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

1. Format. The Contract Documents are divided into parts, divisions, and sections for convenient organization and reference. Generally, there has been no attempt to divide the Specification sections into Work performed by the various building trades, any Work by separate contractors, or any Work required for separate facilities in or phases of the Project.

2. Duty to Notify. Bidders shall promptly notify the Port in writing of any ambiguity, inconsistency, or error that they may discover upon examination of the Bidding Documents or of the site and local conditions.

3. Products and Installation. All Bidders shall thoroughly familiarize themselves with specified products and installation procedures and submit to the Port any objections (in writing) no later than seven (7) days prior to the Bid Date. The submittal of the Bid constitutes acceptance of products and procedures specified as sufficient, adequate, and satisfactory for completion of the Contract.

4. Written Request. Bidders requiring clarification or interpretation of the Bidding Documents shall make a written email request to procurement@portoftacoma.com at least **seven (7) days prior to the Bid Date**.

5. **Request to Modify Responsibility Criteria.** No later than **ten (10) days** prior to the Bid Date, a potential Bidder may request in writing that the Port modify the Responsibility Criteria. The Port will evaluate the information submitted by the potential Bidder and respond before the Bid Date. If the evaluation results in a change of the Criteria, the Port will issue an Addendum identifying the new Criteria.

6. Addenda. The Bidder shall not rely on oral information provided at any pre-Bid meetings or during site visits. Verbal statements made by representatives of the Port are for informational purposes only. Any interpretation, correction or change of the Bidding Documents will be made solely by written Addendum. Interpretations, corrections or changes of the Bidding Documents made in any manner other than by written Addendum, including but not limited to oral statements, will not be binding, and Bidders shall not rely upon such statements, interpretations, corrections or changes. The Port is not responsible for explanations or interpretations of the Bidding Documents other than in a written Addendum.
7. Site Visits. Any site visits are provided as a courtesy to potential Bidders to assist them in becoming familiar with the Project site conditions. However, only the Bidding Documents, including any issued Addenda, may be relied upon by Bidders. Work areas to be examined during the site visit may contain hazardous materials or conditions. Attendees should review the information and safety precautions set forth in the Contract Documents to determine for themselves appropriate protective clothing or equipment. Attendees further agree to indemnify and hold the Port harmless from any and all claims of personal injury arising from their participation in the site visit.
8. Singular References. Reference in the singular to an article, device, or piece of equipment shall include as many of such articles, devices, or pieces as are indicated in the Contract Documents or as are required to complete the installation.
9. Utilities and Runs. The Bidder should assume that the exact locations of any underground or hidden utilities, underground fuel tanks, and plumbing and electrical runs may be somewhat different from any location indicated in the surveys or Contract Documents.

C. SUBSTITUTIONS

1. For substitutions during bidding, refer to Section 00 26 00 – Substitution Procedures During Bidding.

D. ADDENDA

1. Distribution. All Addenda will be written and will be posted to the Port's project website for this bid: www.portoftacoma.com, then under 'Contracts', 'Procurement' and then select the Contract Number (070136). **Only those who have signed up for the Holder's List through the Port's website will get the automatic emails when new project information is posted for this procurement.**
2. Copies. Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
3. Verification and Acknowledgment of Receipt. Prior to submitting a Bid, each Bidder shall ascertain that it has received all Addenda issued. Each Bidder shall acknowledge its receipt and consideration of all Addenda in its Bid.

1.04 BIDDING PROCEDURE

A. FORM AND STYLE OF BIDS

1. Form. Bids (including required attachments) shall be submitted on forms identical to the Bid Form included with the Bidding Documents. No oral, email, or telephonic responses or modifications will be considered.
2. Entries on the Bid Form. All blanks on the Bid Form shall be filled in by typewriter, printer, or manually in ink.

3. Figures. All sums shall be expressed in figures, not words. Portions of the Bid Form may require the addition or multiplication of components bids to a total or the identification of component amounts within a total. In case of discrepancy between unit prices listed and their sum(s), the unit prices listed shall govern (rather than the sum).
4. Initial Changes. Any interlineation, alteration or erasure shall be initialed by an authorized representative of the Bidder.
5. Bid Breakdown. The Bid Form may contain, for the Port's accounting purposes only, a breakdown of some or all of the components included in the Base Bid.
    a. For lump sum bids the total Contract Sum shall be submitted.
    b. For unit price bids a price shall be submitted for each item of the Work, an extension thereof, and, if requested, the total Contract Sum.
6. No Conditions. The Bidder shall make no conditions or stipulations on the Bid Form nor qualify its Bid in any manner.
7. Identity of Bidder. The Bidder shall include in the specified location on the Bid Form the legal name of the Bidder and, if requested, a description of the Bidder as a sole proprietor, a partnership, a joint venture, a corporation, or another described form of legal entity. The Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. The Port verifies signature authority on the Labor and Industries website https://fortress.wa.gov/lni/bbip/Search.aspx under the contractor registration business owner information. If the business owner information is not current the bidder shall show proof of authority to sign at the request of the Port. A Bid submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Bidder
8. Bid Amounts Do Not Include Sales Tax. The Work to be performed constitutes a "retail sale" as this term is defined in RCW 82.04.050. Thus, the Base Bid amount shall include in the sum stated all taxes imposed by law, EXCEPT WASHINGTON STATE AND LOCAL SALES TAX. The engaged Contractor will pay retail sales tax on all consumables used during the performance of the Work and on all items that are not incorporated into the final Work; this tax shall be included in the Base Bid price and in any other prices set forth on the Bid Form. The Port will pay state and local retail sales tax on each progress payment and final payment to the engaged Contractor for transmittal by the Contractor to the Washington State Department of Revenue or to the applicable local government.

B. POTENTIAL LISTING OF SUB-BIDDERS (SUBCONTRACTORS)

1. Procedure. On certain projects of the Port, the Bid Form includes a requirement that certain Sub-Bidders be listed, in which case the Bidder must complete the required list. In these circumstances, and regardless of the anticipated cost of the Project, the Bidder must name the Sub-Bidder or Sub-Bidders with whom the Bidder, if Awarded the Contract, will subcontract directly (i.e., not lower-tier Sub-Bidders) for performance of the Work of:
    a. HVAC (heating, ventilation and air conditioning) Work,
    b. plumbing Work as described in RCW 18.106,
    c. electrical Work as described in RCW 19.28, and
    d. any other categories of Work listed on the Sub-Bidder listing form and/or Bid Form.
        1) SELF-PERFORMANCE: If the Bidder intends to self-perform any of these categories of Work, it must name itself for each such category of Work.

2) MULTIPLE ENTRIES: The Bidder shall not list more than one (1) entity for a particular category of Work identified, unless a Sub-Bidder will vary based on an Alternate Bid, in which case the Bidder shall identify the Sub-Bidder to be used for the Alternate and the affected portion of the Work.

2. Failure to Submit. In accordance with RCW 39.30.060, failure of a Bidder to submit as part of the Bid the names of such proposed HVAC, plumbing, and electrical Sub-Bidders or to name itself to perform such Work or the naming of two or more Sub-Bidders to perform the same Work shall render the Bidder's Bid non-responsive and, therefore, void.

3. Requirement to Subcontract. The Bidder, if Awarded the Contract, will subcontract with the listed Sub-Bidders for performance of the portion of the Work designated on the Bid Form, subject to the provisions of the Contract for Construction and RCW 39.30.060. The Bidder shall not substitute a listed Sub-Bidder in furtherance of bid shopping or bid peddling.

4. Sub-Bidder Qualification. Listed Sub-Bidders may be required to provide evidence of their qualifications, including a statement of experience and references, prior to Award, or at any time during the Contract Time. Such information shall be provided within 24 hours of request. This evidence shall demonstrate that the Sub-Bidder meets or exceeds all requirements for experience, qualifications, manufacturer's certifications, or any other requirements specified in any of the technical sections of the Contract Documents for which the Sub-Bidder proposes to perform Work.

5. Replacement. If a listed Sub-Bidder fails to provide adequate evidence of qualifications, is unable to comply with any bonding requirements of the Bidding Documents or with other requirements of the Contract or Bidding Documents, is not properly licensed, or fails to meet the Responsibility Criteria of the Bidding Documents, the Port may require the Bidder to replace the Sub-Bidder with another subcontractor reasonably acceptable to the Port at no change in the Contract Sum or Contract Time.

6. Sub-Bidder Standards. Sub-Bidders shall meet contractual and technical qualification standards, and provide specialized certification, licensing, and/or payment and performance bonding, if required.

7. Small business participation encouraged. The Port's policy is to encourage the Contractor to solicit and document participation, and to provide and promote the maximum lawful, practicable opportunity for increased participation, by small business enterprises.

C. BID SECURITY

1. Purpose and Procedure. Each Bid shall be accompanied by Bid security payable to the Port in the form required by the Bidding Documents and equal to five percent (5%) of the Base Bid only (i.e., not including any Alternates or Unit Prices). The Bid security constitutes a pledge by the Bidder to the Port that the Bidder will enter into the Contract with the Port in the form provided, in a timely manner, and on the terms stated in its Bid, and will furnish in a timely manner the payment and performance bonds, certificates of insurance, and all other documents required in the Contract Documents. Should the Bidder fail or refuse to enter into the Contract or fail to furnish such documents, the amount of the Bid security shall be forfeited to the Port as liquidated damages, not as a penalty. By submitting a Bid, each Bidder represents and agrees that the Bid security, if forfeited, is a reasonable prediction on the Bid Date of future damages to the Port.

2. Form. The Bid security shall be in the form of a certified or bank cashier's check payable to the Port or a Bid bond executed by a bonding company reasonably acceptable to the Port licensed in the State of Washington, registered with the Washington State Insurance Commissioner, possess and A.M. Best rating of "A minus, Fiscal Size Category (FSC) (6) or better and be authorized by the U.S. Department of the Treasury. The Bid security shall be signed by the person or persons legally authorized to bind the Bidder. Bid bonds shall be submitted using the form included with the Bidding Documents.

3. Retaining Bid Security. The Port will have the right to retain the Bid security of Bidders to whom an Award is being considered until the earliest of either (a) mutual execution of the Contract, and the Port's receipt of payment and performance bonds, or (b) the specified time has elapsed so that Bids may be withdrawn, or (c) when all Bids have been rejected.

4. Return of Bid Security. Within sixty (60) days after the Bid Date, the Port will release or return Bid securities to Bidders who's Bids are not to be further considered in Awarding the Contract. Bid securities of the three apparent low Bidders will be held until the Contract has been finally executed, after which all unforfeited Bid securities will be returned. Bid security may be returned in the form provided or by separate payment.

D. SUBMISSION OF BIDS

1. Procedure. The Bid, the Bid security, and other documents required to be submitted with the Bid shall be enclosed in a sealed envelope identified with the Project name and number and the Bidder's name and address. If the Bid is sent by mail the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face of the mailing envelope.

   a. If a Bid is mailed, it shall be addressed to the Port of Tacoma, Contracts Department, One Sitcum Plaza, Tacoma, WA 98421.

   b. If a Bid is delivered, it shall be delivered to the Front Reception Desk, Port of Tacoma, One Sitcum Plaza, Tacoma, WA 98421.

   c. The time stamp clock at the Front Reception Desk at One Sitcum Plaza is the Port's official clock.

2. Deposit. Bids shall be deposited at the designated location prior to the Bid Date indicated in the Advertisement or Invitation to Bid, or any extension thereof made by Addendum. Bids received after the Bid Date and time specified shall be returned without consideration at the discretion of the Port or rejected at the time of receipt.

3. Delivery. The Bidder assumes full responsibility for timely delivery at the location designated for receipt of Bids.

4. Form. Oral, facsimile, telephonic, electronic, or email Bids are invalid and will not be considered.

E. MODIFICATION OR WITHDRAWAL OF BID

1. After the Bid Date. A Bid may not be modified, withdrawn or canceled by the Bidder during a sixty (60) day period following the Bid Date, and each Bidder so agrees by virtue of submitting its Bid.

2. Before the Bid Date. Prior to the Bid Date, any Bid submitted may be modified or withdrawn only by notice to the party receiving Bids at the place designated for receipt of Bids. The notice shall be in writing with the signature of the Bidder and shall be worded so as not to reveal the amount of the original Bid. Email notice will not be accepted. It shall be the Bidder's sole responsibility to verify that the notice has been received by the Port in time to be withdrawn before the Bid opening.

3. Resubmittal. Withdrawn Bids may be resubmitted up to the time designated for the receipt of Bids provided that they are then fully in conformance with these Instructions to Bidders.

4. Bid Security with Resubmission. Bid security shall be in an amount sufficient for the Bid as modified or resubmitted.

F. COMMUNICATIONS

1. Communications from a Bidder related to these Instructions to Bidders must be in writing to procurement@portoftacoma.com. Communications, including but not limited to notices and requests, by Sub-Bidders shall be made through the Bidder and not directly by a Sub-Bidder to the Port.

1.05 CONSIDERATION OF BIDS

A. OPENING OF BIDS: Unless stated otherwise in the Advertisement or Invitation to Bid or an Addendum, the properly identified Bids received on time will be opened publicly and will be read aloud. An abstract of the Base Bids and any Alternate Bids will promptly (and generally within 24 hours) be made available to Bidders and other interested parties.

B. REJECTION OF BIDS: The Port shall have the right but not the obligation to reject any or all Bids for any reason or for no reason, to reject a Bid not accompanied by the required Bid security, or to reject a Bid which is in any way incomplete or irregular.

C. BIDDING MISTAKES: The Port will not be obligated to consider notice of claimed Bid mistakes received more than 24 hours after the Bid Date. In accordance with Washington law, a low Bidder that claims error and fails to enter into the Contract is prohibited from Bidding on the Project if a subsequent call for Bids is made for the Project.

D. ACCEPTANCE OF BID (AWARD)

1. Intent to Accept. The Port intends (but is not bound) to Award a Contract to the Responsible Bidder with the lowest responsive Bid, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The Port has the right to waive any informality or irregularity in any Bid(s) received and to accept the Bid which, in its judgment, is in its own best interests.

2. Requirements for Award. Before the Award, the lowest responsive Bidder must be deemed Responsible by the Port and must satisfy all Award Requirements.

E. BID PROTEST PROCEDURES

1. Procedure. A Bidder protesting for any reason the Bidding Documents, a Bidding procedure, the Port's objection to a Bidder or a person or entity proposed by the Bidder, including but not limited to a finding of non-Responsibility, the Award of the Contract or any other aspect arising from or relating in any way to the Bidding shall cause a written protest to be filed with the Port within two (2) business days of the event giving rise to the protest. (Intermediate Saturdays, Sundays, and legal holidays are not counted as business days.) The written protest shall include the name of the protesting Bidder, the bid solicitation number and title under which the protest is submitted, a detailed description of the specific factual and legal grounds for the protest, copies of all supporting documents, evidence that the apparent low bidder has been given notice of the protest, and the specific relief requested. The written protest shall be sent by email to procurement@portoftacoma.com.
2. Consideration. Upon receipt of the written protest, the Port will consider the protest. The Port may, within three (3) business days of the Port's receipt of the protest, provide any other affected Bidder(s) the opportunity to respond in writing to the protest. If the protest is not resolved by mutual agreement of the protesting Bidder and the Port, the Contracts Director of the Port or his or her designee will review the issues and promptly furnish a final and binding written decision to the protesting Bidder and any other affected Bidder(s) within six (6) business days of the Port's receipt of the protest. (If more than one (1) protest is filed, the Port's decision will be provided within six (6) business days of the Port's receipt of the last protest.) If no reply is received from the Port during the six (6) business-day period, the protest will be deemed rejected.
3. Waiver. Failure to comply with these protest procedures will render a protest waived.
4. Condition Precedent. Timely and proper compliance with and exhaustion of these protest procedures shall be a condition precedent to any otherwise permissible judicial consideration of a protest.

1.06 POST BID INFORMATION

A. THE LOWEST RESPONSIVE BIDDER SHALL:

1. Responsibility Detail Form. Within 24 hours of the Low Responsive Bidder Selection Notification, the apparent low Bidder shall submit to the Port the Responsibility Detail Form (Section 00 45 13) executed by an authorized company officer with all accompanied attachments as noted in the form. As requested from the Port, the low, responsive Bidder shall provide written confirmation that the person signing the Bid on behalf of the Bidder was duly authorized at the time of bid, a detailed breakdown of the Bid in a form acceptable to the Port, and other information required by the Port.
2. Within ten (10) days after the Port's Notice of Award of the Contract, the apparent low Bidder shall also submit to the Port, if requested:
    a. additional information regarding the use of the Bidder's own forces and the use of subcontractors and suppliers;
    b. the names of the persons or entities (including a designation of the Work to be performed with the Bidder's own forces, and the names of those who are to furnish materials or equipment fabricated to a special design) proposed for each of the principal portions of the Work (i.e., either a listed Sub-Bidder or a Sub-Bidder performing Work valued at least ten percent (10%) of the Base Bid), consistent with the listing required with the Bid; and
    c. the proprietary names and the suppliers of the principal items or systems of materials and equipment proposed for the Work.

3. Failure to provide any of the above information in a timely manner will constitute an event of breach permitting forfeiture of the Bid security.

4. Bidder Responsibility. The Bidder will be required to establish to the satisfaction of the Port the reliability and Responsibility of itself and the persons or entities proposed to furnish and perform the Work described in the Bidding Documents. Within two days, upon request, the Bidder shall meet with the Port to discuss the Bid, including any pricing, the Bid components, and any assumptions made by the Bidder.

5. Sub-Bidder Responsibility. The Responsibility of the Bidder may be judged in part by the Responsibility of Sub-Bidders. Bidders must verify the Responsibility Criteria for each first-tier Sub-Bidder. A Sub-Bidder of any tier that hires other Sub-Bidders must verify Responsibility Criteria for each of its lower-tier Sub-Bidders. The verification shall include a representation that each Sub-Bidders, at the time of subcontract execution, is Responsible and possesses required licenses.

6. Objection. Prior to an Award of the Contract, the Port will notify the Bidder in writing if the Port, after due investigation, has reasonable objection to the Bidder or a person or entity proposed by the Bidder. Upon receiving such objection, the Bidder may, at Bidder's option, (1) withdraw their Bid, (2) submit an acceptable substitute person or entity with no change in the Contract Time and no adjustment in the Base Bid or any Alternate Bid, even if there is a cost to the Bidder occasioned by such substitution, or (3) file a protest in accordance with the Bidding Documents.

7. Change. Persons and entities proposed by the Bidder to whom the Port has made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Port.

8. Right to Terminate. The Bidder's representations concerning its qualifications will be construed as a covenant under the Contract. If a Bidder makes a material misrepresentation on a Qualification Statement, the Port has the right to terminate the Contract for cause and may then pursue any remedies that exist under the Contract or that are otherwise available.

B. INFORMATION FROM OTHER BIDDERS: All other Bidders designated by the Port as under consideration for Award of a Contract shall also provide a properly executed Qualification Statement, if so requested by the Port.

1.07 PERFORMANCE BOND, LABOR AND MATERIAL PAYMENT BOND, AND INSURANCE

A. BOND REQUIREMENTS: Within ten (10) days after the Port's Notice of Award of the Contract, the successful Bidder shall obtain and furnish statutory bonds pursuant to RCW 39.08 covering the faithful performance of the Contract and the payment of all obligations arising thereunder in the form and amount prescribed in the Contract Documents. The cost of such bonds shall be included in the Base Bid.

B. TIME OF DELIVERY AND FORM OF BONDS: The successful Bidder shall deliver an original copy of the required bonds to the Port, 1 Sitcum Plaza, Tacoma, WA 98421, within the time specified in the Contract Documents.

C. INSURANCE: a certificate of insurance from the Bidder's insurance company that meets or exceeds all requirements of the Contract Documents;

D. GOVERNMENTAL REQUIREMENTS: Notwithstanding anything in the Bidding or Contract Documents to the contrary, the Bidder shall provide all bonding, insurance and permit documentation as required by governmental authorities having jurisdiction for any portions of the Project.

1.08 FORM OF AGREEMENT

A. FORM TO BE USED: The Contract for the Work will be written on the form(s) contained in the Bidding Documents, including any General, Supplemental or Special Conditions, and the other Contract Documents included with the project manual.

B. CONFLICTS: In case of conflict between the provisions of these Instructions and any other Bidding Document, these Instructions shall govern. In case of conflict between the provisions of the Bidding Documents and the Contract Documents, the Contract Documents shall govern.

C. CONTRACT DELIVERY. Within ten (10) days after Notice of Award, the Bidder shall submit a signed Contract to the Port in the form tendered to the Bidder and without modification.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions and Supplementary Conditions, and Division 0 and 1 Specifications sections shall apply to all sections of the Contract Documents, including specifications, drawings, addenda, or other changes of documents issued for bidding.

1.02 SUMMARY

A. Section includes administrative and procedural requirements for substitutions during bidding.

1.03 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. The bidding documents include performance specifications for products and equipment which meet project requirements. In those cases where a representative item or manufacturer is named in the specification, it is provided for the sole purpose of identifying a product meeting the required functional performance, and where the words “or equal” are used, a substitution request as further described, is not required.

C. Where non-competitive or sole source products or manufacturers are explicitly specified with the words “or approved equal”, or “Engineer approved equal”, or “as approved by the Engineer” are used, they shall be taken to mean “or approved equal”. In these cases a substitution request as further described in this section, is required.

1.04 SUBMITTALS

A. Pre-Bid Substitution Requests: Submit one PDF of the substitution request form along with all supporting documentation for consideration of each request. Identify product or fabrication or installation method to be replaced. Include Drawing numbers and titles. Substitution requests prior to bid date may originate directly from a prime bidder, or from a prospective supplier or subcontractor.

1. Substitution Request Form: Use copy of form located in Section 00 43 25.

2. Documentation: Show compliance with requirements for substitutions with the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work that will be necessary to accommodate proposed substitution.

c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

d. Samples, where applicable or requested.

e. Certificates and qualification data, where applicable or requested.

f. Research reports evidencing compliance with building code in effect for project

3. Engineer's Action: Engineer will review substitution requests if received electronically to procurement@portoftacoma.com at least 7 days prior to the bid opening date set forth in these documents. Substitution requests received after this time will not be reviewed.

a. Forms of Acceptance: Substitution requests will be formally accepted via written addendum prior to the bid opening date. Bidders shall not rely upon approvals made in any other manner.

b. Use product originally specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

c. The Port's decision of approval or disapproval of a proposed substitution shall be final.

B. Substitutions will not be considered when:

1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this Section.

2. Acceptance will require substantial revision of Contract Documents or other items of the Work.

3. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.

1.05 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 EXISTING CONDITIONS

A. Certain information relating to existing surface and subsurface conditions and structures is available to bidders but will not be part of the Contract Documents, as follows:

B. A copy of the reference documents are available on line at https://webftp.portoftacoma.com/
Username: NLR
Password: NWSA2016!

C. Geotechnical Report: Entitled Port of Tacoma North Lead Rail Project, Prepared by KPFF Consultaing Engineers, dated September 8, 2015.

1. This report identifies properties of below grade conditions and offers recommendations for the design of foundations, prepared primarily for the use of Engineer.

2. The recommendations described shall not be construed as a requirement of this Contract, unless specifically referenced in the Contract Documents.

3. This report, by its nature, cannot reveal all conditions that exist on the site. Should subsurface conditions be found to vary substantially from this report, changes in the design and construction of foundations will be made, with resulting credits or expenditures to the Contract Price accruing to the Port.

1.02 PRELIMINARY DATA

A. Certain preliminary investigations and studies made by the the Port are available to the bidders but will not be part of the Contract Documents, as follows:

B. Hydraulic Analysis: Entitled Erdahl Ditch Hydraulic Analysis dated July 2, 2015.

C. Soil Ballast Chemical Analysis Test Results, dated 12/14/15

1. These test results identify preliminary testing of soil materials in the areas of the project assumed to be free of regulated materials.

D. Special Trackwork shop drawings: Progress Rail Services.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section provides the notification required for disclosure of asbestos, lead-containing or other hazardous materials.

1.02 HAZARDOUS MATERIALS NOTICE

A. The Port is reasonably certain that asbestos and lead will not be disturbed by the project. If the Contractor encounters material suspected of containing lead or asbestos which will interfere with the execution of the work, the Contractor shall stop work and notify the Engineer.

B. The Contractor is notified that certain portions of the Work area are anticipated to contain petroleum or other pollutant impacted soil material. The presents of pollutants in soil materials is anticipated near existing tracks. The Contractor will manage these materials according to the Contract Documents.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

BIDDER'S NAME: _____

PROJECT TITLE: **NORTH LEAD RAIL IMPROVEMENTS**

The undersigned Bidder declares that it has read the specifications, understands the conditions, has examined the site, and has determined for itself all situations affecting the work herein bid upon. Bidder proposes and agrees, if this bid is accepted, to provide at Bidder's own expense, all labor, machinery, tools, materials, etc., including all work incidental to, or described or implied as incidental to such items, according to the bidding documents, and that the Bidder will complete the work within the time stated, and that Bidder will accept in full payment therefore the lump sums and unit prices set forth below.

Proposed Bid Price. (Note: Show prices in figures only.) Complete Installation:

ITEM NO.	DESCRIPTION OF ITEM	QTY	UOM	UNIT PRICE	EXTENDED PRICE
1	Mobilization and Demobilization	1	LS		
2	North Lead Rail Project Complete	1	LS		
3	Off-site disposal of Type C soil at Subtitle D Landfill.	18,240	TN		
4	Off-site disposal of Type D soil material.	24,180	TN		
				BASE BID SUBTOTAL	

Evaluation of Bids. In accordance with the provisions of these Contract Documents, Bids will be evaluated to determine the lowest Base Bid Subtotal offered by a responsible Bidder submitting a responsive bid.

Addenda. Bidder acknowledges review of all Addenda through No. _____

Principal Subcontractors/Suppliers. The bidder shall list below the name of each subcontractor or supplier to whom the bidder proposes to subcontract the portions of the work listed below, or name itself for the work.

Work to be Performed	Name of Firm
HVAC (Heating, Ventilation and Air Conditioning) Work	
Plumbing Work as described in RCW 18.106	
Electrical Work as described in RCW 19.28	

Trench Excavation Safety Provision. If the bid amount contains work which requires trenching exceeding a depth of 4 feet, all costs for trench safety shall be included in the Base Bid and indicated below for adequate trench safety systems in compliance with RCW 39.04 and WAC 296-155-650. Bidder shall include a lump sum amount, excluding Washington State Sales Tax. If trench excavation safety provisions do not pertain to the Work, the Bidder should enter "N.A." or "Not Applicable" in the blank on the Bid Form.

Trench Excavation Safety: _____ (Total in Written Figures Only)

Noncollusion. The undersigned declares under penalty of perjury that the bid submitted is a genuine and not a sham or collusive bid, or made in the interest or on behalf of any person or firm not therein named; and 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 the bidder an advantage over any other bidder or bidder.

Name of Firm	Date
Signature	Print Name, Title
Mailing Address	City, State, Zip Code
Telephone Number	Email Address
WA State Contractor's License No.	Date of Issue Expiration Date
Unified Business Identifier (UBI) No.	Employment Security Department No.

Identification of Contractor as a sole proprietor, a partnership, a joint venture, a corporation or another described form of legal entity

END OF SECTION

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, and _____, as Surety, are held and firmly bound unto the PORT OF TACOMA as Obligee, in the penal sum of _____ _____ Dollars, for the payment of which the Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigned, jointly and severally, by these present.

The condition of this obligation is such that if the Obligee shall make any award to the Principal for _____, according to the terms of the proposal or bid made by the Principal therefor, and the Principal shall duly make and enter into a contract with the Obligee in accordance with the terms of said proposal or bid and award and shall give bond for the faithful performance thereof, with Surety or Sureties approved by the Obligee; or, if the principal shall, in case of failure to do so, pay and forfeit to the Obligee the penal amount of the deposit specified in the call for bids, then this obligation shall be null and void; otherwise it shall be and remain in full force and effect and the Surety shall forthwith pay and forfeit to the Obligee, as penalty and liquidated damages, the amount of this bond.

SIGNED, SEALED AND DATED THIS _____ day of _____, 20____

BY _____

Principal

BY _____

Surety

_____

_____

_____

Agent and Address

Note: Bidder may submit Surety's bid bond form, provided it is similar in substance, made out in the name of the Port of Tacoma, and that the agent’s name and address appear as specified. Bonds containing riders limiting responsibility for toxic waste or limiting the term of responsibility will be rejected.

END OF SECTION

Project Title _____ **Project No.** _____

Submitted By: _____ Contract No. _____

Prime/Sub/Supplier: _____ Date: _____

Specification Title: _____ Section No. _____

Description: _____ Paragraph: _____

_____ Page No. _____

Proposed Substitution: _____

Trade Name: _____ Model No.: _____

Manufacturer: _____

Address: _____ Phone No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.

Submitted By: _____

Signed By: _____ Firm: _____

Address: _____

_____

Telephone: _____ Email: _____

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ Other _____

ENGINEER'S REVIEW AND ACTION

☐ Substitution approved
☐ Substitution approved as noted
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

The low responsive Bidder shall be required to complete this Responsibility Detail Form as specified in Section 00 21 00 – Instructions to Bidders. **This completed Responsibility Detail Form shall be submitted electronically (pdf) via email to the Contact(s) identified in the Low Responsive Bidder Selection Notification. THIS IS NOT TO BE SUBMITTED WITH A BID.**

Bidder's Company Name:_____

For the below Mandatory Bidder Responsibility Criteria, please check the appropriate box.

1.0 MANDATORY BIDDER RESPONSIBILITY CRITERIA

A. The Bidder shall meet the following mandatory responsibility criteria as described in RCW 39.04.350(1). The Bidder shall be rejected as not responsible if any answer to questions 1 through 5 is "No" or any answer to questions 6 through 8 is "Yes".

1. Does the Bidder have a Certificate of Registration in compliance with RCW 18.27?

   ☐ Yes ☐ No

2. Does the Bidder have a current Washington State Unified Business Identifier number?

   ☐ Yes ☐ No

3. Does the Bidder have Industrial Insurance Coverage for the Bidder's employees working in Washington State as required in RCW 51?

   ☐ Yes ☐ No

4. Does the Bidder have an Employment Security Department number as required in RCW 50? **Attach* *letter dated within 6 months of bid opening date from publicworks@esd.wa.gov.*

   ☐ Yes ☐ No

5. Does the Bidder have a Washington State Excise Tax Registration number as required in RCW 82?

   ☐ Yes ☐ No

6. Has the Bidder been disqualified from bidding on any public works project under RCW 39.06.010 or 39.12.065(3)?

   ☐ Yes ☐ No

7. Has the Bidder violated RCW 39.04.370 more than one time as determined by the Washington State Department of Labor and Industries?

   ☐ Yes ☐ No

8. Has the Bidder ever been found to be out of compliance with Apprenticeship Utilization requirements of RCW 39.04.320?

   ☐ Yes ☐ No

If any answer to questions 1 through 5 is "No" or any answer to questions 6 through 8 is "Yes" - **STOP HERE** and contact the Contract Administrator. The Bidder is not responsible for this Work. Otherwise proceed to 1.1. **Provide attached to this completed form documentation to confirm responsibility criteria.**

For remaining criteria below, check or fill-out the appropriate box. Based upon the answer provided by the Bidder, the Port may request additional information or seek further explanation. As needed, provide backup documentation for any explanations listed below.

1.1 CONTRACT AND REGULATORY HISTORY

A. The Port will evaluate whether the Bidder's contract and regulatory history demonstrates an acceptable record of past project performance and consistent responsibility. The Bidder shall answer the following questions. The Bidder may be rejected as not responsible if any answer to questions 1 through 5 below is "Yes".

1. Has the Bidder had a contract terminated for cause or default, in the last 5 years?

   ☐Yes ☐No **If YES, explain below.**

   _____

2. Has the Bidder required a Surety to take over all, or a portion of, a project to cure or respond to an asserted default or material breach of contract on the part of the Bidder on any public works project, in the last 5 years?

   ☐Yes ☐No **If YES, explain below.**

   _____

3. Have the Bidder and major Sub-Bidders been in bankruptcy, reorganization and/or receivership on any public works project, in the last 5 years?

   ☐Yes ☐No **If YES, explain below.**

   _____

4. Have the Bidder and major Sub-Bidders been disqualified by any state or local agency from being awarded and/or participating on any public works project, in the last 5 years?

   ☐Yes ☐No **If YES, explain below.**

   _____

5. Are the Bidder and major Sub-Bidders currently a party to a formal dispute resolution process with the Port—i.e., a pending mediation, arbitration or litigation.

   ☐Yes ☐No **If YES, explain below.**

   _____

1.2 ACCIDENT/INJURY EXPERIENCE

A. The Port will evaluate the Bidder's accident/injury Experience Modification Factor ("EMF") from the Washington State Department of Labor and Industries to assess whether the Bidder has an acceptable safety record preventing personal injuries on projects.

B. List the Bidder's accident/injury EMF for the last five (5) years. An experience factor is calculated annually by the Washington State Department of Labor and Industries.

Year	Effective Year	Experience Factor
1		
2		
3		
4		
5		

If the Bidder has received an EMF of greater than 1.0 for any year, explain the cause(s) of the designation and what remedial steps were taken to correct the EMF. The Bidder may be rejected as not responsible if the Bidder's EMF is greater than 1.0 and sufficient remedial steps have not been implemented.

1.3 WORK PERFORMED BY BIDDER

A. The Bidder shall state the amount of the Contract Work, as an equivalent to the Total Bid Price, excluding taxes, insurance and bonding, the Bidder will execute with its own forces.

_____%

1.4 PROJECT EXAMPLE SHEETS

A. As part of completing this Responsibility Detail Form, **submit the following information with the completed Responsibility Detail Form**:

1. Bidder's recent job resume including a list of similar projects performed and contact information for the similar project Owner(s).
2. Resumes of bidder's proposed project manager and job superintendent.

B. The Bidder's failure to provide the required project information may result in a determination of the Bidder being declared non-responsible by the Port.

C. The Bidder shall submit this completed, **SIGNED** Responsibility Detail Form electronically (PDF), with all requested backup documentation, via email to the Contact(s) noted on the Low Responsive Bidder Selection Notification.

PROJECT: _____

PROJECT NO. _____

CONTRACT NO. _____

Responsibility Certification Form

The Low responsive Bidder shall complete the Responsibility Detail Form, attach all documentation and submit to the Port within 24 hours following receipt of the Low, Responsive Bidder Selection Notification. All forms shall be submitted electronically (PDF) via email to the contact(s) listed on the Selection Notice. Note, the same project may be used to demonstrate experience across multiple categories if applicable.

By completing and signing this Responsibility Detail Form, the Bidder is certifying that the information contained within the form, and the backup documentation, and any additional information requested by the Port is true and complete. The Bidder's failure to disclose the required information or the submittal of false or misleading information may result in the rejection of the Bidder's bid, revocation of award or contract termination.

The information provided herein is true and complete.	
Signature of Authorized Representative	Date
Print Name and Title	

AGREEMENT BETWEEN PORT AND CONTRACTOR

THIS **AGREEMENT** is made and entered into by and between the **PORT OF TACOMA**, a State of Washington municipal corporation, hereinafter designated as the "**Port**," and:

The "**Contractor**":	_____	**(Legal Name)**
	_____	(Address)
	_____	(Address 2)
	_____	(Phone No.)
The "**Project**" is:	**North Lead Rail Improvements**	**(Title)**
	092938 | 070164	(Project &Contract No)
	Port of Tacoma Railyard	(Project Address)
	Tacoma, WA	(Project Address 2)
The "**Engineer**" is:	**Thais Howard, P.E.**	**(Engineer)**
	Director of Engineering	(Title)
	_____	(Email)
	_____	(Phone No.)
The "**Contractor's representative**" is:	_____	**(Representative)**
	_____	(Title)
	_____	(Email)
	_____	(Phone No.)

BACKGROUND AND REPRESENTATIONS:

The Port has caused Drawings, Specifications, and other Contract Documents to be prepared for the performance of Work on the Project.

The Port publicly solicited bids on the Contract Documents. The Contractor submitted a bid to the Port on the _____ day of _____, 20___ to perform the Work.

The Contractor represents that it has the personnel, experience, qualifications, capabilities, and means to accomplish the Work in strict accordance with the Contract Documents, within the Contract Time and for the Contract Price, and that it and its Subcontractors satisfy the responsibility criteria set forth in the Contract Documents, including any supplemental responsibility criteria.

The Contractor further represents that it has carefully examined and is fully familiar with all provisions of the Contract Documents, including any Addenda, that it has fully satisfied itself as to the nature, location, difficulty, character, quality, and quantity of the Work required by the Contract Documents and the conditions and other matters that may be encountered at or near the Project site(s), or that may affect performance of the Work or the cost or difficulty thereof including all applicable safety and site responsibilities, and that it understands and can satisfy all scheduling and coordination requirements and interim milestones.

AGREEMENT:

The Port and the Contractor agree as follows:

1.0 CONTRACTOR TO FULLY PERFORM THE WORK

The Contractor shall fully execute and complete the entire Work described in the Contract Documents, except to the extent specifically indicated in the Agreement, the General Conditions of the Contract (as well as any Supplemental, Special or other Conditions included in the project manual), the Drawings, the Specifications, and all Addenda issued prior to, and all modifications issued after, execution of the Contract.

2.0 DATE OF COMMENCEMENT

The date of commencement of the Work, which is the date from which the Contract Time is measured, shall be fixed as the date this agreement is executed.

3.0 CONTRACT TIME AND LIQUIDATED DAMAGES

The Contractor shall achieve all interim milestones as set forth in the Contract Documents. Partial Substantial Completion of the **East End** of the project shall be achieved not later than **262 calendar days** from contract execution and Substantial Completion of the entire Work shall be achieved not later than **349 calendar days** from contract execution, subject to adjustments of this Contract Time as provided in the Contract Documents. The Contractor shall achieve Final Completion of the Work within **30 calendar days** of the date on which Substantial Completion is achieved.

Provisions for liquidated damages as a reasonable estimate of future loss, as of the date of this Agreement, are included in the Contract Documents. The parties agree that the stated liquidated damages are not penalties individually or cumulatively.

The liquidated damages for failure to achieve Substantial Completion by the prescribed date shall be **$1,000 per calendar day**. After the prescribed Final Completion date, the liquidated damages for failure to achieve Final Completion shall be **$500 per calendar day**.

Liquidated damages assessed by the Port will be deducted from monies due to the Contractor, or from monies that will become due to the Contractor. The liquidated damages, as specified and calculated herein, shall be levied for each and every calendar day that Substantial Completion and/or Final Completion of the work is delayed beyond the prescribed completion dates, or the completion dates modified by the Port for extensions of the contract time.

4.0 CONTRACT PRICE

In accordance with the Contractor's bid dated [ ], the Port shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Price of _____ dollars ($), subject to additions and deductions as provided in the Contract Documents. State and local sales tax is not included in the Contract Price but will be due and paid by the Port with each progress payment.

5.0 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in the Contract Documents.

This Agreement is entered into as of the execution date written below:

CONTRACTOR		**PORT OF TACOMA**	
By:	_____	By:	_____
Title:	_____	Title:	_____
Date	_____	Execution Date	_____

END OF SECTION

PERFORMANCE BOND # _____

CONTRACTOR (NAME AND ADDRESS)	**SURETY (NAME AND PRINCIPLE PLACE OF BUSINESS)**
OWNER (NAME AND ADDRESS)	**AGENT OR BROKER (FOR INFORMATION ONLY)**
PORT OF TACOMA	
P.O. BOX 1837	
TACOMA, WA 98401-1837	

KNOW ALL MEN BY THESE PRESENTS:

That _____ as Principal, hereinafter called Contractor, and _____ as Surety, hereinafter called Surety, are held and firmly bound unto the Port of Tacoma as Obligee, hereinafter called the Port, in the amount of _____ Dollars ($_____) for the payment whereof Contractor and Surety bind themselves, their executors, administrators, legal representatives, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS:

Contractor has executed an agreement with the Port dated _____ for _____ a copy of which Contract is by reference made a part hereof (the term "Contract" as used herein to include the aforesaid agreement together with all the Contract Documents, addenda, modifications, all alterations, additions thereto, deletions therefrom and any other document or provision incorporated into the Contract) and is hereinafter referred to as the Contract.

This bond is executed and issued pursuant to the provisions of Chapter 39.08 Revised Code of Washington.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

FURTHER:

A. Surety hereby waives notice of any alterations, change orders, modifications or extensions of time made by the Port.

B. Surety recognizes that the Contract includes provisions for additions, deletions and modifications to the work or Contract Time and the amounts payable to the Contractor. Subject to the limitations contained in (A) above, Surety agrees that no such addition, deletion, or modification, or any combination thereof, shall avoid or impair Surety's obligation hereunder.

C. Whenever Contractor has been declared by the Port to be in default, and the Port has given Surety notice of the Port's determination of such default, Surety shall promptly (in no event more than fifteen (15) days following receipt of such notice) advise the Port of its intended action to:

   1. Remedy the default within fifteen (15) days following its advice to the Port as set forth above, or

2. Assume within fifteen (15) days, following its advice to the Port as set forth above, completion of the Contract in accordance with the Contract Documents and become entitled to payment of the balance of the Contract Sum, or

3. Pay the Port upon completion of the Contract, in cash, the cost of completion together with all other reasonable costs and expenses incurred by the Port as a result of the Contractor's default, including but not limited to, those reasonable costs and expenses incurred by the Port in its efforts to mitigate its losses, which may include but are not limited to, attorney's fees and efforts to complete the Work prior to the Surety exercising the options available to it as set forth herein.

D. If the Port shall commence suit and obtain judgment against the Surety for recovery hereunder, then the Surety, in addition to such judgment, shall pay all costs and attorney's fees incurred by the Port in enforcement of its rights hereunder. Venue for any action arising out of or in connection with this bond shall be in Pierce County, Washington.

E. No right or action shall accrue on this bond to or for the use of any person or corporation other than the Port of Tacoma.

Signed and Sealed the_____ day of _____, 20___.

IMPORTANT: Surety companies executing bonds must have an A.M. Best Rating of A- FSC of (6) or higher, have an underwriting limitation of not less than the Contract Sum, and be authorized to transact business in the State of Washington.

SURETY	**CONTRACTOR**
_____	_____
Signature	Signature
_____	_____
Printed Name and Title	Printed Name and Title

Power of Attorney attached.

END OF SECTION

LABOR AND MATERIAL PAYMENT BOND #_____

CONTRACTOR (NAME AND ADDRESS)	**SURETY (NAME AND PRINCIPLE PLACE OF BUSINESS)**
OWNER (NAME AND ADDRESS)	**AGENT OR BROKER (FOR INFORMATION ONLY)**
PORT OF TACOMA	
P.O. BOX 1837	
TACOMA, WA 98401-1837	

KNOW ALL MEN BY THESE PRESENTS:

That _____ as Principal, hereinafter called Contractor, and _____ as Surety, hereinafter called Surety, are held and firmly bound unto the Port of Tacoma as Obligee, hereinafter called the Port, and all others entitled to recovery hereunder, in the amount of _____ Dollars ($_____) for the payment whereof Contractor and Surety bind themselves, their executors, administrators, legal representatives, successors and assigns, jointly and severally firmly by these presents.

WHEREAS:

Contractor shall executed an agreement with the Port dated _____ for _____ a copy of which Contract is be reference made a part hereof (the term "Contract" as used herein to include the aforesaid agreement together with all the Contract Documents, addenda, modifications, alterations, additions thereto, deletions therefrom and any other documents or provisions incorporated into the Contract) and is hereinafter referred to as the Contract.

This bond is executed pursuant to the provisions of Chapter 39.08 Revised Code of Washington.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that if Contractor shall promptly make payment to all claimants, as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the Contract and shall indemnify and save the Port harmless from all cost and damage by reason of Contractor's default, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject to the following conditions:

A. The Surety hereby waives notice of any alterations, change orders, modifications or extensions of time made by the Port.

B. Surety recognizes that the Contract includes provisions for additions, deletions and modifications to the Work or Contract Time and the amounts payable to the Contractor. Surety agrees that no such addition, deletion, or modification, or any combination thereof, shall avoid or impair Surety's obligation hereunder.

C. Surety hereby agrees that every person protected under the provisions of RCW 39.08.010 who has not been paid as provided under the Contract and pursuant to RCW 39.08.010, less any amounts withheld pursuant to statute, and less retainage withheld pursuant to RCW 60.28, after the expiration of a period of thirty (30) days after the date on which the completion of the Contract in accordance with RCW 39.08, may sue on this bond, prosecute the suit to final judgment as may be due claimant, and have execution thereon including recovery of reasonable costs and attorney's fees as provided by RCW 39.08. The Port shall not be liable for the payment of any costs or expenses of any such suit.

D. No suit or action shall be commenced hereunder by any claimant unless claimant shall have given the written notices to the Port, and where required, the Contractor, in accordance with RCW 39.08.030.

E. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of claims which may be properly filed in accordance with RCW 39.08 whether or not suit is commenced under and against this bond.

F. If any Claimant shall commence suit and obtain judgment against the Surety for recovery hereunder, then the Surety, in addition to such judgment and attorney fees as provided by RCW 39.08.030, shall also pay such costs and attorney fees as may be incurred by the Port as a result of such suit. Venue for any action arising out of or in connection with this bond shall be in Pierce County, Washington.

Signed and Sealed this _____ day of _____, 20___.

IMPORTANT: Surety companies executing bonds must have an A.M. Best Rating of A- FSC of (6) or higher, have an underwriting limitation of not less than the Contract Sum, and be authorized to transact business in the State of Washington.

SURETY	**CONTRACTOR**
_____	_____
Signature	Signature
_____	_____
Printed Name and Title	Printed Name and Title

Power of Attorney attached.

END OF SECTION

Bond No. _____

Project Title: _____

Project No.: _____

Contract No. _____

KNOW ALL MEN BY THESE PRESENTS: That we _____, a corporation existing under and by virtue of the laws of the State of Washington and authorized to do business in the State of Washington, as Principal, and _____, a corporation organized and existing under the laws of the State of _____ and authorized to transact the business of surety in the State of Washington, as Surety, are jointly and severally held and bound unto the PORT OF TACOMA, hereinafter called Port, as Obligee, and are similarly held and bound unto the beneficiaries of the trust fund created by RCW 60.28 as their heirs, executors, administrators, successors and assigns in the penal sum of _____ (_____) plus 5% of any increases in the contract amount that have occurred or may occur, due to change orders, increases in the quantities or the addition of any new item of work.

WHEREAS, on the _____ day of _____, the said Principal herein executed Contract No. _____ with the Port for _____ _____.

WHEREAS, said contract and RCW 60.28 require the Port to with withhold from the Principal the sum of 5% from monies earned by the Principal on estimates during the progress of the work, hereinafter referred to as earned retained funds.

WHEREAS, the Principal has requested that the Port accept a bond in lieu of earned retained funds as allowed under Chapter 60.28 RCW.

NOW THEREFORE, this obligation is such that the Surety , its successors, and assigns are held and bound unto the Port and unto all beneficiaries of the trust fund created by RCW 60.28.011(1) in the aforesaid sum. This bond, including any proceeds therefrom, is subject to all claims and liens and in the same manner and priority as set forth for retained percentages in Chapter 60.28 RCW. The condition of this obligation is also that if the Principal shall satisfy all payment obligations to persons who may lawfully claim under the trust fund created pursuant to Chapter 60.28 RCW, to the Port, and indemnify and hold the Port harmless from any and all loss, costs, and damages that the Port may sustain by release of said retainage to Principal, then this obligation shall be null and void, provided the Surety is notified by the Port that the requirements of RCW 60.28.021 have been satisfied and the obligation is duly released by the Port.

IT IS HEREBY DECLARED AND AGREED that the Surety shall be liable under this obligation as Principal. The Surety will not be discharged or released from liability for any act, omission or defenses of any kind or nature that would not also discharge the Principal.

IT IS HEREBY FURTHER DECLARED AND AGREED that this obligation shall be binding upon and inure to the benefit of the Principal, the Surety, the Port, the beneficiaries of the trust fund created by Chapter 60.28 Revised Code of Washington (RCW) and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, said Principal and said Surety have caused these presents to be duly signed and sealed this _____ day of _____, 201__.

_____

By: _____
Principal

Address: _____

City/ST/Zip: _____

Phone: _____

_____

Surety Name _____

By: _____
Attorney-In-Fact

Address: _____

City/ST/Zip: _____

Phone: _____

IMPORTANT: Surety companies executing bonds must have an A.M. Best Rating of A- FSC of (6) or higher, and be authorized to transact business in the State of Washington.

To:	Bank Name, Address, Phone	Escrow Account No:	
		Contract No:	Port fills in
		Project No:	Port fills in
Agency:	Port of Tacoma PO Box 1837 Tacoma, WA 98401-1837	Project Title:	Port fills in

The Undersigned _____, (Contractor Name and Address) hereinafter referred to as the Contractor, has directed the Port of Tacoma, hereinafter referred to as the Port, to deliver to _____ (Name of Bank), hereinafter referred to as "You", its checks for retainage under the Contract which shall be payable to You and the Contractor jointly, and which shall be held and disposed of by You in accordance with the following instructions and upon the terms and conditions hereinafter set forth.

ESCROW INSTRUCTIONS:

1. Checks made payable to You and the Contractor jointly upon delivery to You shall be endorsed by the Contractor and by You and then forwarded for collection by You. The moneys will then be used by You to purchase, as directed by the Contractor, bonds or other securities (hereinafter collectively referred to as "Securities") chosen by the Contractor and approved by the Port. Attached is a list of Securities approved by the Port. Other Securities, except stocks, may be selected by the Contractor, subject to express prior written approval of the Port, in its sole and absolute discretion. The purchase of Securities shall be in a form which shall allow You alone to reconvert such Securities into money if You are required to do so by the Port as provided in Paragraph 4 of this Escrow Agreement.

2. When and as interest on the Securities held by You pursuant to this Agreement accrues and is paid, You shall collect such interest and forward it to the Contractor at its address designated in the first paragraph unless otherwise directed by the Contractor.

3. You are not authorized to deliver to the Contractor all or any part of the checks or moneys received by You or the Securities held by You pursuant to this Agreement (or moneys derived from the sale of such Securities, or the negotiation of the Port's checks) except in accordance with written instructions from the Port's Sr. Contract Administrator. Compliance with such instructions shall relieve You of any further liability related thereto. The estimated final completion date on the Contract underlying this Agreement is _____.

4. In the event the Port orders You to do so in writing, You shall, within ten (10) days of receipt of such order, reconvert into money some or all of the Securities held by You pursuant to this Agreement, as required to satisfy the Port's order, and return such money, together with any other moneys held by You hereunder and required to satisfy the Port's order, to the Port. Consent of Contractor shall not be required for payment to the Port hereunder, and objection or other communication from Contractor shall not prevent, delay, or otherwise affect payment to the Port forthwith in accordance with the Port's order and this Agreement.

5. The Contractor agrees to pay You as compensation for Your services hereunder as follows: Payment of all fees shall be the sole responsibility of the Contractor and shall not be deducted from any checks, moneys, Securities, or other property placed with You or held by you pursuant to this Agreement until and unless the Port directs the release thereof to the Contractor, whereupon You shall be granted a first lien upon such property released and shall be entitled to reimburse Yourself from such property for the entire amount of Your fees as provided for hereinabove. In the event that You

are made a party to any litigation with respect to the checks, moneys, Securities, or other property held by You hereunder, or in the event that the conditions of this escrow are not promptly fulfilled or that You are required to render any service not provided for in these instructions, or that there is any assignment of the interests of this escrow or any modification hereof, You shall be entitled to reasonable compensation for such extraordinary services from the Contractor and reimbursement from the Contractor for all costs and expenses, including reasonable attorney fees occasioned by such default, delay, controversy or litigation.

6. This Agreement shall not be binding until executed by Contractor and Port, and accepted by You.

7. This instrument contains the entire agreement between You, the Contractor, and the Port with respect to this escrow. There are no terms, obligations, covenants, or conditions regarding this escrow other than those contained herein, and You are not a party to nor bound by any instrument or agreement regarding this escrow other than this Agreement. You shall not be required to take notice of any default or any other matter under the Contract nor be bound by nor required to give notice or demand under the Contract, nor required to take any action whatsoever except as herein expressly provided. You shall not be liable for any loss or damage not caused by Your own negligence or wilful misconduct.

8. The foregoing provisions shall be binding upon the assigns, successors, personal representatives and heirs of the parties hereto.

9. The Contractor's Federal Income Tax Identification number is _____.

The undersigned have read and hereby approve the instructions as given above governing the administration of this escrow and do hereby execute this Agreement this ___ day of _____, 20__.

Contractor:	**Port of Tacoma**
_____	_____
Signature	Signature
_____	_____
Name/Title	Name/ Port Treasurer or Deputy Treasurer
_____	_____
Date	Date

The above escrow instructions received and accepted this _____ day of _____, 20__.

Bank: By _____ Name:_____
(Signature of Authorized Bank Officer) Title: _____

SECURITIES AUTHORIZED BY THE PORT:

1. FDIC insured time deposits and time deposits in commercial banks authorized by the Washington State Public Deposit Protection Commission.
2. Savings account deposits in commercial banks authorized by the Washington State Public Deposit Protection Commission.
3. Bills, certificates, notes or bonds of the United States;
4. Other obligations of the United States or its agencies; and
5. Obligation of any corporation wholly-owned by the government of the United States;

INSTRUCTIONS FOR RETAINAGE ESCROW AGREEMENTS:

Whenever possible, use the Port of Tacoma (Port) approved Escrow Agreement. The Port, at its discretion, may or may not accept an agreement form from another source.

Please return all three (3) originals of the Agreement, with completed contractor and bank information and signatures, and the escrow account number. The Port will review and sign the Agreement and distribute copies. One (1) original will go directly to the Bank, one (1) original will be returned to the Contractor.

Fill in the following on the Escrow Agreement:

1) Page 1 – Escrow Account Number
2) Page 1 – Name, address, and phone number of the Bank
3) Page 2 – Signature, typed/printed name, date, and the title of the Contractor Signatory.
4) Page 2 – Signature, typed/printed name, date, and the title of the Authorized Bank Officer signatory.

Do not fill in the date in the paragraph directly following paragraph 9. The Port will fill in this date once the document has been fully executed by the Port.

Project Title _____ **Project No.** _____

Submitted By: _____ Contract No. _____

Contractor: _____ Date: _____

Specification Title: _____ Section No. _____

Description: _____ Paragraph: _____

_____ Page No. _____

Proposed Substitution: _____

Trade Name: Model No.:

Manufacturer: _____

Address: _____ Phone No.: _____

Installer: _____

Address: _____ Phone No.: _____

History:

☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old ☐ Other _____

Differences between proposed substitution and specified product: _____

☐ Point-by-point comparative data attached - REQUIRED

Reason for not providing specified item: _____

Similar Installation:

Project: _____ A/E _____

Address: _____

Owner: _____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

Savings to Port for accepting substitution: $ _____

Proposed substitution changes Contract Time: ☐ No ☐ Yes [Add] [Deduct] _____ # of days.

Supporting Data Attached:

☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ Other _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted By: _____

Signed By: _____ Firm: _____

Address: _____

_____

Telephone: _____ Email: _____

Attachments: _____

_____

A/E's REVIEW AND RECOMMENDATION

☐ Approve Substitution
☐ Approve Substitution as noted
☐ Reject Substitution - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

ENGINEER'S REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures. Prepare Change Order.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures. Prepare Change Order.
☐ Substitution rejected - Use specified materials.

Signed by: _____ Date: _____

END OF SECTION

TABLE OF CONTENTS

ARTICLE 1 THE CONTRACT DOCUMENTS

1.01 General

A. Contract Documents form the Contract. The Contract Documents are enumerated in the Agreement between the Port and Contractor ("Agreement"). Together, the Contract Documents form the Contract. The Contract represents the entire integrated agreement between the parties and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only in writing and only as set forth in the Contract Documents.

B. Headings only for convenience. The titles or headings of the sections, divisions, parts, articles, paragraphs, and subparagraphs of the Contract Documents are intended only for convenience.

1.02 Definitions

A. "Contractor" means the person or entity contracting to perform the Work under these Contract Documents. The term Contractor includes the Contractor's authorized representative for purposes of identifying obligations and responsibilities under the Contract Documents, including the ability to receive notice and direction from the Port.

B. "Drawings" are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, including plans, elevations, sections, details, and diagrams.

C. "Engineer" is the Port employee generally tasked with administering the Project on the Port's behalf and the person with overall responsibility for managing, for the Port, the Project scope, budget, and schedule. To the extent empowered, the Engineer may delegate to others at the Port (such as a Project Manager or Inspector) the responsibility for performing delegated responsibilities of the Engineer's under this Contract.

D. "Port" means the Port of Tacoma. The Port will designate in writing a representative (usually the Engineer) who shall have the authority to act on the Port's behalf related to the Project. The "Port" does not include staff, maintenance or safety workers, or other Port employees or consultants that may contact the Contractor or be present at the Project site.

E. "Project" is identified in the Agreement and is the total construction to be performed by or through the Port, of which the Work performed under the Contract Documents may be only a part.

F. "Specifications" are those portions of the Contract Documents that specify the written requirements for materials, equipment, systems, standards and workmanship for the Work and for the performance of related services.

G. "Subcontractor" means a person or entity that contracts directly with the Contractor to perform any Work under the Contract Documents. "Subcontractor of any tier" includes Subcontractors as well as any other person or entity, including suppliers, that contracts with a Subcontractor or a lower-tier Subcontractor (also referred to as "Sub-subcontractors") to perform any of the Work.

H. "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all labor, tools, equipment, materials, services and incidentals necessary to complete all obligations under the Contract Documents. The Work may constitute only a part of the Project, and may interface and need to be coordinated with the work of others.

1.03 Intent of the Contract Documents

A. Intent of Contract Documents. The intent of the Contract Documents is to describe the complete Work and to include all items necessary for the proper execution and completion of the Work by the Contractor.

B. Contract Documents are complementary. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor is required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

C. No third party contract rights. The Contract Documents shall not create a contractual relationship of any kind (1) between the Port and a Subcontractor of any tier (although the Port does not waive any third-party beneficiary rights it may otherwise have as to Subcontractors of any tier), (2) between the Contractor and the Engineer or other Port employees or consultants, or (3) between any persons or entities other than the Port and Contractor.

1.04 Correlation of the Contract Documents

A. Precedence. In the event of a conflict or discrepancy between or among the Contract Documents, the conflict or discrepancy will be resolved by the following order of precedence: with an addendum or Change Order having precedence over an earlier document, and computed dimensions having precedence over scaled dimensions and large scale drawings take precedence over small scale drawings:

1. The signed Agreement
2. Supplemental Conditions
3. General Conditions
4. Division 01 General Requirements of Specifications
5. All other Specifications, including all remaining divisions, material and system schedules and attachments, and Drawings
6. All other sections in Division 00 not specifically identified herein by Section.

B. Inconsistency between or among Contract Documents. If there is any inconsistency between the Drawings, schedules, or Specifications, or any attachments, the Contractor will make an inquiry to the Engineer to determine how to proceed, and, unless otherwise directed, the Contractor will provide the better quality or greater quantity of any work or materials, as reasonably interpreted by the Port, at no change in the Contract Sum or Contract Time. Thus, if Work is shown on Drawings but not contained in Specifications or schedules, or contained in Specifications or schedules but not shown on the Drawings, the Work as shown or contained will be provided at no change in the Contract Sum or Contract Time, according to Specifications or Drawings to be issued by the Port.

C. Inconsistency with law. In the event of a conflict between the Contract Documents and applicable laws, codes, ordinances, regulations or orders of governmental authorities having jurisdiction over the Work, or in the event of any conflict between such laws, the most stringent requirements govern.

D. Organization of Contract Documents. The organization of the Specifications and Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of the Work to be performed. The Port assumes no responsibility for the division and proper coordination of Work between particular Subcontractors.

E. Bid quantities are estimates only. Any "bid quantities" set forth in the Contract Documents are estimates only. The Port does not warrant that the actual amount of Work will correspond to any estimates. The basis of payment will be the actual quantities performed in accordance with the Contract Documents.

1.05 Ownership of the Contract Documents

A. Port owns all Contract Documents. All Drawings, Specifications, and other Contract Documents furnished to the Contractor are Port property, and the Port retains all intellectual property rights, including copyrights. The Contract Documents are to be used only with respect to the Project.

ARTICLE 2 PORT OF TACOMA

2.01 Authority of the Engineer

A. Engineer will be Port's representative. The Engineer or the Engineer's designee will be the Port's representative during the Project and will administer the Project on the Port's behalf.

B. Engineer may enforce all obligations. The Engineer has the authority to enforce all requirements imposed on the Contractor by the Contract Documents.

C. Only Engineer is agent of Port. Other than the Engineer, no other Port employee or consultant is an agent of the Port, and none are authorized to agree on behalf of the Port to changes in the Contract Sum or Contract Time, nor to waive provisions of the Contract Documents, nor to direct the Contractor to take actions that change the Contract Sum or Contract Time, nor to accept notice of protests or claims on behalf of the Port.

2.02 Administration of the Contract

A. Port will administer Contract. The Port will provide administration of the Contract through the Engineer or the Engineer's designee. All communications with the Port or its consultants related to the Contract will be through the designated representative.

B. Port not responsible for means and methods. The Port is not responsible for, and will have no control or charge of, the means, methods, techniques, sequences, or procedures of construction, or for safety precautions or programs incidental thereto, because these are the sole responsibility of the Contractor. If the Port makes any suggestion of means, methods, techniques, sequences or procedures, the Contractor will exercise its independent judgment in deciding whether to adopt the suggestion, except as otherwise provided in the Contract Documents.

C. Port not responsible for acts or omissions of Contractor or Subcontractors. The Port is not responsible for, and will have no control or charge of, the acts or omissions of the Contractor, Subcontractors of any tier, suppliers, or any of their agents or employees, or any other persons performing a portion of the Work.

D. Port not responsible for the Work. The Port is not responsible for the Contractor's failure to carry out the Work in accordance with the Contract Documents. The presence of the Engineer or others at the Project site at any time does not relieve the Contractor from its responsibility for non-conforming Work.

E. Port will have access to the Work. The Port and its representatives will at all times have access to the Work in progress, and the Contractor will provide proper facilities for such access and for inspection.

2.03 Information Provided by the Port

A. Port to furnish information with reasonable promptness. The Port shall furnish information and services required of the Port by the Contract Documents with reasonable promptness.

B. Subsurface investigation. The Port may have undertaken a limited investigation of the soil and other subsurface conditions at the Project site for design purposes only. The results of these investigations will be available for the convenience of the Contractor, but they are not Contract Documents. There is no warranty or guarantee, express or implied, that the conditions indicated are representative of those existing at the site or that unforeseen developments may not occur. The Contractor is solely responsible for interpreting the information.

2.04 Contractor Review of Project Information

A. Contractor to familiarize itself with site and conditions of Work. Prior to executing the Contract, the Contractor shall visit the site, become generally familiar with local conditions under which the Work is to be performed, and correlate personal observations with the requirements of the Contract Documents. By signing the Contract, the Contractor confirms that the Contract Sum is reasonable compensation for the Work; that the Contract Time is adequate; that it has carefully examined the Contract Documents and the Project site; and that it has satisfied itself as to the nature, location, and character of the Work, the labor, materials, equipment, and other items required and all other requirements of the Contract Documents. The Contractor's failure fully to acquaint itself with any such condition does not relieve the Contractor from the responsibility for performing the Work in accordance with the Contract Documents, within the Contract Time, and for the Contract Sum.

B. Contractor to review Contract Documents. Because the Contract Documents are complementary, the Contractor will, before starting each portion of the Work, carefully study and compare the various Drawings, Specifications, and other Contract Documents, as well as all information furnished by the Port.

C. Contractor to confirm field conditions. Before starting each portion of the Work the Contractor shall take field measurements of and verify any existing conditions, including all Work in place, and all general reference points; shall observe any conditions at the site affecting the Contractor; and shall carefully compare field measurements, conditions and other information known to the Contractor with the Contract Documents.

2.05 Port's Right to Reject, Stop and/or Carry-Out the Work

A. Port may reject Work. The Port has the authority but not the obligation to reject work, materials and equipment that is defective or that otherwise does not conform to the Contract Documents, and to decide questions concerning the Contract Documents. However, the failure to so reject or the presence of the Port at the site shall not be construed as assurance that the Work is acceptable or being completed in compliance with the Contract Documents.

B. Port may stop Work. If the Contractor fails to correct Work that does not comply with the requirements of the Contract Documents, or repeatedly or materially fails to properly carry out the Work, the Port may issue an order to stop all or a portion of the Work until the cause for the order has been eliminated. The Port's right to stop the Work shall not impose a duty on the Port to exercise this right for the benefit of the Contractor or any third party.

B. Port may carry-out Work. If the Contractor fails to perform the Work properly, fails to perform any provision of this Contract, or fails to maintain the Progress Schedule, or if the Port reasonably concludes that the Work will not be completed in the specified manner or within the Contract Time, then the Port may, after three (3) days' written notice to the Contractor and without prejudice to any other remedy the Port may have, perform itself or have performed any or all of the Work and may deduct the cost thereof from any payment then or later due the Contractor.

2.06 Separate Contractors

A. Port may engage separate contractors or perform work with its own forces. The Port may contract with other contractors ("Separate Contractor") in connection with the Project or perform work with its own forces. The Contractor shall coordinate and cooperate with any Port forces or Separate Contractors, as applicable. The Contractor shall provide reasonable opportunity for the introduction and storage of materials and the execution of work by others.

B. Contractor to inspect work of others. If any part of the Contractor's Work depends on the work of the Port or any Separate Contractor, the Contractor shall inspect and promptly report to the Port, in writing, any defects that impact the Contractor. Failure of the Contractor to so inspect and report defects in writing shall constitute an acceptance by Contractor of the work of the Port or Separate Contractor.

C. Contractor to resolve claims of others. Should the Contractor or any of its Subcontractors of any tier cause damage of any kind, including but not limited to delay, to any Separate Contractor, the Contractor shall promptly and using its best efforts settle or otherwise resolve the dispute with the Separate Contractor. The Contractor shall also promptly remedy damage caused to completed or partially completed construction.

2.07 Officers and Employees of the Port

A. No personal liability. Officers, employees, and representatives of the Port, including the Commissioners, acting within the scope of their employment, shall not be personally liable to Contractor for any acts or omissions arising out of the Project.

ARTICLE 3 CONTRACTOR'S RESPONSIBILITIES

3.01 Duty to Perform the Entire Work

A. Contractor must perform entire Work in accordance with Contract Documents. The Contractor shall perform the entire Work required by the Contract in accordance with the Contract Documents. Unless otherwise specifically provided, the Contractor shall provide and pay for all labor, tools, equipment, materials, electricity, power, water, other utilities, transportation and other facilities necessary for the execution and completion of the Work.

B. Contractor shall be independent contractor. The Contractor shall be and operate as an independent contractor in the performance of the Work. The Contractor is not authorized to enter into any agreements or undertakings for or on behalf of the Port and is not an agent or employee of the Port.

3.02 Observed Errors, Inconsistencies, Omissions or Variances in the Contract Documents

A. Contractor to notify Port of any discrepancy. The Contractor's obligations to review and carefully study the Contract Documents and field conditions are for the purpose of facilitating coordination and construction. If the Contractor at any time observes that the Contract Documents, including Drawings and Specifications, vary from the conditions of the Project site, are in error, or omit any necessary detail, the Contractor shall promptly notify the Engineer in writing through a Request for Information. Any Work done after such observation, until authorized by the Engineer, shall be at Contractor's risk. The Contractor shall also promptly report to the Engineer any observed error, inconsistency, omission, or variance with applicable laws through a Request for Information. If the Contractor fails either to carefully study and compare the Contract Documents, or to promptly report any observed error, inconsistency, omission, or variance, the Contractor shall assume full responsibility and shall bear all costs, liabilities and damages attributable to the error, inconsistency, omission, or variance.

B. Requests for Information. The Contractor shall submit Requests for Information concerning the Contract Documents by following the procedure and using such form as the Port may require. The Contractor shall minimize Requests for Information by thoroughly studying the Contract Documents and reviewing all Subcontractor requests. The Contractor shall allow adequate time in its planning and scheduling for a response from the Port to a Request for Information.

C. Port may provide information to supplement Drawings and Specifications. Minor items of work or detail that are omitted from the Drawings and Specifications but inferable from the information presented and normally provided by accepted good practice shall be provided and/or performed by the Contractor as part of the Contract Sum and within the Contract Time. Similarly, the Engineer may furnish to the Contractor additional Drawings and clarifications, consistent with the Contract Documents, as necessary to detail and illustrate the Work. The Contractor shall conform its Work to such additional Drawings and clarifications at no increase in the Contract Sum or Contract Time.

3.03 Supervision and Responsibility for Subcontractors

A. Contractor responsible for Work and workers. The Contractor shall have complete control of the means, methods, techniques, sequences or procedures related to the Work, and for all safety precautions or programs. The Contractor shall have complete control over and responsibility for all personnel performing the Work. The Contractor is also responsible for the acts and omissions of the Contractor's principals, employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors of any tier.

B. Contractor to supervise the Work. The Contractor shall continuously supervise and direct the Work using competent and skilled personnel and the Contractor's best skill and attention.

C. Contractor to enforce discipline and good order. The Contractor shall enforce strict discipline and good order among all workers on the Project, and shall not employ any unfit person or anyone not skilled in the work to which they are assigned. Incompetent, careless, or negligent workers shall immediately be removed from the Work. The Port may, but is not obligated to, require the Contractor to remove from the Work, at no change in the Contract Sum or Contract Time, anyone whom the Port considers objectionable.

3.04 Materials and Equipment

A. Material and equipment to be new. All materials and equipment to be incorporated into the Work shall be new unless specifically provided otherwise in the Contract Documents. ~~The Contractor shall, if required in writing by the Port, furnish satisfactory evidence regarding the kind and quality of any materials, identify the source, and warrant compliance with the Contract Documents.~~ The Contractor shall ensure that all materials and equipment are protected, kept dry and stored under cover in a manner to protect such materials and equipment.

B. Material and equipment shall conform to manufacturer instructions. All materials and equipment shall conform, and shall be applied, installed, used, maintained and conditioned in accordance with, the instructions of the applicable manufacturer, fabricator or processor, unless otherwise specifically provided by the Engineer.

3.05 Contractor Warranties

A. Work will be of good quality and performed in workmanlike manner. In addition to any specific warranties set forth in the Contract Documents, the Contractor warrants that the Work, including all materials and equipment furnished under the Contract, will be of good quality and new, will be performed in a skillful and workmanlike manner and will conform to the requirements of the Contract Documents. Any Work not conforming to this warranty, including unapproved or unauthorized substitutions, shall be considered defective.

B. Work will be free from defects. The Contractor warrants that the Work will be free from defects for a period of one (1) year from the date of Substantial Completion of the Project.

C. Contractor to collect and deliver warranties to Port. ~~The Contractor shall collect and deliver to the Port any written warranties required by the Contract Documents.~~ These warranties shall be obtained and enforced by the Contractor for the benefit of the Port without the necessity of separate assignment. ~~These warranties shall extend to the Port all rights, claims, benefits and interests that the Contractor may have under express or implied warranties or guarantees against a Subcontractor of any tier, supplier or manufacturer for defective or non-conforming Work.~~ Warranty provisions that purport to limit or alter the Port's rights under the Contract Documents or the laws of the State of Washington are null and void.

D. General requirements. The Contractor is not relieved of its general warranty obligations by the specification of a particular product or procedure in the Contract Documents. Warranties in the Contract Documents shall survive completion, acceptance and final payment.

3.06 Required Wages

A. Contractor will pay required wages. The Contractor shall pay (and shall ensure that all Subcontractors of any tier pay) all prevailing wages and other wages (such as Davis-Bacon Act wages) applicable to the Project. See Specification Section 00 73 46.

B. The Contractor shall defend (at Contractor's sole cost, with legal counsel approved by Port), indemnify and hold the Port harmless from all liabilities, obligations, claims, demands, damages, disbursements, lawsuits, losses, fines, penalties, costs and expenses, whether direct or indirect, and including but not limited to attorneys' fees and consultants' fees and other costs and expenses of litigation, from any violation or alleged violation by the Contractor or any Subcontractor of any tier of RCW 39.12 ("Prevailing Wages on Public Works") or Chapter 51 RCW ("Industrial Insurance").

3.07 State and Local Taxes

A. Contractor will pay taxes on consumables. The Contractor will pay the retail sales tax on all consumables used during performance of the Work and on all items that are not incorporated into the final Work; this tax shall be included in the Contract Sum.

B. Port will pay taxes on the Contract Sum. The Port will pay state and local retail sales tax on the Contract Sum with each progress payment and on final payment for transmittal by the Contractor to the Washington State Department of Revenue or to the applicable local taxing authority. Rule 170: WAC 458-20-170.

C. Direct all tax questions to the Department of Revenue. The Contractor should direct all questions concerning taxes on any portion of the Work to the State of Washington Department of Revenue or to the local taxing authority.

D. State Sales Tax – Rule 171: WAC 458-20-171. For work performed related 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, the Contractor shall include Washington State Retail Sales Taxes in the various schedule prices, or other contract amounts, including those that the Contractor pays on the purchase of materials, equipment, or supplies used or consumed in doing the Work.

1. The bid form will indicate which bid items are subject to Rule 171. Any such identification by the Port is not binding upon the Department of Revenue.

3.08 Permits, Licenses, Fees, and Royalties

A. Contractor to provide and pay for permits unless otherwise specified. Unless otherwise specified, the Contractor shall procure and pay for all permits, licenses, and governmental inspection fees necessary or incidental to the performance of the Work. All costs related to these permits, licenses, and inspections shall be included in the Contract Sum. Any action taken by the Port to assist the Contractor in obtaining permits or licenses shall not relieve the Contractor of its sole responsibility to obtain and pay for permits, licenses, and inspections as part of the Contract Sum.

B. Contractor's obligations when permit must be in Port's name. When applicable law or agency requires a permit to be issued to a public agency, the Port will support the Contractor's request for the permit and accept the permit in the Port's name, if:

1. The Contractor takes all necessary steps required for the permit to be issued;
2. The permit applies to Work performed in connection with the Project; and
3. The Contractor agrees in writing to abide by all requirements of the permit and to defend and hold harmless the Port from any liability in connection with the permit.

C. Contractor to pay royalties. The Contractor shall pay all royalties and license fees required for the Work unless otherwise specified in the Contract Documents.

3.09 Safety

A. Contractor solely responsible for safety. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work and the performance of the Contract.

B. Port not responsible for safety. The Port may identify safety concerns to the Contractor. However, no action or inaction of the Port or any third party relating to safety will: (1) relieve the Contractor of its sole and complete responsibility for safety and sole liability for any consequences; (2) impose any obligation on the Port or a third party to inspect or review the Contractor's safety program or precautions; (3) impose any continuing obligation on the Port or a third party to ensure the Contractor performs the Work safely; or (4) affect the Contractor's responsibility for the protection of property, workers, and the general public.

C. Contractor to maintain a safe Work site. The Project site may be occupied during performance of the Work. The safety of these site occupants is of paramount importance to the Port. The Contractor shall maintain the Work site and perform the Work in a safe manner and in accordance with the Washington Industrial Safety and Health Act (WISHA) and all other applicable safety laws, rules, and regulations. This requirement shall apply continuously and not be limited to working hours.

D. Contractor to protect Work site and adjacent property until Final Completion. The Contractor shall continuously protect the Work and adjacent property from damage. At all times until Final Completion, the Contractor shall be responsible for and protect from damage, weather, deterioration, theft, and vandalism the Work and all materials, equipment, tools, and other items incorporated or to be incorporated in the Work, and shall repair any damage, injury or loss.

3.10 Correction of Work

A. Contractor to correct defective Work. The Contractor shall, at no cost to the Port, promptly correct Work that is defective or that otherwise fails to conform to the requirements of the Contract Documents. Such Work shall be corrected, whether before or after Substantial Completion, and even if it was previously inspected or observed by the Port.

B. One-year correction period. The Contractor shall correct all defects in the Work appearing within one (1) year of Substantial Completion or within any longer period prescribed by law or by the Contract Documents. The Contractor shall initiate remedial action within fourteen (14) days of receipt of notice from the Port and shall complete remedial work within a reasonable time. Work corrected by the Contractor shall be subject to the provisions of this Section 3.10 for an additional one-year period following the Port's acceptance of the corrected Work.

C. Contractor responsible for defects and failures to correct. The Contractor shall be responsible for any expenses incurred by the Port resulting from defects in the Work. If the Contractor refuses or neglects to correct the defects or does not timely accomplish corrections, the Port may correct the Work and charge the Contractor the cost of the corrections. If damage or loss of service may result from a delay in correction, the corrections may be made by the Port and reimbursed by the Contractor.

D. Port may accept defective work. The Port may, at its sole option, elect to retain defective or nonconforming Work. In such a case, the Port shall reduce the Contract Sum by a reasonable amount to account for the defect or non-conformance.

E. No period of limitation established. Nothing contained in this Section 3.10 establishes a period of limitation with respect to any obligations under the Contract Documents or law. The establishment of the one (1) year correction period relates only to the specific obligation of the Contractor to correct defective or non-conforming Work.

3.11 Uncovering of Work

A. Contractor to uncover work covered prior to inspection. If any portion of the Work is covered prior to inspection and approval, the Contractor shall, at its expense, uncover or remove the Work for inspection by the Port or others, and replace the Work to the standard required by the Contract Documents.

B. Contractor to uncover work at Port's request. After initial inspection and observation, the Port may order a reexamination of Work, and the Work must be uncovered by the Contractor. If the uncovered Work complies with the Contract Documents, the Port shall pay the cost of reexamination and replacement. If the Work is found not to comply with the Contract Documents, the Contractor shall pay the cost of replacement unless the Contractor demonstrates that it did not cause the defect in the Work.

3.12 Relocation of Utilities

A. Contractor should assume underground utilities are in approximate locations. The Contractor should assume that the locations of any underground or hidden utilities, underground tanks, and plumbing or electrical runs indicated in surveys or the Contract Documents are shown in approximate locations. The accuracy of this information is not guaranteed by the Port and ~~shall be verified by the Contractor~~. The Contractor shall comply with RCW 19.122.030 and utilize a utility locator service to locate utilities on Port property. The Contractor shall bear the risk of loss if any of its Work directly or indirectly damages or interrupts any utility service or causes or contributes to damages of any nature.

B. Utility relocation or removal. Where relocation or removal of utilities is necessary or required, it shall be performed at the Contractor's sole expense, unless the Contract Documents specify otherwise. If a utility owner is identified as being responsible for relocating or removing utilities, the work will be accomplished at the utility owner's convenience, either during or in advance of construction. Unless otherwise specified, it shall be the Contractor's sole responsibility to coordinate, schedule, and pay for work performed by a utility owner.

C. Contractor to notify Port of unknown utilities. If the Contractor discovers the presence of any unknown utilities, it shall immediately notify the Engineer in writing.

3.13 Labor

A. Contractor responsible for labor peace. ~~The Contractor is responsible for labor peace relating to the Work and shall cooperate in maintaining Project-wide labor harmony. The Contractor shall use its best efforts as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes or strikes.~~

B. Contractor to minimize impact of labor disputes. The Contractor will take all necessary steps to prevent labor disputes from disrupting or otherwise interfering with access to Port property. If a labor dispute disrupts the progress of the Work or interferes with access, the Contractor shall promptly and expeditiously take all necessary action to eliminate or minimize the disruption or interference.

3.14 Indemnification

A. Duty to defend, indemnify, and hold harmless. To the fullest extent permitted by law and subject to this Section 3.14, the Contractor shall defend (at the Contractor's sole cost, with legal counsel approved by Port), indemnify and hold harmless the Port, including its Commission, officers, managers, employees (including the Engineer), any consultants, and the agents and employees, successors and assigns of any of them (the "Indemnified Parties") from and against claims, damages, lawsuits, losses (including loss of use), disbursements, liabilities, obligations, fines, penalties, costs and expenses, whether direct and indirect or consequential, including but not limited to consultants' fees, and attorneys' fees incurred on such claims and in proving the right to indemnification ("Claims"), arising out of or resulting from the acts or omissions of the Contractor, a Subcontractor of any tier, their agents and anyone directly or indirectly employed by any of them or anyone for whose acts they may be liable (individually and collectively, the "Indemnitor").

B. Duty to defend, indemnify, and hold harmless for sole negligence. The Contractor will fully defend, indemnify, and hold harmless the Indemnified Parties for the sole negligence or willful misconduct of the Indemnitor.

C. Duty to defend, indemnify, and hold harmless for concurrent negligence. Where Claims arise from the concurrent negligence of (1) the Port and (2) the Indemnitor, the Contractor's obligations to indemnify and defend the Indemnified Parties under this Section 3.14 shall be effective only to the extent of the Indemnitor's negligence.

D. Duty to indemnify not limited by workers' compensation or similar employee benefit acts. In claims against any of the Indemnified Parties by an employee of the Contractor, a Subcontractor of any tier, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under this Section 3.14 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable under workers' compensation acts, disability benefit acts or other employee benefit acts. After mutual negotiation of the parties, the Contractor waives immunity as to the Indemnified Parties under Title 51 RCW, "Industrial Insurance."

E. Intellectual property indemnification. The Contractor will be liable for and shall defend (at the Contractor's sole cost, with legal counsel approved by Port) indemnify and hold the Indemnified Parties harmless for Claims for infringement by the Contractor of copyrights or patent rights arising out of or relating to the Project.

F. Labor peace indemnification. If the Contractor fails to satisfy its labor peace obligations under the Contract, the Contractor will be liable for and shall defend (at the Contractor's sole cost, with legal counsel approved by Port), indemnify and hold harmless the Indemnified Parties for Claims brought against the Port by third parties (including but not limited to lessees, tenants, contractors, customers, licensees and invitees of the Port) for injunctive relief or monetary loss.

G. Joinder. The Contractor agrees to being added by the Port as a party to any arbitration or litigation with third parties in which the Port alleges indemnification or seeks contribution from the Indemnitor. The Contractor shall cause each of its Subcontractors of any tier to similarly stipulate in their subcontracts; in the event any does not, the Contractor shall be liable in place of such Subcontractor(s) of any tier.

H. Other. To the extent that any portion of this Section 3.14 is stricken by a court or arbitrator for any reason, all remaining provisions shall retain their vitality and effect. The obligations of the Contractor under this Section 3.14 shall not be construed to negate, abridge, or otherwise reduce any other right or obligations of indemnity which would otherwise exist. To the extent the wording of this Section 3.14 would reduce or eliminate an available insurance coverage, it shall be considered modified to the extent necessary so that the insurance coverage is not affected. This Section 3.14 shall survive completion, acceptance, final payment and termination of the Contract.

3.15 Waiver of Consequential Damages

A. Mutual waiver of consequential damages. The Contractor and Port waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes but is not limited to: (1) damages incurred by the Port for rental expenses, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and (2) damages incurred by the Contractor for principal and home office overhead and expenses including but not limited to the compensation of personnel stationed there, for losses of financing, business and reputation, for losses on other projects, for loss of profit, and for interest or financing costs. This mutual waiver includes but is not limited to all consequential damages due to either party's termination.

B. Limitation. Nothing contained in this Section 3.15, however, shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents, to preclude damages specified in the Agreement or to affect the Contractor's obligation to indemnify the Port for direct, indirect or consequential damages alleged by a third party.

ARTICLE 4 SUBCONTRACTORS AND SUPPLIERS

4.01 Responsibility for Actions of Subcontractors and Suppliers.

A. Contractor responsible for Subcontractors. The Contractor is fully responsible to the Port for the acts and omissions of its Subcontractors of any tier and all persons either directly or indirectly employed by the Contractor or its Subcontractors.

4.02 Award of Contracts to Subcontractors and Suppliers

A. Contractor to provide proposed Subcontractor information. The Contractor, within ten (10) days after the Port's notice of award of the Contract, shall provide to the Engineer with the names of the persons or entities proposed to perform each of the principal portions of the Work (i.e., either a Subcontractor listed in a bid or proposal or a Subcontractor performing Work valued at least ten percent (10%) of the Contract Sum) and the proprietary names and the suppliers of the principal items or systems of materials and equipment proposed for the Work. No progress payment will become due until after this information has been furnished.

B. Port to respond promptly with objections. The Port may respond promptly to the Contractor in writing stating (1) whether the Port has reasonable objection to any proposed person or entity or (2) whether the Port requires additional time for review. If the Port makes a reasonable objection, the Contractor shall replace the Subcontractor with no increase to the Contract Sum or Contract Time. Such a replacement shall not relieve the Contractor of its responsibility for the performance of the Work and compliance with all of the requirements of the Contract within the Contract Sum and Contract Time.

C. Reasonable objection defined. "Reasonable objection" as used in this Section 4.02 includes but is not limited to: (1) a proposed Subcontractor of any tier different from the entity listed with the bid, (2) lack of "responsibility" of the proposed Subcontractor, as defined by Washington law and the Bidding Documents, or lack of qualification or responsibility of the proposed Subcontractor based on the Contract or Bidding Documents, or (3) failure of the Subcontractor to perform satisfactorily in the Port's opinion (such as causing a material delay or submitting a claim that the Port considers inappropriate) on one or more projects for the Port within five (5) years of the bid date.

D. No substitution allowed without permission. The Contractor shall not substitute a Subcontractor, person, or organization without the Engineer's written consent.

4.03 Subcontractor and Supplier Relations

A. Contractor to schedule, supervise, and coordinate Subcontractors. The Contractor shall schedule, supervise and coordinate the operations of all Subcontractors of any tier, including suppliers. The Contractor shall ensure that appropriate Subcontractors coordinate the Work of lower-tier Subcontractors.

B. Subcontractors to be bound to Contract Documents. By appropriate agreement, the Contractor shall require each Subcontractor and supplier to be bound to the terms of the Contract Documents and to assume toward the Contractor, to the extent of their Work, all of the obligations that the Contractor assumes toward the Port under the Contract Documents. Each subcontract shall preserve and protect the rights of the Port and shall allow to the Subcontractor, unless specifically provided in the subcontract, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Port. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with lower-tier Subcontractors.

C. Contractor to correct deficiencies in Subcontractor performance. When a portion of the Work subcontracted by the Contractor is not being prosecuted in accordance with the Contract Documents, or if such subcontracted Work is otherwise being performed in an unsatisfactory manner in the Port's opinion, the Contractor shall, on its own initiative or upon the written request of the Port, take immediate steps to correct the deficiency or remove the non-performing party from the Project. The Contractor shall replace inadequately performing Subcontractors upon request of the Port at no change in the Contract Sum or Contract Time.

E. Contractor to provide subcontracts. Upon request, the Contractor will provide the Port copies of written agreements between the Contractor and any Subcontractor.

ARTICLE 5 WORKFORCE AND NON-DISCRIMINATION REQUIREMENTS

5.01 Compliance with Non-Discrimination Laws

A. Contractor to comply with non-discrimination laws. The Contractor shall fully comply with all applicable laws, regulations, and ordinances pertaining to non-discrimination.

5.02 Small Business Enterprise Participation.

A. Small business participation encouraged. The Port's policy is to encourage the Contractor to solicit and document participation, and to provide and promote the maximum lawful, practicable opportunity for increased participation, by small business enterprises.

ARTICLE 6 CONTRACT TIME AND COMPLETION

6.01 Contract Time

A. Contract Time is measured from Contract execution. Unless otherwise provided in the Agreement, the Contract Time is the period of time, including authorized adjustments, specified in the Contract Documents from the date the Contract is executed to the date Substantial Completion of the Work is achieved.

B. Commencement of the Work. The Contractor shall begin Work in accordance with the notice of award and the notice to proceed and shall complete all Work within the Contract Time. When the Contractor's signed Agreement, required insurance certificate with endorsements, bonds and other submittals required by the notice of award have been accepted by the Port, the Port will execute the Contract and, following receipt of other required pre-work submittals, will issue a notice to proceed to allow the Contractor to mobilize and commence physical Work at the Project site, as further described in these contract documents. No Work at the Project site may commence until the Port issues a notice to proceed.

C. Contractor shall achieve specified completion dates. The Contractor shall achieve Substantial Completion within the Contract Time and shall achieve Final Completion within the time period thereafter stated in the Contract Documents.

D. Time is of the essence. Time limits stated in the Contract Documents, including any interim milestones, are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

6.02 Progress and Completion

A. Contractor to maintain schedule. The Contractor's sequence and method of operations, application of effort, and work force shall at all times be created and implemented to ensure the orderly, expeditious, and timely completion of the Work and performance of the Contract. ~~The Contractor shall furnish sufficient forces and shall work such hours, including extra shifts, overtime operations and weekend and holiday work as may be necessary to ensure completion of the Work within the Contract Time and the approved Progress Schedule.~~

~~B. Contractor to take necessary steps to meet schedule. If the Contractor fails substantially to perform in a timely manner in accordance with the Contract Documents and, through the fault of the Contractor or Subcontractor(s) of any tier, fails to meet the Progress Schedule, the Contractor shall take such steps as may be necessary to immediately improve its progress by increasing the number of workers, shifts, overtime operations or days of work, or by other means and methods, all without additional cost to the Port.~~ If the Contractor believes that any action or inaction of the Port constitutes acceleration, the Contractor shall immediately notify the Port in writing and shall not accelerate the Work until the Port either directs the acceleration in writing or denies the constructive acceleration.

C. Liquidated damages not exclusive. Any provisions in the Contract Documents for liquidated damages shall not preclude other damages due to breaches of Contract of the Contractor.

6.03 Substantial Completion

A. Substantial Completion defined. Substantial Completion is the stage in the progress of the Work, or portion or phase thereof, when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Port can fully occupy or utilize the Work, or the designated portion thereof, for its intended use, all requirements in the Contract Documents for Substantial Completion have been achieved, and all required documentation has been properly submitted to the Port in accordance with the Contract Documents. All Work other than incidental corrective or punch list Work and final cleaning must be completed. The fact that the Port may occupy the Work or a designated portion thereof does not indicate that Substantial Completion has occurred or that the Work is acceptable in whole or in part.

B. Work not Substantially Complete unless Final Completion attainable. The Work is not Substantially Complete unless the Port reasonably judges that the Work can achieve Final Completion within the period of time specified in the Contract Documents.

C. Notice of Substantial Completion. When the Work or designated portion has achieved Substantial Completion, the Port will provide a notice to establish the date of Substantial Completion. The notice shall establish responsibilities of the Port and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all remaining Work. If the notice of Substantial Completion does not so state, all responsibility for the foregoing items shall remain with the Contractor until Final Completion.

6.04 Completion of Punch List

A. Contractor shall complete punch list items prior to Final Completion. The Contractor shall cause punch list items to be completed prior to Final Completion. If, after Substantial Completion, the Contractor does not expeditiously proceed to correct punch list items or if the Port considers that the punch list items are unlikely to be completed prior to the date established for Final Completion (or such other period of time as is specified in the Contract Documents), the Port may, upon seven (7) days' written notice to the Contractor, take over and perform some or all of the punch list items. The Port may also take over and complete any portion of the Work at any time following Substantial Completion and deduct the actual cost of performing the Work (including direct and indirect costs) from the Contract Sum. The Port's rights under this Section 6.04 are not obligations and shall not relieve the Contractor of its responsibilities under any other provisions of the Contract Documents.

6.05 Final Completion

A. Final Completion. Upon receipt of written notice from the Contractor that all punch list items and other Contract requirements are completed, the Contractor will notify the Port, and the Port will perform a final inspection. If the Port determines that some or all of the punch list items have not been addressed, the Contractor shall be responsible to the Port for all costs, including re-inspection fees, for any subsequent reviews to determine completion of the punch list. When the Port determines that all punch list items have been satisfactorily addressed, that the Work is acceptable under the Contract Documents and that the Work has fully been performed, the Port will promptly notify the Contractor of Final Completion.

B. Contractor responsible for costs if Final Completion is not timely achieved. In addition to any liquidated damages, the Contractor is liable for, and the Port may deduct from any amounts due the Contractor, all costs incurred by the Port for services performed after the contractual date of Final Completion, whether or not those services would have been performed prior to that date had Final Completion been timely achieved.

C. Final Completion submittals. The Port is not obligated to accept the Project as complete until the Contractor has submitted all required submittals to the Port.

D. Contractor responsible for the Work until Final Completion. The Contractor shall assume the sole risk of loss and responsibility for all Work under the Contract, and all materials to be incorporated in the Work, whether in storage or at the Project site, until Final Completion. Damage from any cause to either permanent or temporary Work, utilities, materials, equipment, existing structures, the site, or other property owned by the Port or others, shall be repaired by the Contractor to the reasonable satisfaction of the Port at no change in the Contract Sum.

6.06 Final Acceptance

A. Final Acceptance. Final Acceptance is the formal action of the Port accepting the Project as complete. Public notification of Final Acceptance will be posted on the Port's external website (http://www.portoftacoma.com/final-acceptance).

B. Final Acceptance not an acceptance of defective Work. Final Acceptance shall not constitute acceptance by the Port of unauthorized or defective Work, and the Port shall not be prevented from requiring the Contractor to remove, replace, repair, or dispose of unauthorized or defective Work or recovering damages due to the same.

C. Completion of Work under RCW 60.28. Pursuant to RCW 60.28, "Lien for Labor, Materials, Taxes on Public Works," completion of the Contract Work shall occur upon Final Acceptance.

6.07 Port's Right to Use the Premises

A. Port has right to use and occupy Work. The Port reserves the right to occupy or use any part of the Work before or after Substantial Completion of some or all of the Work without relieving the Contractor of any of its obligations under the Contract. Such occupancy or use shall not constitute acceptance by the Port of any of the Work, and shall not cause any insurance to be canceled or lapse.

B. No compensation due if Port elects to use and occupy Work. No additional compensation shall be due to the Contractor as a result of the Port's use or occupancy of the Work or a designated portion.

ARTICLE 7 PAYMENT

7.01 All Payments Subject to Applicable Laws and Schedule of Values

A. Payment of the Contract Sum. The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Port to the Contractor for performance of the Work under the Contract Documents. Payments made to the Contractor are subject to all laws applicable to the Port and the Contractor. Payment of the Contract Sum constitutes full compensation to the Contractor for performance of the Work, including all risk, loss, damages, or expense of whatever character arising out of the nature or prosecution of the Work. The Port is not obligated to pay for extra work or materials furnished without prior written approval of the Port.

B. Schedule of Values. All payments will be based upon an approved Schedule of Values. Prior to submitting its first Application for Payment, the Contractor shall submit a Schedule of Values to the Port allocating the entire Contract Sum to the various portions of the Work. The Schedule of Values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Port may require. This schedule, unless objected to by the Port, shall be used as a basis for reviewing the Contractor's applications for payment.

7.02 Applications for Payment

A. Applications for Payment. Progress payments will be made monthly for Work duly certified, approved by the Engineer, and performed (based on the Schedule of Values and actual quantities of Work performed) during the calendar month preceding the Application for Payment. These amounts are paid in trust to the Contractor for distribution to Subcontractors to the extent and in accordance with the approved Application for Payment.

7.03 Progress Payments

A. Progress payments. Following receipt of a complete Application for Payment, the Engineer will either authorize payment or indicate in writing to the Contractor the specific reasons why the payment request is being denied, in whole or in part, and the remedial action the Contractor must take to receive the withheld amount. After a complete Application for Payment has been received and approved by the Port, payment will be made within thirty (30) days. Any payments made by, or through, or following receipt of payment from third parties will be made in accordance with the third party's policies and procedures.

B. Port may withhold payment. The Port may withhold payment in whole or in part as provided in the Contract Documents or to the extent reasonably necessary to protect the Port from loss or potential loss for which the Contractor is responsible, including loss resulting from the Contractor's acts and omissions.

7.04 Payment by Contractor to Subcontractors

A. Payment to Subcontractors. With each Application for Payment, the Contractor shall provide a list of Subcontractors to be paid by the Contractor. No payment request shall include amounts the Contractor does not intend to pay to a Subcontractor because of a dispute or other reason. If, however, after submitting an Application for Payment but before paying a Subcontractor, the Contractor discovers that part or all of a payment otherwise due to the Subcontractor is subject to withholding from the Subcontractor under the subcontract (such as for unsatisfactory performance or non-payment of lower-tier Subcontractors), the Contractor may withhold the amount as allowed under the subcontract, but it shall give the Subcontractor and the Port written notice of the remedial actions that must be taken and pay the Subcontractor within eight (8) working days after the Subcontractor satisfactorily completes the remedial action identified in the notice.

B. Payment certification to be provided upon request. The Contractor shall provide with each Application for Payment a certification signed by Contractor attesting that all payments by the Contractor to Subcontractors from the last Application for Payment were made within ten (10) days of the Contractor's receipt of payment. The certification will also attest that the Contractor will make payment to Subcontractors for the current Application for Payment within ten (10) days of receipt of payment from the Port.

7.05 Final Payment

A. Final payment. Final applications for payment are due within seven (7) days following Final Completion. Final payment of the unpaid balance of the Contract Sum, except retainage, will be made following Final Completion and within thirty (30) days of the Contractor's submission of an approved final Application for Payment.

B. Releases required for final payment. The final payment shall not become due until the Contractor delivers to the Port a complete release of all liens arising out of the Contract, as well as an affidavit stating that, to the best of Contractor's knowledge, its release includes all labor and materials for which a lien could be filed. If a Subcontractor of any tier refuses to furnish a release or waiver required by the Port, the Port may (a) retain in the fund, account, or escrow funds in such amount as to defray the cost of foreclosing the liens of such claims and to pay attorneys' fees, the total of which shall be no less than 150% of the claimed amount, or (b) accept a bond from the Contractor, satisfactory to the Port, to indemnify the Port against the lien. If any such lien remains unsatisfied after all payments from the retainage are made, the Contractor shall refund to the Port all moneys that the Port may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

C. Contractor to hold Port harmless from liens. The Contractor shall defend (at the Contractor's sole cost, with legal counsel approved by Port), indemnify, and hold harmless the Port from any liens, claims, demands, lawsuits, losses, damages, disbursements, liabilities, obligations, fines, penalties, costs and expenses, whether direct, indirect, including but not limited to attorneys' fees and consultants' fees and other costs and expenses, except to the extent a lien has been filed because of the failure of the Port to make a contractually required payment.

7.06 Retainage

A. Retainage to be withheld. In accordance with RCW 60.28, a sum equal to five percent (5%) of each approved Application for Payment shall be retained. Prior to submitting its first Application for Payment, the Contractor shall exercise one of the options listed below:

1. Retained percentages will be retained by the Port in a fund; or
2. Deposited by the Port in an interest-bearing account in a bank, mutual savings bank or savings and loan association; or
3. Placed in escrow with a bank or trust company; or
4. If the Contractor provides a bond in place of retainage, it shall be in an amount equal to 5% of the Contract Sum plus Change Orders. The retainage bond shall be based on the form furnished in Section 00 61 23 or otherwise acceptable to the Port and duly completed and signed by a licensed surety or sureties registered with the Washington State Insurance Commissioner and on the currently authorized insurance list published by the Washington State Insurance Commissioner. The surety or sureties must be rated at least A minus, FSC(6), or higher by A.M. Best Rating Guide and be authorized by the Federal Department of the Treasury. Attorneys-in-fact who sign the retainage bond must file with each bond a certified and effective Power of Attorney statement.

B. Contractor may withhold retainage from Subcontractors. The Contractor or a Subcontractor may withhold not more than five percent (5%) retainage from the monies earned by any Subcontractor or lower-tier Subcontractor, provided that the Contractor pays interest to the Subcontractor at the same interest rate it receives from its reserved funds. If requested by the Port, the Contractor shall specify the amount of retainage and interest due a Subcontractor.

C. Release of retainage. Retainage will be withheld and applied by the Port in a manner required by RCW 60.28 and released in accordance with the Contract Documents and statutory requirements. Release of the retainage will be processed in the ordinary course of business within sixty (60) days following Final Acceptance of the Work by the Port provided that no notice of lien has been given as provided in RCW 60.28, that no claims have been brought to the attention of the Port, that the Port has no claims under this Contract, and that release of retention has been duly authorized by the State. The following items must also be obtained prior to release of retainage: pursuant to RCW 60.28, a certificate from the Department of Revenue; pursuant to RCW 50.24, a certificate from the Department of Employment Security; and appropriate information from the Department of Labor and Industries including approved affidavits of wages paid for the Contractor and each subcontractor.

7.07 Disputed Amounts

A. Disputed amounts. If the Contractor believes it is entitled to payment for Work performed during the prior calendar month in addition to the agreed-upon amount, the Contractor may submit to the Port along with the approved Application for Payment, a separate written payment request specifying the exact additional amount claimed to be due, the category in the Schedule of Values to which the payment would apply, the specific Work for which additional payment is sought, and an explanation of why the Contractor believes additional payment is due.

7.08 Effect of Payment

A. Payment does not relieve Contractor of obligations. Payment to the Contractor of progress payments or final payment does not relieve the Contractor from its responsibility for the Work or its responsibility to repair, replace, or otherwise make good defective Work, materials or equipment. Likewise, the making of a payment does not constitute a waiver of the Port's right to reject defective or non-conforming Work, materials, or equipment (even though they are covered by the payment), nor is it a waiver of any other rights of the Port.

B. Acceptance of final payment waives claims. Acceptance of final payment by the Contractor, a Subcontractor of any tier or a supplier shall constitute a waiver of claims except those previously made in writing and identified as unsettled in Contractor's final Application for Payment.

C. Execution of Change Order waives claims. The execution of a Change Order shall constitute a waiver of claims by the Contractor arising out of the Work to be performed or deleted pursuant to the Change Order, except as specifically described in the Change Order.

7.09 Liens

A. Contractor to discharge liens. The Contractor shall promptly pay (and secure the discharge of any liens asserted by) all persons properly furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited to, any Subcontractors of any tier).

ARTICLE 8 CHANGES IN THE WORK

8.01 Changes in the Work

A. Changes in the Work authorized. Without invalidating the Contract and without notice to the Contractor's surety, the Port may authorize changes in the Work after execution of the Contract, including changes in the Contract Sum or Contract Time. Changes shall occur solely by Change Order, Unilateral Change Directive, or Minor Change in Work. All changes in the Work are effective immediately and the Contractor shall proceed promptly to perform the change, unless otherwise provided in the Change Order or Directive.

B. Changes in the Work Defined.

1. A **Change Order** is a written instrument signed by the Port and Contractor stating their agreement to a change in the Work and the adjustment, if any, in the Contract Sum and/or Contract Time.

2. A **Unilateral Change Directive** is a written instrument issued by the Port to transmit new or revised Drawings, issue additions or modifications to the Contract, furnish other direction and documents adjustment, if any, to the Contract Sum and/or Contract Time. A Unilateral Change Directive is signed only by the Port, without requiring the consent or signature of the Contractor.

3. A **Minor Change in the Work** is a written order from the Port directing a change that does not involve an adjustment to the Contract Sum or the Contract Time.

C. Request for Proposal: At any time, the Port may issue a Proposal Request directing the Contractor to propose a change to the Contract Sum and/or Contract Time, if any, based on a proposed change in the Work. The Contractor shall submit a responsive Change Order proposal as soon as possible and no later than fourteen (14) days after receipt in which the Contractor specifies in good faith the extent to which the Contract Sum and/or Contract Time would change. All cost components shall be limited to the manner described in Section 8.02(B). If the Contractor fails to timely respond to a Proposal Request, the Port may issue the change as a Unilateral Change Directive.

1. Fixed price method is default for Contractor Change Order proposal. When the Port has requested that the Contractor submit a Change Order proposal, the Port may specify the basis on which the Contract Sum will be adjusted by the Contractor. The Engineer's preference, unless otherwise indicated, is for changes in the Work to be priced using Lump Sums or Unit Prices or on a time and material (Force Account) basis if unit pricing or lump sums cannot be negotiated or determined. In all instances, however, proposed changes shall include a not-to-exceed price for the change and shall be itemized for evaluation purposes in accordance with Section 8.02(B), as requested by the Engineer.

2. The Port may accept or reject the Contractor's Change Order proposal, request further documentation, or negotiate acceptable terms with the Contractor. If The Port and Contractor reach agreement on the terms of any change in the Work, including any adjustment in the Contract Sum or Contract Time, such agreement shall be incorporated in a Change Order.

3. The Change Order shall constitute full payment and final settlement of all claims for time and for direct, indirect, and consequential costs, including costs of delays, inconvenience, disruption of schedule, or loss of efficiency or productivity, related to any Work either covered or affected by the Change Order, or related to the events giving rise to the request for equitable adjustment. The Port may reject a proposal, in which case the Port may either not effectuate the change or issue a Unilateral Change Directive. The Port will not make payment to the Contractor for any work until that work has been incorporated into an executed Change Order.

D. Unforeseen Conditions: If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or any soils reports made available by the Port to the Contractor or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall immediately provide oral notice to the Engineer before conditions are disturbed, followed within 24 hours by an initial written notice. The Contractor shall submit a detailed proposal no later than seven (7) days following discovery of differing site conditions. The Engineer will promptly investigate these conditions and, if the Engineer determines that they differ materially and cause an increase or decrease in the Contractor's cost or time required for, performance of any part of the Work, will establish a change in the Contract Sum or Contract Time, or both, consistent with the requirements of the Contract Documents. If the Contractor disputes the Engineer's determination, the Contractor may proceed as provided in the dispute resolution procedure (Article 11). No increase to the Contract Sum or the Contract Time shall be allowed if the Contractor does not comply with the contractual requirements or if the Contractor knew or reasonably should have known of the concealed conditions prior to executing the Contract.

E. Proceed Immediately: Pending agreement on the terms of the Change Order or upon determination of a differing site condition as defined in 8.01(D), the Engineer may direct Contractor to proceed immediately with the change in the Work. Contractor shall not proceed with any change in the Work until it has obtained the Engineer's written approval and documentation of the following:

1. The scope of work
2. An agreed upon maximum not-to-exceed amount
3. The method of final cost determination
4. Estimated time to complete the changed work.
5. As a change in the Work is performed, unless the parties have signed a written Change Order to establish the cost of the change, the Contractor shall maintain an itemized accounting of all costs related to the change based on the categories in Section 8.02(B) and provide such data to the Port upon request. This includes, without limitation, invoices, including freight and express bills, and other support for all material, equipment, Subcontractor, and other charges related to the change and, for material furnished from the Contractor's own inventory, a sworn affidavit certifying the actual cost of such material. Failure to provide data to the Port within seven (7) days of a request constitutes a waiver of any claim. The Port may furnish any material or equipment to the Contractor that it deems advisable, and the Contractor shall have no claim for any costs or fee on such material or equipment.

G. Procedure for Unilateral Change Directive. Whether or not the Port has rejected a Contractor's proposal, the Port may issue a Unilateral Change Directive and the Contractor shall promptly proceed with the specified Work. If the Contractor disagrees with a Unilateral Change Directive, the Contractor shall advise the Port in writing through a Change Order proposal within seven (7) days of receipt. The Contractor's Change Order proposal shall reasonably specify the reasons for any disagreement and the adjustment it proposes. Without this timely Change Order proposal, the Contractor shall conclusively be deemed to have accepted the Port's proposal.

I. Payment pending final determination of Force Account work. Pending final determination of the total cost of Force Account Work, and provided that the Work to be performed under Force Account is complete and any reservations of rights have been signed by the Port, the Contractor may request payment for amounts not in dispute in the next Application for Payment accompanied by documentation indicating the parties' agreement. Work done on a Force Account basis must be approved in writing on a daily basis by the Engineer or the Engineer's designee and invoices shall be submitted with an Application for Payment within sixty (60) days of performance of the Work.

8.02 Changes in the Contract Sum

A. Port to Decide How Changes are Measured. The Port may elect, in its sole discretion, how changes in the Work will be measured for payment. Change in the Work may be priced on a lump sum basis, through Unit Prices, as Force Account, or by another method documented in the executed Change Order, Unilateral Change Directive or Minor Change in the Work.

B. Determination of Cost of Change. The total cost of any change in the Work, including a claim under Article 11, shall not exceed the prevailing cost for the Work in the locality of the Project. In all circumstances, the change in the Work shall be limited to the reasonable, actual cost of the following components:

1. Direct labor costs: These are the actual labor costs determined by the number of additional craft hours at their normal hourly rate necessary to perform a change in the Work. The hourly cost of labor will be based upon the following:

   a. Basic wages and fringe benefits: The hourly wage (without markup or labor burden) and fringe benefits paid by the Contractor as established by the Washington Department of Labor and Industries or contributed to labor trust funds as itemized fringe benefits, whichever is applicable, not to exceed that specified in the applicable "Intent to Pay Prevailing Wage," for the laborers, apprentices, journeymen, and foremen performing or directly supervising the change in the Work on site. These wages do not include the cost of Contractor's project manager or superintendent or above, and the premium portion of overtime wages is not included unless pre-approved in writing by the Port. Costs paid or incurred by the Contractor for vacations, per diem, subsistence, housing, travel, bonuses, stock options, or discretionary payments to employees are not separately reimbursable. The Contractor shall provide to the Port copies of payroll records, including certified payroll statements for itself and Subcontractors of any tier, upon the Port's request.

   b. Workers' insurance: Direct contributions to the State of Washington as industrial insurance; medical aid; and supplemental pension by class and rates established by the Washington Department of Labor and Industries.

   c. Federal insurance: Direct contributions required by the Federal Insurance Compensation Act (FICA); Federal Unemployment Tax Act (FUTA); and State Unemployment Compensation Act (SUCA).

2. Direct material costs: This is an itemization, including material invoices, of the quantity and actual cost of additional materials necessary to perform the change in the Work. The cost will be the net cost after all discounts or rebates, freight costs, express charges, or special delivery costs, when applicable. No lump sum costs will be allowed unless approved in advance by the Port.

3. Construction equipment usage costs: This is an itemization of the actual length of time that construction equipment necessary and appropriate for the Work is used solely on the changed Work times the applicable rental cost as established by the lower of the local prevailing rates published in www.equipmentwatch.com, as modified by the AGC/WSDOT agreement, or the actual rate paid to an unrelated third party. If more than one rate is applicable, the lowest available rate will be utilized. Rates and quantities of equipment rented that exceed the local fair market rental costs shall be subject to the Port's prior written approval. Total rental charges for equipment or tools shall not exceed 75% of the fair market purchase value of the equipment or the tool. Actual, reasonable mobilization costs are permitted if the equipment is brought to the site solely for the change in the Work. Mobilization and standby costs shall not be charged for equipment already present on the site.

   The rates in effect at the time of the performance of the changed Work are the maximum rates allowable for equipment of modern design and in good working condition and include full compensation for furnishing all fuel, oil, lubrication, repairs, maintenance, and insurance. No gas surcharges are payable. Equipment not of modern design and/or not in good working condition will have lower rates. Hourly, weekly, and/or monthly rates, as appropriate, will be applied to yield the lowest total cost.

4. Subcontractor costs: These are payments the Contractor makes to Subcontractors for changed Work performed by Subcontractors. The Subcontractors' cost of changed Work shall be determined in the same manner as prescribed in this Section 8.02 and, among other things, shall not include consultant costs, attorneys' fees, or claim preparation expenses.

5. Service provider costs: These are payments the Contractor makes to service providers for changed Work performed by service providers. The service providers' cost of changed Work shall be determined in the same manner as prescribed in this Section 8.02.

6. Markup: This is the maximum total amount for overhead, profit and other costs, including office, home office and site overhead (including purchasing, project manager, superintendent, project engineer, estimator, and their vehicles and clerical assistants), taxes (except for sales tax on the Contract Sum), warranty, safety costs, printing and copying, layout and control, quality control/assurance, small or hand tools (a tool that costs $500 or less and is normally furnished by the performing contractor), preparation of as-built drawings, impact on unchanged Work, Change Order and/or claim preparation, and delay and impact costs of any kind (cumulative, ripple, or otherwise), added to the total cost to the Port of any Change Order work. No markup shall be due, however, for direct settlements of Subcontractor claims by the Port after Substantial Completion. The markup shall be limited in all cases to the following schedule:

   a. Direct labor costs -- 20% markup on the direct cost of labor for the party (Contractor or Subcontractor) providing labor related to the change in the Work;

   b. Direct material costs -- 20% markup on the direct cost of material for the party (Contractor or Subcontractor) providing material related to the change in the Work;

   c. Construction equipment usage costs -- 10% markup on the direct cost of equipment for the party (Contractor or Subcontractor) providing equipment related to the change in the Work;

d. Contractor markup on Subcontractor costs -- 10% markup for the Contractor on the direct cost (excluding markup) of a change in the Work performed by Subcontractors (and for Subcontractors, for a change in the Work performed by lower-tier Subcontractors); and

e. Service provider costs -- 5% markup for the Contractor on the direct cost (excluding markup) of a change in the Work performed by service providers.

The total summed markup of the Contractor and all Subcontractors of any tier shall not exceed 30% of the direct costs of the change in the Work. If the markup would otherwise exceed 30%, the Contractor shall proportionately reduce the markup for the Contractor and all Subcontractors of any tier.

7. Cost of change in insurance or bond premium. This is defined as:

a. Contractor's liability insurance: The actual cost (expressed as a percentage submitted with the certificate of insurance provided under the Contract Documents and subject to audit) of the Contractor's liability insurance arising directly from the changed Work; and

b. Public works bond: The actual cost (expressed as a percentage submitted under the Contract Documents and subject to audit) of the Contractor's performance and payment bond arising directly from the changed Work.

Upon request, the Contractor shall provide the Port with supporting documentation from its insurer or surety of any associated cost incurred. The cost of the insurance or bond premium together shall not exceed 2.0% of the cost of the changed Work.

8. Unit Prices. If Unit Prices are specified in the Contract Documents or established by agreement of the parties for certain Work, the Port may apply them to the changed Work. Unit Prices shall include pre-agreed rates for material quantities and shall include reimbursement for all direct and indirect costs of the Work, including overhead, profit, bond, and insurance costs arising out of or related to the Unit Priced item. Quantities must be supported by field measurement statements signed by the Port, and the Port shall have access as necessary for quantity measurement. The Port shall not be responsible for not-to-exceed limit(s) without its prior written approval.

8.03 Changes in the Contract Time

A. Extension of the Contract Time. If the Contractor is delayed at any time in the commencement or progress of the Work by events for which the Port is responsible, by unanticipated abnormal weather (subject to Section 8.03(E) below), or by other causes not the fault or responsibility of the Contractor that the Port determines may justify a delay in the Contract Time, then the Contract Time shall be extended by Change Order for such reasonable time as the Port may determine~~. In no event, however, shall the Contractor be entitled to any extension of time absent proof of (1) delay to an activity on the critical path of the Project, or (2) delay transforming an activity to the critical path, so as to actually delay the anticipated date of Substantial Completion~~.

B. Allocation of responsibility for delay not caused by Port or Contractor. If a delay was not caused by the Port, the Contractor, or anyone acting on behalf of any of them, the Contractor is entitled only to an increase in the Contract Time but not an increase in the Contract Sum.

C. Allocation of responsibility for delay caused by Port. If a delay was caused by the Port or someone acting on behalf of the Portand affected the critical path, the Contractor shall be entitled to a change in the Contract Time and Contract Sum in accordance with Section 8.02. The Contractor shall not recover damages, an equitable adjustment or an increase in the Contract Sum or Contract Time from the Port, however, where the Contractor could reasonably have avoided the delay. The Port is not obligated directly or indirectly for damages for any delay suffered by a Subcontractor of any tier that does not increase the Contract Time.

D. Allocation of responsibility for delay caused by Contractor. If a delay was caused by the Contractor, a Subcontractor of any tier, or anyone acting on behalf of any of them, the Contractor is not entitled to an increase in the Contract Time or in the Contract Sum.

E. Adverse weather. If adverse weather is identified as the basis for a claim for additional time, the claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not reasonably have been anticipated and had an adverse effect on the critical path of construction, and that the Work was on schedule (or not behind schedule through the fault of the Contractor) at the time the adverse weather conditions occurred. Neither the Contract Time nor the Contract Sum will be adjusted for normal inclement weather. For a claim based on adverse weather, the Contractor shall be eligible only for a change in the Contract Time (but not a change in the Contract Sum) if the Contractor can substantiate that there was significantly greater than normal inclement weather considering the full term of the Contract Time.

F. Damages for delay. In the event the Contractor (including any Subcontractors of any tier) is held to be entitled to damages from the Port for delay beyond the amount permitted in Section 8.02(B), the total combined damages to the Contractor and any Subcontractors of any tier for each day of delay shall be limited to the same daily liquidated damage rate specified in the Contract Documents due the Port for the Contractor's delay in achieving Substantial Completion. ~~By submitting a bid on the Work and executing the Contract, the Contractor represents that these liquidated damages are a reasonable estimate of its loss.~~

G. Limitation on damages. The Contractor shall not be entitled to damages arising out of loss of efficiency; morale, fatigue, attitude, or labor rhythm; constructive acceleration; home office overhead; expectant under run; trade stacking; reassignment of workers; rescheduling of Work, concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended or increased overhead or general conditions; profit upon damages for delay; impact damages including cumulative impacts; or similar damages. Any effect that such alleged costs may have upon the Contractor or its Subcontractors of any tier is fully compensated through the markup on Change Orders paid through Section 8.02(B) and any liquidated damages paid hereunder.

8.04 Reservation of Rights

A. Reservations of rights void unless signed by Port. Reservations of rights will be deemed waived and are void unless any reserved rights are described in detail and are signed by the Contractor and the Port.

B. Procedure for unsigned reservations of rights. If the Contractor adds a reservation of rights not signed by the Port to any Change Order, Unilateral Change Directive, Change Order proposal, Application for Payment or any other document, all amounts and all Work therein shall be considered disputed and not payable until costs are re-negotiated or the reservation is withdrawn or changed in a manner satisfactory to and signed by the Port. If the Port makes payment based on a document that contains a reservation of rights not signed by the Port, and if the Contractor cashes such payment, then the reservation of rights shall be deemed waived, withdrawn and of no effect.

8.05 Unit Prices

A. Adjustment to Unit Prices. If Unit Prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed (less than eighty percent (80%) or more than one hundred and twenty percent (120%) of the quantity estimated) so that application of a Unit Price would be substantially unfair, the applicable Unit Price but not the Contract Time shall be adjusted if the Port prospectively approves a Change Order revising the Unit Price.

B. Procedure to change Unit Prices. The Contractor or Port may request a Change Order revising a Unit Price by submitting information to support the change. A proposed change to a Unit Price will be evaluated by the Port based on the change in cost resulting solely from the change in quantity, any change in production rate or method as compared to the original plan, and the share, if any, of fixed expenses properly chargeable to the item. If the Port and Contractor agree on the change, a Change Order will be executed. If the parties cannot agree, the Contractor shall comply with the dispute resolution procedures (Article 11).

ARTICLE 9 SUSPENSION AND TERMINATION OF CONTRACT

9.01 Port's Right to Suspend Work

A. Port may suspend the Work. The Port may at any time suspend the Work, or any part thereof, by giving notice to the Contractor. The Work shall be resumed by the Contractor as soon as possible, but no later than fourteen (14) days after the date fixed in a notice to resume the Work. The Port shall reimburse the Contractor for appropriate and reasonable expenses consistent with Section 8.02 incurred by the Contractor as a result of the suspension, except where a suspension is the result of the Contractor repeatedly or materially failing to carry out or correct the Work in accordance with the Contract Documents, and the Contractor shall take all necessary steps to minimize expenses.

B. Contractor obligations. During any suspension of Work, the Contractor shall take every precaution to prevent damage to, or deterioration of, the Work. The Contractor shall be responsible for all damage or deterioration to the Work during the period of suspension and shall, at its sole expense, correct or restore the Work to a condition acceptable to the Port prior to resuming Work.

9.02 Termination of Contract for Cause by the Port

A. Port may terminate for cause. If the Contractor is adjudged bankrupt or makes a general assignment for the benefit of the Contractor's creditors, if a receiver is appointed due to the Contractor's insolvency, or if the Contractor, in the opinion of the Port, persistently or materially refuses or fails to supply enough properly skilled workmen or materials for proper completion of the Contract, fails to make prompt payment to Subcontractors or suppliers for material or labor, disregards laws, ordinances, or the instructions of the Port, fails to prosecute the Work continuously with promptness and diligence, or otherwise materially violates any provision of the Contract, then the Port, without prejudice to any other right or remedy, may terminate the Contractor after giving the Contractor seven (7) days' written notice (during which period the Contractor shall have the right to cure).

B. Procedure following termination for cause. Following a termination for cause, the Port may take possession of the Project site and all materials and equipment, and utilize such materials and equipment to finish the Work. The Port may also exclude the Contractor from the Project site(s). If the Port elects to complete all or a portion of the Work, it may do so as it sees fit. The Port shall not be required to accept the lowest bid for completion of the Work and may choose to complete all or a portion of the Work using its own work force. If the Port elects to complete all or a portion of the Work, the Contractor shall not be entitled to any further payment until the Work is finished. If the expense of finishing the Work, including compensation for additional managerial and administrative services of the Port, exceeds the unpaid balance of the Contract Sum, the excess shall be paid by the Contractor.

C. Port's remedies following termination for cause. The Port may exercise any rights, claims or demands that the Contractor may have against third persons in connection with the Contract, and for this purpose the Contractor assigns and transfers to the Port all such rights, claims and demands.

D. Inadequate termination for cause converted to termination for convenience. If, after the Contractor has been terminated for cause, it is determined that inadequate "cause" for such termination exists, then the termination shall be considered a termination for convenience pursuant to Section 9.03.

9.03 Termination of Contract for Convenience by the Port

A. Port may terminate for convenience. The Port may, at any time (without prejudice to any right or remedy of the Port), terminate all or any portion of the Contract for the Port's convenience and without cause. The Contractor shall be entitled to receive payment consistent with the Contract Documents only for Work properly executed through the date of termination, and costs necessarily incurred by reason of the termination (such as the cost of settling and paying claims arising out of the termination under subcontracts or orders), along with a fee of one percent (1%) of the Contract Sum not yet earned on the whole or part of the Work. The total amount to be paid to the Contractor shall not exceed the Contract Sum as reduced by the amount of payments otherwise made. The Port shall have title to all Work performed through the date of termination.

9.04 Termination of Contract by the Contractor

A. Contractor may terminate for cause. The Contractor may terminate the Contract if the Work is stopped for a period of sixty (60) consecutive days through no act or fault of the Contractor or a Subcontractor of any tier, for either of the following reasons:

1. Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped; or
2. An act of government, such as a declaration of national emergency that requires all Work to be stopped.

B. Procedure for Contractor termination. If one of the reasons described in Section 9.04A exists, the Contractor may, upon seven (7) days' written notice to the Port (during which period the Port has the opportunity to cure), terminate the Contract and recover from the Port payment for Work executed through the date of termination in accordance with the Contract Documents and for proven loss with respect to materials, equipment, tools, and construction equipment and machinery, including reasonable overhead and profit on Work executed and direct costs incurred by reason of such termination. The total recovery of the Contractor shall not exceed the unpaid balance of the Contract Sum.

C. Contractor may stop the Work for failure of Port to pay undisputed amounts. The Contractor may stop Work under the Contract if the Port does not pay undisputed amounts due and owing to the Contractor within fifteen (15) days of the date established in the Contract Documents. If the Port fails to pay undisputed amounts, the Contractor may, upon fifteen (15) additional days' written notice to the Port, during which the Port can cure, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately, and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up.

9.05 Subcontract Assignment Upon Termination

A. Subcontracts assigned upon termination. Each subcontract is hereby assigned by the Contractor to the Port provided that:

1. The Port requests that the subcontract be assigned;
2. The assignment is effective only after termination by the Port and only for those subcontracts that the Port accepts in writing; and
3. The assignment is subject to the prior rights of the surety, if any, under any bond issued in accordance with the Contract Documents.

When the Port accepts the assignment of a subcontract, the Port assumes the Contractor's rights and obligations under the subcontract, but only for events and payment obligations that arise after the date of the assignment.

ARTICLE 10 BONDS

10.01 Contractor Performance and Payment Bonds

A. Contractor to furnish performance and payment bonds. Within ten (10) days following its receipt of a notice of award, and as part of the Contract Sum, the Contractor shall secure and furnish duly executed performance and payment bonds using the forms furnished by the Port. The bonds shall be executed by a surety (or sureties) reasonably acceptable to the Port, admitted and licensed in the State of Washington, registered with the Washington State Insurance Commissioner, and possessing an A.M. Best rating of "A minus, FSC (6)" or better and be authorized by the U.S. Department of the Treasury. Pursuant to RCW 39.08, the bonds shall be in an amount equal to the Contract Sum, and shall be conditioned only upon the faithful performance of the Contract by the Contractor within the Contract Time and upon the payment by the Contractor of all taxes, fees, and penalties to the State of Washington and all laborers, Subcontractors, and suppliers, and others who supply provisions, equipment, or supplies for the performance of the Work covered by this Contract. The bonds shall be signed by the person or persons legally authorized to bind the Contractor.

B. Port may notify surety. If the Port makes or receives a claim against the Contractor, the Port may, but is not obligated to, notify the Contractor's surety of the nature and amount of the claim. If the claim relates to a possibility of a Contractor's default, the Port may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

ARTICLE 11 DISPUTE RESOLUTION

11.01 Notice of Protest and Claim

A. Dispute resolution procedure mandatory. All claims, direct or indirect, arising out of, or relating to, the Contract Documents or the breach thereof, shall be decided exclusively by the following alternative dispute resolution procedure unless the parties mutually agree otherwise. If the Port and Contractor agree to a partnering process to assist in the resolution of disputes, the partnering process shall occur prior to, and not be in place of, the mandatory dispute resolution procedures set forth below.

B. Notice of protest defined. Except for claims requiring notice before proceeding with the affected Work as otherwise described in the Contract Documents, the Contractor shall provide immediate oral notice of protest to the Engineer prior to performing any disputed Work and shall submit a written notice of protest to the Port within seven (7) days of the occurrence of the event giving rise to the protest that includes a clear description of the event(s). The protest shall identify any point of disagreement, those portions of the Contract Documents believed to be applicable, and an estimate of quantities and costs involved. When a protest relates to cost, the Contractor shall keep full and complete records and shall permit the Port to have access to those records at any time as requested by the Port.

C. Claim defined. A claim is a demand by one of the parties seeking adjustment or interpretation of the Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract Documents. The term "claim" also includes all disputes and matters in question between the Port and Contractor arising out of or relating to the Contract Documents. Claims must be initiated in writing and include a detailed factual statement and clear description of the claim providing all necessary dates, locations and items of Work, the date or dates on which the events occurred that give rise to the claim, the names of employees or representatives knowledgeable about the claim, the specific provisions of the Contract Documents that support the claim, any documents or oral communications that support the claim, any proposed change in the Contract Sum (showing all components and calculations) and/or Contract Time (showing cause and analysis of the resultant delay in the critical path), and all other data supporting the claim. Claims shall also be submitted with a statement certifying, under penalty of perjury, that the claim as submitted is made in good faith, that the supporting cost and pricing data are true and accurate to the best of Contractor's knowledge and belief, that the claim is fully supported, and that the amount requested accurately reflects the adjustment in the Contract Sum or Contract Time for which Contractor believes the Port is liable. A claim shall be deemed to include all changes, direct and indirect, in cost and in time to which the Contractor and Subcontractors of any tier are entitled and may not contain reservations of rights without the Port's written approval; any unapproved reservations of rights shall be without effect.

D. Claim procedure. The Contractor shall submit a written claim within thirty (30) days of providing written notice of protest. ~~The Contractor may delay submitting supporting data by an additional thirty (30) days if it notifies the Port in its claim that substantial data must be assembled.~~ Any claim of a Subcontractor of any tier may be brought only through, and after review by and concurrence of, the Contractor.

~~E. Failure to comply with notice of protest and claim requirements waives claims. Any notice of protest by the Contractor and any claim of the Contractor, whether under the Contract or otherwise, must be made pursuant to and in strict accordance with the applicable provisions of the Contract.~~ Failure to properly and timely submit a notice of protest or to timely submit a claim shall waive the claim. ~~No act, omission, or knowledge, actual or constructive, of the Port shall waive the requirement for timely written notice of protest and a timely written claim unless the Port and the Contractor sign an explicit, unequivocal written waiver approved by the Port.~~ The Contractor expressly acknowledges and agrees that the Contractor's failure to timely submit required notices of protest and/or timely submit claims has a substantial impact upon and prejudices the Port. For the purpose of calculating time periods, an "event giving rise to a claim," among other things, is not a Request for Information but rather is a response that the Contractor believes would change the Contract Sum and/or Contract Time.

F. False claims. The Contractor shall not make any fraudulent misrepresentations, concealments, errors, omissions, or inducements to the Port in the formation or performance of the Contract. If the Contractor or a Subcontractor of any tier submits a false or frivolous claim to the Port, which for purposes of this Section 11.01(F) is defined as a claim based in whole or in part on a materially incorrect fact, statement, representation, assertion, or record, the Port shall be entitled to collect from the Contractor by offset or otherwise (without prejudice to any right or remedy of the Port) any and all costs and expenses, including investigation and consultant costs, incurred by the Port in investigating, responding to, and defending against the false or frivolous claim.

G. Compliance with lien and retainage statutes required. If a claim relates to or is the subject of a lien or retainage claim, the party asserting the claim may proceed in accordance with applicable law to comply with the notice and filing deadlines prior to resolution of the claim by mediation or by litigation.

H. Performance required pending claim resolution. Pending final resolution of a claim, the Contractor shall continue to perform the Contract and maintain the Progress Schedule, and the Port shall continue to make payments of undisputed amounts due in accordance with the Contract Documents.

11.02 Mediation

A. Claims must be subject to mediation. At any time following the Port's receipt of a written claim, the Port may require that an officer of the Contractor and the Port's designee (all with authority to settle) meet, confer, and attempt to resolve a claim. If the claim is not resolved during this meeting, the claim shall be subject to mandatory mediation as a condition precedent to the initiation of litigation. This requirement can be waived only by an explicit, written waiver signed by the Port and the Contractor.

B. ~~Mediation procedure. A request for mediation shall be filed in writing with the other party to the Contract, and the parties shall promptly attempt to agree upon a mediator. If the parties have not reached agreement within thirty (30) days of the request, either party may file the request with the American Arbitration Association or such other alternative dispute resolution service to~~ which the parties mutually agree, with a copy to the other party, and the mediation shall be administered by the American Arbitration Association (or other agreed service). The parties to the mediation shall share the mediator's fee and any filing fees equally. The mediation shall be held in Pierce County, Washington unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof. Unless the Port and the Contractor mutually agree in writing otherwise, all claims shall be considered at a mediation session that shall occur prior to Final Completion.

11.03 Litigation

A. Claims not resolved by mediation are subject to litigation. Claims not resolved through mediation shall be resolved by litigation unless the parties mutually agree otherwise. The venue for any litigation shall be Pierce County, Washington. The Contractor may bring no litigation on claims unless such claims have been properly raised and considered in the procedures of this Article 11. The Contractor must demonstrate in any litigation that it complied with all requirements of this Article.

B. Litigation must be commenced promptly. All unresolved claims of the Contractor shall be waived and released unless the Contractor has complied with the requirements of the Contract Documents, and litigation is served and filed within 180 days of the date of Substantial Completion approved in writing by the Port or termination of the Contract. The pendency of mediation (the time period between receipt by the non-requesting party of a written mediation request and the date of mediation) shall toll these deadlines until the earlier of the mediator providing written notice to the parties of impasse or thirty (30) days after the date of the mediation session.

C. Port not responsible for attorneys' fees. Neither the Contractor nor a Subcontractor of any tier, whether claiming under a bond or lien statute or otherwise, shall be entitled to attorneys' fees directly or indirectly from the Port (but may recover attorneys' fees from the bond or statutory retainage fund itself to the extent allowable under law).

D. Port may join Contractor in dispute. The Port may join the Contractor as a party to any litigation or arbitration involving the alleged fault, responsibility, or breach of contract of the Contractor or Subcontractor of any tier.

ARTICLE 12 MISCELLANEOUS

12.01 General

A. Rights and remedies are cumulative. The rights and remedies of the Port set forth in the Contract Documents are cumulative and in addition to and not in limitation of any rights and remedies otherwise available to the Port. The pursuit of any remedy by the Port shall not be construed to bar the Port from the pursuit of any other remedy in the event of similar, different, or subsequent breaches of this Contract. All such rights of the Port shall survive completion of the Project or termination of the Contractor.

B. Reserved rights do not give rise to duty. The rights reserved or possessed by the Port to take any action shall not give rise to a duty for the Port to exercise any such right.

12.02 Waiver

A. Waiver must be in writing and authorized by Port. Waiver of any provisions of the Contract Documents must be in writing and authorized by the Port. No other waiver is valid on behalf of the Port.

B. Inaction or delay not a waiver. No action, delay in acting, or failure to act by the Port shall constitute a waiver of any right or remedy of the Port, or constitute an approval or acquiescence of any breach or defect in the Work. Nor shall any delay or failure of the Port to act waive or otherwise prejudice the right of the Port to enforce a right or remedy at any subsequent time.

C. Claim negotiation not a waiver. The fact that the Port and the Contractor may consider, discuss, or negotiate a claim that has or may have been defective or untimely under the Contract shall not constitute a waiver of the provisions of the Contract Documents unless the Port and the Contractor sign an explicit, unequivocal waiver.

12.03 Governing Law

A. Washington law governs. This Contract and the rights and duties of the parties hereunder shall be governed by the internal laws of the State of Washington, without regard to its conflict of law principles.

12.04 Compliance with Law

A. Contractor to comply with applicable laws. The Contractor shall at all times comply with all applicable Federal, State and local laws, ordinances, and regulations. This compliance shall include, but is not limited to, the payment of all applicable taxes, royalties, license fees, penalties, and duties.

B. Contractor to provide required notices. The Contractor shall give notices required by all applicable Federal, State, and local laws, ordinances and regulations bearing on the Work.

C. Contractor to confine operations at site to permitted areas. The Contractor shall confine operations at the Project site to areas permitted by applicable laws, ordinances, permits, rules and regulations, and lawful orders of public authorities and the Contract Documents.

12.05 Assignment

A. Assignment. The Port and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to the other party and to the partners, successors, assigns and legal representatives of such other party. The Contractor may not assign, transfer, or novate all or any portion of the Contract, including but not limited to any claim or right to the Contract Sum, without the Port's prior written consent. If the Contractor attempts to make an assignment, transfer, or novation without the Port's consent, the assignment shall be of no effect, and Contractor shall nevertheless remain legally responsible for all obligations under the Contract. The Contractor also shall not assign or transfer to any third party any claims it may have against the Port arising under the Contract or otherwise related to the Project.

12.06 Time Limit on Causes of Action

A. Time limit on causes of action. The Port and Contractor shall commence all causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the dispute resolution procedure set forth in Article 11 of these General Conditions, within the time period specified by applicable law, and within the time limits identified in the Contract Documents. The Contractor waives all claims and causes of action not commenced in accordance with this Section 12.06.

12.07 Service of Notice

A. Notice. Written notice under the Contract Documents by either the Contractor or Port may be served on the other party by personal service, electronic or facsimile transmission, or delivery service to the last address provided in writing to the other party. For the purpose of measuring time, notice shall be deemed to be received by the other party on the next business day following the sender's electronic or facsimile transmittal or delivery by delivery service.

12.08 Records

A. Contractor and Subcontractors to maintain records and cooperate with Port audit. The Contractor and Subcontractors of any tier shall maintain books, ledgers, records, documents, estimates, bids, correspondence, logs, schedules, emails, and other tangible and electronic data and evidence relating or pertaining to costs and/or performance of the Contract ("records") to such extent and in such detail as will properly reflect and fully support compliance with the Contract Documents and with all costs, charges and other amounts of whatever nature. The Contractor shall preserve these records for a period of six (6) years following the date of Final Acceptance under the Contract. Within seven (7) days of the Port's request, both during the Project and for six (6) years following Final Acceptance, the Contractor and Subcontractors of any tier shall make available at their office during normal business hours all records for inspection, audit and reproduction (including electronic reproduction) by the Port or its representatives; failure to fully comply with this requirement shall constitute a material breach of contract and a waiver of all claims by the Contractor and Subcontractors of any tier.

B. Rights under RCW 42.56. The Contractor agrees, on behalf of itself and Subcontractors of any tier, that any rights under Chapter 42.56 RCW will commence at Final Acceptance, and that the invocation of such rights at any time by the Contractor or a Subcontractor of any tier, or their respective representatives, shall initiate an equivalent right to disclosures from the Contractor and Subcontractors of any tier for the benefit of the Port.

12.09 Statutes

A. Contractor to comply with Washington statutes. The Contractor shall abide by the provisions of all applicable statutes, regulations, and other laws. Although a number of statutes are referenced in the Contract Documents, these references are not meant to be and are not a complete list.

1. Pursuant to RCW 39.06, "Registration, Licensing of Contractors," the Contractor shall be registered and licensed as required by the laws of the State of Washington, including but not limited to RCW 18.27, "Registration of Contractors," and shall satisfy all State of Washington bonding and insurance requirements. The Contractor shall also have a current state unified business identifier number; have industrial insurance coverage for the Contractor's employees working in Washington as required by Title 51 RCW; have an employment security department number as required by Title 50 RCW; have a state excise tax registration number as required in Title 82 RCW, and; not be disqualified from bidding on any public works contract under RCW 39.06.010 (unregistered or unlicensed contractors) or RCW 39.12.065(3) (prevailing wage violations).
2. The Contractor shall comply with all applicable provisions of RCW 49.28, "Hours of Labor."
3. The Contractor shall comply with pertinent statutory provisions relating to public works of RCW 49.60, "Discrimination."
4. The Contractor shall comply with pertinent statutory provisions relating to public works of RCW 70.92, "Provisions in Buildings for Aged and Handicapped Persons," and the Americans with Disabilities Act.
5. Pursuant to RCW 50.24, "Contributions by Employers," in general and RCW 50.24.130 in particular, the Contractor shall pay contributions for wages for personal services performed under this Contract or arrange for an acceptable bond.
6. The Contractor shall comply with pertinent provisions of RCW 49.17, "Washington Industrial Safety and Health Act," and Chapter 296-155 WAC, "Safety Standards for Construction Work."
7. Pursuant to RCW 49.70, "Worker and Community Right to Know Act," and WAC 296-62-054 et seq., the Contractor shall provide to the Port and have copies available at the Project site, a workplace survey or material safety data sheets for all "hazardous" chemicals under the control or use of Contractor or any Subcontractor of any tier.
8. All products and materials incorporated into the Project as part of the Work shall be certified as "asbestos-free" and "lead-free" by United States standards, and shall also be free of all hazardous materials or substances. At the completion of the Project, the Contractor shall submit certifications of asbestos-free and of lead-free materials certifying that all materials and products incorporated into the Work meet the requirements of this Section, and shall also certify that materials and products incorporated into the Work are free of hazardous materials and substances.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE

A. The provisions and intent of the Contract, including the General and Supplemental Conditions apply to this work as if specified in this section. Work related to this section is described throughout these Specifications.

1.02 SUBMITTAL REQUIREMENTS

A. Evidence of the required insurance within 10 days of the issued Notice of Award to the Contractor.

B. Updated evidence of insurance as required until final completion.

1.03 CONTRACTOR LIABILITY INSURANCE

A. The Contractor shall secure and maintain until Final Completion, at its sole cost and expense, the following insurance in carriers reasonably acceptable to the Port, licensed in the State of Washington, registered with the Washington State Insurance Commissioner, and possessing an A.M. Best rating of “A-, FSC (6)” or better.

B. The Port and Tacoma Rail will be included as an additional insured for both ongoing and completed operations by endorsement to the policy using ISO Form CG 20 10 11 85 or forms CG 20 10 03 97 and CG 20 37 10 01 (or equivalent coverage endorsements). Also, by endorsement to the policy, there shall be an express waiver of subrogation in favor of the Port; a cross liabilities clause, and an endorsement stating that the Contractor’s policy is primary and not contributory with any insurance carried by the Port. The inclusion of the Port as an additional insured shall not create premium liability for the Port.

C. If the Contractor, Supplier or Subcontractor’s will perform any work requiring the use of a licensed professional per RCW 18 the Contractor shall provide evidence to the Port of professional liability insurance in amounts not less than $1,000,000.

D. This insurance shall cover all of the Contractors’ operations of whatever nature connected in any way with the Contract, including any operations performed by the Contractor’s Subcontractors of any tier. It is the obligation of the Contractor to ensure that all Subcontractors (at whatever level) carry a similar program that provides the identified types of coverage, limits of liability, inclusion of the Port as an additional insured, waiver of subrogation and cross liabilities clause. The Port reserves the right to reject any insurance policy as to company, form, or substance. Contractor’s failure to provide or the Port’s acceptance of the Contractor’s certificate of insurance does not waive the Contractor’s obligation to comply with the insurance requirements of the Contract as specifically described below:

1. Commercial General or Liability Insurance on an Occurrence Form Basis including but not limited to:

    a. Bodily Injury Liability;

    b. Property Damage Liability;

    c. Contractual Liability;

    d. Products - Completed Operations Liability;

    e. Personal Injury Liability;

    f. By endorsement to the policy, not exclude work within fifty feet of any railroad track.

Alternatively, a Commercial General Liability (CGL) policy is acceptable if all of the above coverages are incorporated in the policy and there are no marine exclusions that will remove coverage for either vessels or work done by or above or around the water.

2. Comprehensive Automobile Liability including but not limited to:
    a. Bodily Injury Liability;
    b. Property Damage Liability;
    c. Personal Injury Liability;
    d. Owned and Non-Owned Automobile Liability; and
    e. Hired and Borrowed Automobile Liability.
3. Railroad protective liability issued in name of the railroad and in the limits required by the railroad.
4. Contractor's Pollution Liability (CPL) covering claims for bodily injury, property damage and cleanup costs and environmental damages from pollution conditions arising from the performance of covered operations.
    a. If the Work involves remediation or abatement of regulated waste to include but not limited to: asbestos containing materials, lead containing products, mercury, PCB, underground storage tanks or other hazardous materials or substances, the CPL policy shall not exclude such coverage or a specific policy covering such exposure shall be required from the Contractor and all Subcontractors performing such Work.
    b. If the Work involves transporting regulated materials or substances or waste, a separate policy or endorsement to the CPL policy specifically providing coverage for liability and cleanup arising from an upset of collision during transportation of hazardous materials or substances shall be required from the Contractor and all Subcontractors performing such Work.
    c. It is preferred that CPL insurance shall be on a true occurrence form without a sunset clause. However, if CPL insurance is provided on a Claims Made basis, the policy shall have a retroactive date prior to the start of this project and this insurance shall be kept in force for at least three years after the final completion of this project. Alternatively, the contractor at its option may provide evidence of extended reporting period of not less than three (3) years in its place. The Contractor shall be responsible for providing the Port with certificates of insurance each year evidencing this coverage.
    d. The Port shall be named as an Additional Insured on the CPL policy.

E. Except where indicated above, the limits of all insurance required to be provided by the Contractor shall be not less than $2,000,000 for each occurrence and $2,000,000 in the aggregate. However, coverage in the amounts of these minimum limits shall not be construed as to relieve the Contractor from liability in excess of such limits. The Additional Insured endorsement shall NOT be limited to the amounts specified by this contract unless expressly waived in writing by the Port of Tacoma.

F. Contractor shall certify that its operations are covered by the Washington State Worker's Compensation Fund. The Contractor shall provide its Account Number or, if self-insured, its Certificate of Qualification Number. The Contractor shall also provide evidence of Stop-Gap Employers' Liability Insurance.

G. The Contractor shall furnish within ten (10) days following issuance of the notice of award a certificate of insurance satisfactory to the Port evidencing that insurance in the types and

minimum amounts required by the Contract Documents has been secured. The Certificate of Insurance shall be signed by an authorized representative of the insurer together with a copy of the endorsement, which shows that the Port is named as additional insured.

H. Contractor shall provide at least forty-five (45) days prior written notice to the Port of any termination or material change or ten (10) days notice in the case of non-payment of premium(s).

I. If the Contractor is required to make corrections to the Work after Final Completion, the Contractor shall obtain at its own expense, prior to the commencement of any corrective work, insurance coverage as required by the Contract Documents, which coverage shall be maintained until the corrections to the Work have been completed and accepted by the Port.

1.04 BUILDER'S RISK INSURANCE

A. Until Final Completion of the Work, the construction Work is at the risk of the Contractor and no partial payment shall constitute acceptance of the Work or relieve the Contractor of responsibility of completing the Work under the Contract.

B. Whenever the estimated cost of the Work is less than $25,000,000, the Port will purchase and maintain, in a company or companies lawfully authorized and admitted to do business in Washington, property insurance written on a builder's risk "all-risk" including Earthquake and Flood with applicable sub-limits, or equivalent policy form to cover the course of construction in the amount of the full insurable value thereof. This property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Port has an insurable interest in the property, whichever is later. This insurance shall include interests of the Port, the Contractor, and Subcontractors of any tier on the Project. There may be some differences between this Section and the builder's risk insurance secured by the Port; therefore, the Contractor shall provide an "installation floater" or similar property coverage for materials not yet installed, whether stored on site or off site or in transit, and the Contractor shall obtain property coverage for all Contractor-owned equipment and tools-each loss may be subject to a deductible. Losses up to the deductible amount shall be the responsibility of the Contractor. All tools and equipment not intended as part of the construction or installation will be the sole responsibility of the Contractor.

C. Whenever the estimated cost of the Work is $25,000,000 or more, the Contractor shall purchase and maintain, in a company or companies lawfully authorized and admitted to do business in Washington, property insurance written on a builder's risk "all-risk" including Earthquake and Flood or equivalent policy form to cover the course of construction in the amount of the full insurable value thereof. This property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Port has an insurable interest in the property, whichever is later. This insurance shall include as named insureds and as loss payees the Port, the Contractor, and Subcontractors of any tier, as their respective interests appear. This insurance shall insure against the perils of fire (with extended coverage) and physical loss or damage including without limitation, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal, and shall also provide "all risk" coverage for the interests of the Port, the Contractor and Subcontractors of any tier as named insureds, as their respective interests appear. Upon written request, the Contractor will provide a copy of its policy to the Port. Each loss may be subject to a deductible of not more than $10,000, except that the deductible for earthquake and flood losses shall be no greater

than 5% of the loss or $100,000, whichever is more. Losses up to the deductible amount or otherwise not covered by insurance shall be the responsibility of the Contractor. This insurance shall include as named insureds and as loss payees the Port, the Contractor and Subcontractors of any tier, as their respective interests appear. The policy shall be endorsed to allow complete or partial occupancy by the Port before or after Substantial Completion without the insurer's approval. All tools and equipment of the Contractor and Subcontractors of any tier not intended as part of the construction or installation of the Work will be the sole responsibility of the Contractor.

PART 2 - PRODUCTS - NOT USED

PART 3 - PRODUCTS - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 PREVAILING AND OTHER REQUIRED WAGES

A. The Contractor shall pay (and shall ensure that all Subcontractors of any tier pay) all prevailing wages and other wages (such as Davis-Bacon Act wages) applicable to the Project.

B. Pursuant to RCW 39.12, “Prevailing Wages on Public Works,” no worker, laborer, or mechanic employed in the performance of any part of the Work shall be paid less than the “prevailing rate of wage” in effect as of the date that bids are due.

1. Based on the bid submittal deadline for this project, the applicable effective date for prevailing wages for this project is **March 2nd, 2016.**

C. The State of Washington prevailing wage rates applicable for this public works project, which is located in Pierce County, may be found at the following website address of the Department of Labor and Industries:

https://fortress.wa.gov/lni/wagelookup/prvWagelookup.aspx

D. The schedule of the prevailing wage rates is made a part of the Contract Documents by reference as though fully set forth herein; and a copy of the applicable prevailing wage rates are also available for viewing at the Port Administration Building, located at One Sitcum Plaza, Tacoma, WA 98421 (253-383-5841). Upon request to the Procurement Department at procurement@portoftacoma.com, the Port will email or mail a hard copy of the applicable Journey Level prevailing wages for this project.

E. Questions relating to prevailing wage data should be addressed to the Industrial Statistician.

Mailing Address:	Washington State Department of Labor and Industries Prevailing Wage Office P.O. Box 44540 OIympia, WA 98504
Telephone:	(360) 902-5335
Facsimile:	(360) 902-5300

1. If there is any discrepancy between the attached or provided schedule of prevailing wage rates and the published rates applicable under WAC 296-127-011, or if no schedule is attached, the applicable published rates shall apply with no increase in the Contract Sum. It is the Contractor’s responsibility to ensure that the correct prevailing wage rates are paid.

F. Statement to Pay Prevailing Wages

1. Prior to any payment being made by the Port under this Contract, the Contractor, and each Subcontractor of any tier, shall file a Statement of Intent to Pay Prevailing Wages under oath with the Port and certified by the Director of Labor and Industries.

2. The statement shall include the hourly wage rate to be paid to each classification of workers entitled to prevailing wages, which shall not be less than the prevailing rate of wage, and the estimated number of workers in each classification employed on the Project by the Contractor or a Subcontractor of any tier, as well as the Contractor’s contractor registration number and other information required by the Director of Labor and Industries.

3. The statement, and any supplemental statements, shall be filed in accordance with the requirements of the Department of Labor and Industries. No progress payment shall be made until the Port receives such certified statement.

G. The Contractor shall post in a location readily visible to workers at the Project site (1) a copy of the Statement of Intent to Pay Prevailing Wages approved by the Industrial Statistician of the Department of Labor and Industries and (2) the address and telephone number of the Industrial Statistician of the Department of Labor and Industries to whom a complaint or inquiry concerning prevailing wages may be directed.

H. If a State of Washington prevailing wage rate conflicts with another applicable wage rate (such as Davis-Bacon Act wage rate) for the same labor classification, the higher of the two shall govern.

I. Pursuant to RCW 39.12.060, if any dispute arises concerning the appropriate prevailing wage rate for work of a similar nature, and the dispute cannot be adjusted by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the Director of the Department of Labor and Industries, and his or her decision shall be final and conclusive and binding on all parties involved in the dispute.

J. Immediately following the end of all work completed under this Contract, the Contractor, and each Subcontractor of any tier, shall file an approved Affidavit of Wages Paid with the L&I.

K. The Contractor shall defend (at the Contractor's sole cost, with legal counsel approved by Port), indemnify and hold the Port harmless from all liabilities, obligations, claims, demands, damages, disbursements, lawsuits, losses, fines, penalties, costs and expenses, whether direct, indirect, including but not limited to attorneys' fees and consultants' fees and other costs and expenses, from any violation or alleged violation by the Contractor or any Subcontractor of any tier of RCW 39.12 ("Prevailing Wages on Public Works") or Chapter 51 RCW ("Industrial Insurance"), including but not limited to RCW 51.12.050.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 REQUIREMENTS APPLICABLE PORT-WIDE

A. The Contractor shall submit prior to the start of work a list of emergency contact numbers for itself and subcontractors, suppliers and manufacturer representatives. Each person on the project site shall have a valid identification card that is tamper proof with laminated photo identification such as one of the following:

1. State-issued Driver's license (also required if driving a vehicle)
2. Card issued by a governmental agency
3. Passport
4. Identification card issued by the Port of Tacoma
5. Pacific Maritime Association card, or
6. Labor organization identification card

B. Identification cards shall be visible while on the work site or easily displayed when requested.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SCOPE

A. The accompanying Drawings and Specifications show and describe the location and type of Work to be performed under this project. Work is more specifically defined on the drawings listed in Section 00 01 15.

1. The Work under this contract is to provide, furnish and install all labor, materials and equipment required to complete the work, installed, tested, and ready for use, and as described in these documents.

2. The North Lead Rail Improvements consists of:

a. Selective site demolition and erosion control;

b. Furnish and install railway trackwork: Approximately 12,300 track feet of new track and salvage and reuse of existing track.

c. Installation of special trackwork: Double diamond crossings (2 crossings), 9 rail crossovers, and 24 rail turnouts.

d. Access roads within the rail yard;

e. Relocation of fencing and other surface features;

f. Track drainage and relocation of existing storm drainage infrastructure;

g. Installation of Stormfilter Catch Basin units and Modular wetland Stormwater Treatment System (MWS);

h. Relocation of existing electrical and communication infrastructure;

i. Yard power and yard lighting infrastructure and relocations;

j. AEI infrastructure relocations;

k. Installation of an arched culvert and backfill of the open channel portion of the Erdahl Ditch;

l. Compressed air distribution piping and new air connection pits.

1.02 LOCATION

A. The work is located at:

Port of Tacoma Railyard
Site bounded between Milwaukee Ave and
Alexander Avenue, North of SR509
Tacoma, WA

1.03 CONTRACT INTERM MILESTONE COMPLETION DATES

A. Consistent with the Contract Agreement, the Contractor shall met the following project schedule milestones.

1. East End Substantial Completion. All trackwork related construction shall be complete in the area defined on plan G6 as the "East End," not later than 262 calendar days from Contract Execution. The "East End" is further defined on plan G3 as areas 3, 4, 5, 5.1, and 6.

2. All Contract Work shall be completed by Substantial Completion as defined in the Contract Agreement.

1.04 WORK PERFORMED UNDER SEPARATE CONTRACTS

A. The Contractor shall, by way of the Engineer, familiarize itself with other contracts which have been awarded, about to be awarded or are in progress in the same or immediate area. The Contractor shall coordinate the progress of its work with the established schedules for completion and phasing.

B. Contractor shall coordinate and provide access to maintenance, Tacoma Rail and other contractors performing work in the rail yard, including but not limited to fiber optic cable demolition and installation in the project area.

1.05 PORT PROVIDED MATERIALS

A. Port of Tacoma will furnish the Contractor with the following material:

1. Special trackwork including double diamond crossing, crossovers and turnouts.

B. Reference Section 01 64 00 - Owner Provided Materials for coordination.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1- GENERAL

1.01 SECTION INCLUDES

A. This Section specifies work sequence and constraints.

B. The purpose of the milestones, sequence and limitations of construction are to ensure that the Contractor understands the requirements and limitations on its work by the specific characteristics of the Contract, schedules and conducts work in a manner consistent with achieving these purposes, and complies with the construction schedule, the specific sequence, constraints, milestones and limitations of work specified.

C. Sequence of construction: Plan the sequence of construction to accommodate all the requirements of the specifications. The Contract Price shall include all specified requirements as described in this Section.

1.02 CONTRACTOR ACCESS AND USE OF PREMISES

A. Activity Regulations

1. Ensure Contractor personnel deployed to the project become familiar with and follow all regulations or restrictions established by the Engineer.

2. There are no work hours restrictions associated with this location, although the Contractor shall comply with local ordinances with regard to noise and work hour restrictions. In the event the Contractor is planning to work outside typical work hours (Monday - Friday 0700 - 1700) the Contractor is to notify the Engineer at least 3 days in advance to arrange for necessary inspection and testing as may be necessary.

B. Work Site Regulations

1. Keep within the limits of work and assigned avenues of ingress and egress. Do not enter areas outside the designated work location unless previously approved by the Engineer. The Contractor shall comply with the following conditions:

a. Restore all common areas to a clean and useable condition that permits the resumption of Tenant operations after the Contractor ceases daily work.

b. Be responsible for control and security of Contractor-owned equipment and materials at the work site. Report to Port Security (phone (253) 383-9472 any missing/lost/stolen property.

c. Ensure all materials, tools and equipment will be removed from the site or secured within the designated laydown area at the end of each shift.

d. Provide portable lighting capable of sufficiently illuminating work areas in compliance with applicable safety regulations and as required for reliable and satisfactory performance of work during hours of darkness.

1.03 CONSTRAINTS - GENERAL

A. Constraints for Work at Site

1. The Work includes construction adjacent to an active rail lines controlled and operated by Tacoma Rail. For bidding purposes the Contractor may assume one twelve (12) hour work windows per week from 7:00 AM to 7:00 PM will be provided for Work that directly impacts and existing track unless otherwise specified in the Contract Documents. Tacoma Rail reserves the right to run trains if needed during the work windows.

2. Train operations shall have precedence over Contractor's work. Contractor's operations shall yield train operations on adjacent tracks when working with 25 feet of the operating track.
3. At the end of each track outage the track surface, alignment, runoff, gage and track structure shall meet 49 CFR Part 213 for Class 1 track and be accepted by Tacoma Rail and Port of Tacoma.
4. The Contractor shall have full responsibility for all rail safety requirements.
5. All work in proximity of active tracks shall be performed in accordance with 49 CFR Part 214.

B. Schedule constraints

1. There are scheduling constraints and specified track outages associated with the Work on the Contract Drawings. The Contractor shall consider these constraints when preparing its bid and schedule the work.

1.04 RAIL COORDINATION

A. Contractor shall coordinate all work in the vicinity of the existing track with the Engineer and Tacoma Rail.

B. This project requires work in the vicinity of active railroad tracks. The Contractor shall adhere to all Tacoma Rail, Port of Tacoma and Federal safety codes, regulations and specifications for the duration of the project.

C. Contractor shall protect active railroad tracks at all times, unless otherwise noted or allowed by the Engineer.

D. Tacoma Rail reserves the right to operate trains on all active tracks at all times, Contractor shall yield to operating trains at all times.

E. Rail Construction Sequencing Plans

1. Contractor shall submit and obtain approval of a detailed sequencing plan for rail construction in the project East End within 14 days prior to Contract Execution. No onsite work shall begin until the sequencing plan has been reviewed and approved by the Port.
2. Contractor shall submit and obtain approval of a detailed sequencing plan for rail construction in the project West End within 30 days of Contract Execution. No work shall begin in the West End until the sequencing plan has been reviewed and approved by the Port.
3. Contractor may adopt and submit sequencing plans provided in the Drawings, or develop and submit alternative sequencing plans.
4. Rail Construction and Sequencing Plans shall include, at a minimum, the following:
    a. Work area and duration for each phase of construction.
    b. Crews and work hours that will be utilized during each phase of work, including identification of planned weekend work and 24 hour work days.
    c. Itemized list of railroad demolition and construction to be completed in each phase of work.
    d. Itemized list of site, utility, mechanical and electrical demolition and construction to be completed in each phase of work.

e. Schedule and duration of track outages in each phase of construction.

f. Description of temporary trackwork or special trackwork that will be constructed to minimize disruption of Tacoma Rail operations.

g. Procedures for Contractor safety when working adjacent to active railroad tracks in accordance with City, State, and Federal requirements, and compliance with 49 CFR Part 213.

h. Access routes in, out and through the work area for each phase.

F. Track Outages:

1. The Contractor shall schedule all work to minimize the time that any tracks and rail operations are out of service and minimize disruption to Tacoma Rail operations.

2. All track outages shall be requested by the Contractor a minimum of one week prior to beginning of outage. Tacoma Rail will make reasonable effort to adjust planned rail operations to accommodate Contractor outage requests, and will notify Contractor of outages that can be accommodated. Contractor shall accommodate and implement reasonable changes to requested or planned rail construction sequence as required to maintain Tacoma Rail operations at all times.

3. Where days of allowable track outage are noted, Contractor shall work 24 hour days, work weekends, and/or utilize multiple crews to meet the time restrictions and allow rail operations to be resumed within the time allowed.

G. Emergency access requirements of the 2012 International Fire Code, Washington State adopted fire code amendments, and Title 3, Chapter 3.02 of the Tacoma Municipal Code shall be followed throughout the duration of the project.

H. Contractor shall identify all Work within 25 feet of an active track in its three week look ahead schedule.

I. Seventy two (72) hours advance written request for track work window is required prior to beginning any work within 25 feet of the rail lines.

J. Contractor shall coordinate its construction activities with the following Port and Tacoma Rail contacts.

1. Email:

a. railoperations@cityoftacoma.org

b. Carol Rhodes, Senior Project Manager, crhodes@portoftacoma.com

c. Matt Lenn, Port Inspector, mlenn@portoftacoma.com

2. Tacoma Rail Tower number: (253) 502-8867

1.05 UTILITY COORDINATION

A. Contractor shall perform all utility pothole investigations indicated on the Drawings within 20 days of Notice to Proceed.

1.06 ELECTRICAL CONSTRUCTION SEQUENCE

A. Contractor shall submit a work plan for electrical construction within 20 days of notice to proceed. At a minimum, electrical work plan shall address:

1. Detailed electrical sequencing of light pole, vault and raceway construction.

2. Schedule for de-energizing existing light poles and energizing new and existing poles throughout the sequence of electrical construction.
3. Schedule for work to be performed by Tacoma Public Utilities.

B. Contractor shall maintain power to communications hut at all times. Provide generator power as required until permanent power is established.

C. Contractor shall maintain existing TPU service pole and panels in service until new TPU service pole, panels and associated raceways and vaults are complete and energized. Contractor shall provide temporary panel at existing TPU service pole as required to minimize outages of site lighting.

D. Contractor shall minimize outages of existing and new site lighting, the schematic sequence of electrical and lighting construction outlined below represents a possible construction sequence that would result in lighting outages generally acceptable to the Port of Tacoma and Tacoma Rail. The sequence shown is for general information only and is not intended to dictate to the Contractor the sequence of construction.

1. Construct and test new light poles LP1, LP2, LP4, LP5, and all associated vaults, raceways and conductors prior to de-energizing any existing light poles.
2. Energize new light poles LP1, LP2, LP4, LP5, and existing light poles LP3 and LP4A prior to de-energizing any existing light poles.
3. Construct, test and energize new light pole LP7 and all associated vaults, raceways and conductors. Energize new light pole LP7 and existing light poles LP8 and LP9 within 10 days of energizing light poles LP1, LP2, LP4 and LP5.
4. Construct, test and energize permanent power feed to AEI and Communication huts, and existing light pole LP5A and all associated vaults, raceways and conductors prior to the completion of Track Construction Phase 1.
5. Coordinate construction of new TPU service pole and vault and construct, test and energize new TPU service panels. Construct, test and energize new light pole LP6 and all associated vaults, raceways and conductors within 3 days of energizing the TPU service panels. Connect all previously constructed light poles and all associated vaults, raceways and conductors to new TPU service panels within 3 days of energizing the TPU service panels.
6. Construct, test and energize new light pole LP10 and all associated vaults, raceways and conductors prior to the completion of Track Construction Phase 2B.
7. Energize existing light poles LP11, LP12, LP13, LP14, LP15, LP16 and LP17 prior to completion of Track Construction Phase 2B.
8. Construct all remaining electrical work prior to completion of Track Construction Phase 3A.

1.07 CIVIL/SITE CONSTRUCTION SEQUENCE

A. Contractor shall provide 30 day advance written notice prior to demolishing the existing Tacoma Rail maintenance yard fencing, or beginning construction of the new maintenance yard fencing. Contractor shall coordinate with Tacoma Rail for the relocation or consolidation of the materials within the maintenance yard as required for fencing demolition and construction.

B. Contractor shall provide 7 day advance written notice prior to beginning dewatering of Erdahl Ditch or excavations.

C. Coordinate all utility and storm drainage work with track demolition and construction sequence.

D. Coordinate all demolition and sitework with track demolition and construction sequence.

E. Contractor shall dewater active surfacewater drainage systems, including pipes, ditches and culverts, as required to complete construction. Drainage dewatering systems shall be of sufficient capacity to prevent flooding of project site or upstream areas.

F. Contractor shall maintain a minimum of one access route through the project site, from Alexander Avenue to Milwaukee Avenue, at all times. Contractor may use existing access roads, new access roads and temporary access roads and track crossings as required to establish the access route.

1.08 COMPRESSED AIR CONSTRUCTION SEQUENCE

A. Maintain existing compressed air pits in service until new compressed air connection pits are constructed, tested and fully functional.

B. Coordinate piping demolition and installation with track demolition and construction sequence.

PART 2 – PRODUCTS

2.01 NOT USED

PART 3 – EXECUTION

3.01 NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 PAYMENT PROCEDURES

A. Monthly pay estimates shall clearly identify the work performed for the given time period based on the approved Schedule of Values.

1. At the Pre-construction meeting, the Engineer and the Contractor shall agree upon a date each month when payment applications shall be submitted.

B. Prior to submitting a payment application, the Contractor and Engineer shall meet each month to review the work accomplished to determine the actual quantities including labor, materials and equipment charges to be billed.

1. Prior to the payment application meeting, the Contractor shall submit to the Engineer all measurement documentation as referenced in these contract documents; to include all measurement by weight, volume or field.

2. For all change work being done on a force account basis, the Contractor shall submit prior to meeting with Engineer all Force Account back-up documentation as required to process the payment application where Force Account work is being billed. The Engineer and the Contractor shall review the documentation at the payment application meeting to verify quantities and review the work accomplished.

3. The Contractor shall bring a copy of all documentation to the pay application meeting with the Engineer.

C. Following the Engineers' review, the Contractor shall prepare an original pay estimate, in a form approved by the Port or with the Port's supplied form, signed and complete with all supporting documentation attached and submit it electronically using Adobe PDF file format to cpinvoices@portoftacoma.com .

1. With each payment application, the Contractor shall submit a list of all subcontractors (at all tiers) and suppliers on the Port supplied form.

D. An estimated cashflow statement projecting the Contractor's monthly billings on the project shall be submitted with each payment application.

1.02 PAYMENT PRICING

A. Pricing for the various lump sum or unit prices in the Bid Form, as further specified herein, shall include all compensation to be received by the Contractor for furnishing all tools, equipment, supplies, and manufactured articles, and for all labor, operations, and incidentals appurtenant to the items of work being described, as necessary to complete the various items of the work in accordance with the requirements of the Contract Documents.

B. Pricing also includes all costs of compliance with the regulations of public agencies having jurisdiction, including safety and health requirements of the Occupational Safety and Health Administration of the U.S. Department of Labor (OSHA).

C. No separate payment will be made for any item that is not specifically set forth in the Bid Form, and all costs therefore shall be included in the prices named in the Bid Form for the various appurtenant items of work.

D. All other work not specifically mentioned in the measurement and payment sections identified below shall be considered incidental to the work performed and merged into the various unit and lump sum prices bid. Payment for work under one item will not be paid for under any other item.

E. The Port of Tacoma reserves the right to make changes should unforeseen conditions necessitate such changes. Where work is on a unit price basis, the actual quantities occasioned by such changes shall govern the compensation.

1.03 LUMP-SUM MEASUREMENT

A. Lump-sum measurement will be for the entire item, unit of Work, structure, or combination thereof, as specified and as indicated in the Contractor's submitted bid.

1. If the Contractor requests progress payments for lump-sum items, such progress payments will be made in accordance with an approved schedule of values. The quantity for payment for completed work shall be an estimated percentage of the lump sum amount, agreed to between the Engineer and Contractor, payable in monthly progress payments in increments proportional to the work performed in amounts as agreed between the Engineer and the Contractor.

1.04 MEASUREMENT OF QUANTITIES FOR UNIT PRICES

A. Measurement Standards:

1. All Work to be paid for at a contract price per unit measurement, as indicated in the Contractor's submitted bid, will be measured by the Engineer in accordance with United States Standard Measures.

B. Measurement by Weight:

1. Unless shipped by rail, material to be measured and paid for by weight shall be weighed on sealed scales regularly inspected by the Washington State Department of Agriculture's Weights and Measures Section or its designated representative. Measurement shall be furnished by and at the expense of the Contractor. All weighing, measuring, and metering devices shall be suitable for the purpose intended and shall conform to the tolerances and specifications as outlined in Washington State Department of Transportation Standard Specifications, Division 1, General Requirements, Article 1-09.2, Weighing Equipment.

2. Provide or utilize platform scales of sufficient size and capacity to permit the entire vehicle or combination of vehicles to rest on the scale platform while being weighed. Combination vehicles may be weighed as separate units provided they are disconnected while being weighed. Scales shall be inspected and certified as often as the Engineer may deem necessary to ascertain accuracy. Costs incurred as a result of regulating, adjusting, testing, inspecting, and certifying scales shall be borne by the Contractor.

3. A licensed weighmaster shall weigh all Contractor-furnished materials. The Engineer may be present to witness the weighing and to check and compile the daily record of such scale weights. However, in any case, the Engineer will require that the Contractor furnish weight slips and daily summary weigh sheets. In such cases, furnish a duplicate weight slip or a load slip for each vehicle weighed, and deliver the slip to the Engineer at the point of delivery of the material.

4. If the material is shipped by rail, the certified car weights will be accepted, provided only actual weight of material will be paid for and not minimum car weights used for assessing freight tariff. Car weights will not be acceptable for material to be passed through mixing plants. Material to be measured by weight shall be weighed separately for each bid item under which it is to be paid.

5. Trucks used to haul material being paid for by weight shall be weighed empty daily and at such additional times as the Engineer may require. Each truck shall bear a plainly legible identification mark. The Engineer may require the weight of the material be verified by weighing empty and loaded trucks on such other scales as the Engineer may designate.

C. Measurement by Volume:

1. Measurement by volume will be by the cubic dimension indicated in the Contractor's submitted bid. Method of volume measurement will be by the unit volume in place or removed as shown on the Contract Drawings or as specified.

2. When material is to be measured and paid for on a volume basis and it is impractical to determine the volume by the specified method of measurement, or when requested by the Contractor in writing and accepted by the Engineer in writing, the material may be weighed in accordance with the requirements specified for weight measurement. Such weights will be converted to volume measurement for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the Resident Engineer and shall be agreed to by the Contractor before such method of measurement of pay quantities will be accepted.

D. Field Measurement for Payment:

1. The Contractor shall take all measurements by providing equipment, workers, and survey crews as required to measure quantities in accordance with the provisions for measurement specified herein. No allowance will be made for specified tolerances.

2. The Engineer will verify all quantities of Work performed by the Contractor on a unit-price basis, for progress payment purposes.

1.05 REJECTED, EXCESS, OR WASTED MATERIALS

A. Quantities of material wasted or disposed of in a manner not called for under the Contract; rejected loads of material, including material rejected after it has been placed by reasons of the failure of the Contractor to conform to the provisions of the Contract; material not unloaded from the transporting vehicle; material placed outside the lines indicated on the Contract Drawings or established by the Engineer; or material remaining on hand after completion of the Work, will not be paid for, and such quantities shall not be included in the final total quantities. No additional compensation will be permitted for loading, hauling, and disposing of rejected material.

1.06 MEASUREMENT AND PAYMENT

A. Item #1: Mobilization and Demobilization

1. Payment for MOBILIZATION AND DEMOBILIZATION shall be for preparatory work and operations performed by the Contractor including, but not limited to completion and submittal and approval of the following:

a. All bonds and insurance certificates

b. Security Requirements

c. Construction Health and Safety Plan (HASP)

d. Spill Prevention, Control and Countermeasures (SPCC) Plan

e. Initial Submittal Schedule

f. Schedule of Values

g. Phasing plans

h. Detailed CPM progress schedule

i. Construction Stormwater Pollution Prevention Plan (SWPPP)

j. Demolition Plan

k. Export Soil Management Plan

l. Air & Noise Equipment List and Certification

m. Establishing Contractor's Project Manager, Superintendent, and other required specified personnel on the Work site full time.

n. Furnishing and installing all temporary facilities and controls as needed for the safe and proper completion of the work, including utilities, sanitary facilities, barriers and enclosures, fences, staging and entrance areas, and field offices, as specified.

o. Mobilization onto the site required in support of the Contractor's first 30 days of operations.

2. Mobilization and Demobilization shall be paid at the lump sum price listed in the Contractor's submitted bid. Incremental payment shall be made for each location as follows:

a. 40% after completion of 5% of the total contract amount of other bid items have been earned.

b. 40% after completion of 20% of the total contract amount of other bid items have been earned.

c. 20% after all work on the project has been completed, including cleanup and issuance of Final Completion from the Engineer.

B. Item #2: North Lead Rail Project Complete

1. Item Description: The Work of this item includes all Work required to complete the North Lead Rail Project as included in the Contract Documents that is not specifically included in the other bid items described in this section. This includes but is not limited to health and safety requirements, field engineering, temporary erosion and sediment control (TESC), construction stormwater pollution control requirements, dewatering, demolition, storm drainage systems, electrical site work, base courses, asphalt concrete pavement, concrete, trackwork, special trackwork, chain link fencing and gates, and earthwork not specifically identified under other items of work.

2. Measurement: This item will be measured based on a percentage complete for the overall lump sum amount.

3. Payment: This item will be paid for at the Contract lump sum price as specified in the Contractor's submitted bid, approved by the Engineer in accordance with the approved Schedule of Values.

C. Item #2:Off-site disposal of Type C soil at Subtitle D Landfill.

1. Item Description: The Work of this item includes all work loading, transporting, and coordination for offsite disposal of soil materials to at a Subtitle D Landfill in accordance with Section 01 35 43.19, Export Soil Management. All Type C material shall be disposed of at Pierce County Recycling, Composting and Disposal, LLC dba LRI in accordance with the Port's contract for Waste Disposal included in Appendix A. Disposal fees shall be paid by the Port direct to LRI.

2. Measurement: This item will be measured by the ton.

3. Payment: This item will be paid for based on actual quantities for the period being billed.

D. Item #3:Off-site disposal of Type D soil material.

1. Item Description: The Work of this item includes all work in loading, transporting, and disposing offsite Type D soil and ballast materials in accordance with Section 01 35 43.19, Export Soil Management.

2. Measurement: This item will be measured by the ton.

3. Payment: This item will be paid for based on actual quantities for the period being billed.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXEUCTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.02 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment and methods of construction from those required by the Contract Documents and proposed by Contractor.

B. The contract documents include performance specifications for products and equipment which meet project requirements. In those cases where a representative item or manufacturer is named in the specification it is provided for the sole purpose of identifying a product meeting the required functional performance Where the words “or equal” are used a substitution request as further described is not required.

C. Where non-competitive or sole source products or manufacturers are explicitly specified with the words “or approved equal”, or “Engineer approved equal”, or “as approved by the Engineer” are used, they shall be taken to mean “or approved equal”. In these cases a substitution request as further described in this section, is required.

1.03 SUBMITTALS

A. Post-Award Substitution Requests: Submit a substitution request as defined in 01 33 00 – Submittal Procedures. All substitution requests must be submitted by the Contractor and not a subcontractor or supplier.

1. Substitution Request Form: Use a copy of form located in Section 00 63 25.

2. Documentation: Show compliance with requirements for substitutions with the following, as applicable:

a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.

b. Coordination information, including a list of changes or modifications needed to other parts of the Work that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable specification section. Significant qualities may include, but are not limited to, attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified. ·

d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

e. Samples, where applicable or requested.

f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects with project names, and addresses. Also provide names and addresses of the AE and Owners.

h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.

i. Research reports evidencing compliance with building code in effect for project

j. Comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

k. Cost information, including a proposal of change, if any, in the Contract Sum.

l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.

m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within 7 calendar days of receipt of a request for substitution. Engineer will notify Contractor through Port of acceptance or rejection of proposed substitution within 15 calendar days of receipt of request, or 7 calendar days of receipt of additional information or documentation, whichever is later.

a. Forms of Acceptance: Change Order or Minor Change in Work.

b. Use product originally specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

B. Substitutions will not be considered when:

1. Indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with this Section.

2. Submittal for substitution request has not been reviewed and approved by Contractor.

3. Acceptance will require substantial revision of Contract Documents or other items of the Work.

4. Submittal for substitution request does not include point-by-point comparison of proposed substitution with specified product.

1.04 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than 7 days prior to date required for preparation and review of related submittals.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.

b. Requested substitution will not adversely affect Contractor's construction schedule.

c. Requested substitution has received necessary approvals of authorities having jurisdiction.

d. Requested substitution is compatible with other portions of the Work

e. Requested substitution has been coordinated with other portions of the Work

f. Requested substitution provides specified warranty.

g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Engineer will consider Contractor’s requests for substitution if received within 14 days after the Notice of Award.

1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied:

a. Requested substitution offers Port a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities· Port must assume. Port's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Port, and similar considerations.

b. Requested substitution does not require extensive revisions to the Contract Documents.

c. Requested substitution is consistent with the Contract Documents and will produce indicated results.

d. Requested substitution will not adversely affect Contractor's construction schedule.

e. Requested substitution has received necessary approvals of authorities having jurisdiction.

f. Requested substitution is compatible with other portions of the Work.

g. Requested substitution has been coordinated with other portions of the Work.

h. Requested substitution provides specified warranty.

i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for handling and processing Contract modifications.

1.02 SUBMITTALS

A. The Contractor shall submit the following documentation to the Port:

1. List of Labor Rates

a. For the Contractor and each subcontractor, a list of labor rates for each trade applicable to the scope of work to be performed. These submitted rates shall be broken down to include the base wage, fringes, FICA, SUTA, FUTA, industrial insurance and medical aid premiums as stated in the General Conditions. The rates shall not contain any travel time, safety, loss efficiency factors, overhead or profit. Rates shall be submitted for straight time, overtime and double time in a form acceptable to the Engineer. Contractor shall provide proof of all labor rate costs as required by the Engineer including the submission of a copy of the most current Workers Compensation Rate Notice from Labor & Industries and a copy of the Unemployment Insurance Tax Rate notice from the Employment security department.

1) If labor rates change during the course of the project or additional labor rates become required to complete the work, the Contractor shall submit new rates for approval.

2. List of Equipment.

a. Submit for the Contractor and each subcontractor, a list of equipment and rates applicable to the scope of work to be performed. The equipment rates shall conform to the rates shown on Equipment Watch. A separate page from equipment watch detailing the hourly rate shall be submitted as backup documentation for each piece of equipment.

1) If the list of equipment and/or equipment rates changes during the course of the project or additional equipment becomes required to complete the work, the Contractor shall submit a new list and rates for approval.

3. No applications for payment or change orders will be processed for the Contractor until labor and equipment rates have been submitted and approved.

1.03 METHOD TO CALCULATE ADJUSTMENTS TO CONTRACT PRICE

A. One of the following methods shall be used:

1. Unit Price Method;

2. Firm Fixed Price Method (Lump Sum); or,

3. Time and Materials Method (Force Account).

B. The Port preferred methods are firm fixed price or unit prices.

1.04 MINOR CHANGES IN THE WORK

A. Engineer will issue a written directive authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time.

1.05 PROPOSAL REQUESTS

A. Port-Initiated Proposal Requests: The Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.

2. Contractor shall submit a written proposal within the time specified in the General Conditions. The proposal shall represent the Contractor's offer to perform the requested work, and the pricing set forth within the proposal shall represent full, complete, and final compensation for the proposed change and any impacts to any other Contract Work, including any adjustments in the Contract Time.

a. Include a breakdown of the changed work in sufficient detail that permits the Engineer to substantiate the costs.

1) Generally, the cost breakdown should be divided into the time and materials categories listed in the General Conditions under Article 8.02B for either Lump Sum Proposals or Force Account Proposals.

2) For Unit Price Proposals, include the quantity and description of all work involved in the unit pricing being proposed, along with a not to exceed total cost.

b. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or differing site conditions require modifications to the Contract, the Contractor may initiate a claim by submitting a request for a change to the Engineer.

1. Notify the Engineer immediately upon finding differing conditions prior to disturbing the site.

2. Provide follow-up written notification and differing site conditions proposal within the time frames set forth in the General Conditions.

3. Provide the differing site condition change proposal in the same or similar manner as described above under 1.04.A.

4. Comply with requirements in Section 01 25 00 Substitution Procedures During Construction if the proposed change requires substitution of one product or system for product or system specified.

5. Proposal Request Form: Use form acceptable to Engineer.

1.06 PROCEEDING WITH CHANGED WORK

A. The Engineer may issue a directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order per the General Conditions, Article 8.01.E.

1. The directive will contain a description of change in the Work and a not-to exceed amount. It will designate the method to be followed to determine the change in the Contract Sum or the Contract Time.

1.07 CHANGE ORDER PROCEDURES

A. Issuance of Change Order

1. On approval of the Contractor's proposal, and following successful negotiations, the Engineer will issue a Change Order for signature by the Contractor and execution by the Engineer.

a. The Contractor shall sign and return the Change Order to the Engineer within **four (4) days** following receipt of the Change Order from the Engineer. If the Contractor fails to return the signed Change Order within the allotted time, the Engineer may issue a Unilateral Change Directive.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes specifications for preparation, format, and submittal of Schedule of Values.

B. The Schedule of Values will establish unit prices for individual items of work.

C. The Schedule of Values will be the basis for payment of contract work.

1.02 PREPARATION

A. To facilitate monthly pay requests, develop the Schedule of Values based on the Contractor's submitted Bid. The schedule of Values shall be used to provide an allocation of the Work for measurement and payment to a level of detail to ensure accurate payment for the Work accomplished.

B. Obtain the agreement of the Engineer on the Schedule of Values. No payment will be made prior to an agreed upon Schedule of Values.

C. Include an updated version of the Schedule of Values as changes occur. Update the Schedule of Values to include:

1. Dollars earned and percent complete for the current progress payment period.
2. Dollars earned and percent complete to-date, excluding the current progress payment period.
3. Total dollars earned and percent complete to-date.
4. Total dollars remaining
5. Changes resulting from Change Orders

D. The total value of the line items in the Schedule of Values plus any approved Change Orders shall be equal to the current approved contract price.

E. Include as exhibits, drawings or sketches as necessary, to better define the limits of pay items that are in close proximity and that have no clear boundary in the Contract Drawings.

F. Lump sum items shall be broken down into items in sufficient detail to determine completed work. Payment of lump sum sub-items shall be on a percentage basis. To determine the percentage complete of a sub-item, the Contractor shall submit and maintain a list of total quantities and installed to date quantities for lump sum sub-items.

G. The Contractor's schedule of values, for Port's accounting purposes, shall break out and include separate items for furnish and installing track work for the project areas defined by plan sheet G5-West End and G6-East End separately for the following items:

1. Install relay rail and furnish and install ties (TF)
2. Furnish and install new rail and ties (TF)
3. Install new turnout (EA)
4. Install salvaged turnout, furnish and install tie package (EA)
5. Install new crossover (EA)
6. Install salvaged crossover, furnish and install tie package (EA)
7. Surface and link track (TF)

1.03 SUBMITTAL

A. Submit preliminary Schedule of Values within 15 days of the effective date of the Notice to Proceed.

B. Submit corrected Schedule of Values within 10 days upon receipt of reviewed Schedule of Values.

C. At the Engineer's request, submit documentation substantiating the cost allocations for line items within the Schedule of Values.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 SCHEDULE OF VALUES

A. Submit the Schedule of Values in a form acceptable to the Engineer.

B. Provide updated Schedule of Values as required by the Engineer and as indicated in the Contract Documents.

END OF SECTION

PART 1 - GENERAL

1.01 SCOPE

A. The purpose of this section is to provide the framework for communication between the Port and the Contractor by defining the types and timing of administrative tasks including meetings and other items related to communications.

1.02 NOTICE TO PROCEED

A. Contract execution will be made per the requirements of the Contract Documents. Once the contract has been executed and all pre-work submittals have been approved, the Engineer will issue a Notice to Proceed (NTP).

1. In certain instances, the Engineer may issue to the Contractor a Limited NTP for specified elements of the work described in these Contract Documents.

B. The Contractor shall submit all pre-work submittals within 14 days of contract execution.

1. No contract time extension shall be granted for any delays in issuance of the NTP by the Engineer due to the Contractor's failure to provide acceptable submittals required by the Contract Documents.

2. Contractor shall submit and obtain approval for pre-work submittals for Limited Notice to Proceed in order to receive delivery of special track work materials within the time frame specified in Section 01 64 00.

1.03 SUBMITTALS

A. List of Pre-Work Submittals that must be approved prior to issuance of a Limited Notice to Proceed

1. List of Contractor and Subcontractor Personnel (Section 00 73 63 – Security Requirements)

2. Construction Health and Safety Plan (HASP) (Section 01 35 29)

3. Spill Prevention, Control and Countermeasures (SPCC) Plan (Section 01 35 29)

4. Construction Stormwater Pollution Prevention Plan (SWPPP) (Section 01 57 13)

B. Submittals that must be submitted for Notice to Proceed

1. Export Soil Management Plan (Section 01 35 43.19)

2. Demolition Plan (Section 02 41 13)

3. Waste Management Plan (Section 01 74 16)

4. Air and Noise Equipment List and certification (Section 01 35 47)

5. Detailed Project Schedule (Section 01 32 16)

6. Owner Furnished material delivery dates (Section 01 64 00)

7. East End Phasing Plans (Section 01 14 00)

8. Initial Submittal Schedule (Section 01 29 73)

1.04 COORDINATION

A. The Contractor shall coordinate all its activities through the Engineer.

B. The Contractor shall coordinate construction operations as required to execute the Work efficiently, to obtain the best results where installation of one part of the Work depends on other potions.

1.05 PROJECT MEETINGS

A. Pre-Construction Meeting

1. After execution of the contract but prior to commencement of any work at the site, a mandatory one time meeting will be scheduled by the Engineer to discuss and develop a mutual understanding relative to the administration of the safety program, preparation of the schedule of values, change orders, RFI's, submittals, scheduling prosecution of the work. Major subcontractors who will engage in the work shall attend.

2. Suggested Agenda: The agenda will include items of significance to the project. A sample agenda is attached to this section.

3. Location of the Pre-Construction Meeting will be held at the Port of Tacoma Administration Building located at One Sitcum Plaza.

B. Weekly Progress Meetings – Progress meetings include the Contractor, Engineer, consultants and others affected by decisions made.

1. The Engineer will arrange meetings, prepare standard agenda with copies for participants, preside at meetings, record minutes and distribute copies within ten working days to the Contractor, meeting participants, and others affected by decisions made.

2. Attendance is required for the Contractor's job superintendent, major subcontractors and suppliers, Engineer, and representatives of the Port as appropriate to the agenda topics for each meeting.

3. Standard Agenda

a. Review minutes of previous meeting.

b. Review of work progress.

c. Field observations, problems, and decisions.

d. Identification of problems that impede planned progress.

e. Maintenance of Progress Schedule (3 weeks ahead; 1 week back).

f. Review of requested outages on affected tracks.

g. Corrective measures to regain projected schedules.

h. Planned progress during succeeding work period.

i. Coordination of projected progress.

j. Maintenance of quality and work standards.

k. Effect of proposed changes on progress schedule and coordination.

l. Demonstration that the project record drawings are up-to-date.

m. Other business relating to the work.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Critical Path Method (CPM) Project schedule

B. Updated Schedules

C. Three Week Look Ahead Schedule

1.02 SUBMITTALS

A. Within 14 days after Contract Execution, submit detailed project schedule of the first 30 days after mobilization of on-site work.

B. Within 21 days after Contract Execution, submit detailed CPM project schedule.

C. If schedule requires revision after review, submit revised schedule within 10 days.

D. Submit updated schedule monthly or when the plan of the Work has been revised or impacted.

E. Submit three week look ahead schedule weekly.

1.03 QUALITY ASSURANCE

A. Contractor's Personnel or specialist Consultant: 1 years minimum experience in preparing and updating CPM schedules on comparable projects.

1.04 SCHEDULE FORMAT

A. The Contractor shall use the critical path method (CPM) to schedule and monitor project activities. Project schedules shall be prepared and maintained using a system which is fully compatible with Microsoft Project 2010, or other CPM software approved by the Engineer.

B. Schedule reports shall be in a barchart format with critical path and logic relationships between activities shown.

C. Sheet Size: Multiples of 8-1/2 x 11 inches (216 x 280 mm).

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT SCHEDULE CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. The schedule shall reflect all required constraints in the contract and coordinated with contractor's phasing plans. Schedule shall demonstrate completion of the project by the Substantial completion dates in the Contract. The Port shall not compensate for any delays to an early completion schedule.

C. Organize activities in logical categories (e.g. phase, type of work) and in chronological order according to the start date for each activity.

D. The project shall include activities for the procurement and delivery of long lead materials, delivery of owner supplied materials, utility coordination and outages, and on-site construction activities for all Work included in the contract.

E. With the exception of Notice to Proceed and Contract completion milestone activities, work activities shall no be open-ended; with each activity havering both predecessor and successor ties.

F. Activities will be coded to help organize the schedule by stage, type of work, area, etc.

G. Date/time constraints and/or lags, other than those required by the contract, shall not be allowed unless accepted by the Engineer. The Contractor shall include as the next to last activity in the contract schedule, a milestone activity named "Substantial Completion Date" which shall be driven by a “Finish no later than” constraint. The "Final Completion Date" shall be the final item on the schedule.

3.02 NETWORK ANALYSIS

A. Bar chart shall include for each activity of detailed network diagrams:

1. Activity description.
2. Estimated duration of activity, in maximum 15 day intervals.
3. Earliest start date.
4. Earliest finish date.
5. Total and free float; float time shall accrue to Port and to Port's benefit.

3.03 UPDATED SCHEDULE

A. Update the Construction schedule monthly or earlier when the schedule has been revised or impacted. The updated schedule shall be kept current, reflecting actual activity progress and plan for completing the remaining work.

B. Updated schedule shall show completion of the project on or before the current Contract Completion Date. If the Contractor has been delayed by no fault by the Contractor, the Contractor shall submit a separate schedule with his request for additional time.

3.04 THREE WEEK LOOK AHEAD SCHEDULE

A. The three week look ahead shall be consistent with the approved project schedule. Additional tasks shall be added as work progresses in order to provide a more detailed day-to-day plan of upcoming work. The work plans shall be updated each week to show the planned work for the current and following two-week period. Additionally, include upcoming outages, closures.

B. The three week look ahead schedule shall be printed on 8 ½ by 11 or 11 by 17 sheets of paper as directed by the Engineer. Activities shall not exceed 5 working days in duration and shall have sufficient level of detail to assign crews, tools and equipment required to complete the work. The Contract shall provide copies of the schedule at the weekly meeting and an electronic pdf file of the 3-Week Look Ahead Schedule shall be delivered to the Engineer weekly, before the regularly scheduled Project Meeting.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE

A. The provisions and intent of the Contract, including the General Conditions apply to this work as if specified in this section. Work related to this section is described throughout these Specifications

B. Individual submittals required in accordance with the pertinent sections of these specifications. Other submittals may be required during the course of the project and are considered part of the normal work to be completed under the Contract.

1.02 SUBMITTAL LOG

A. Contractor shall, within 14 days of Contract Execution, prepare and submit for Engineer approval a detailed log of all the submittals required under this Contract, along with any other submittals identified by the Port or Contractor. The log shall include, but not be limited to, schedules, required construction work plans, equipment and material cut sheets, shop drawings, project record documents, test results, survey records, record drawings, results of QC testing, and all other items for which a submittal is required. The submittal log shall be organized by CSI Specification Division, and Section number and include the following information:

1. Submittal Number
2. Item identification.
3. Scheduled submittal date, date returned, date approved.
4. Date submittal or material is needed.
5. After the submittal log is reviewed and approved by the Engineer, it shall become the basis for the submittal of all items by Contractor.

1.03 COMPLIANCE

A. Failure to comply with these requirements shall be deemed as the Contractor's agreement to furnish the exact materials specified or materials selected by the Engineer based on these specifications.

1.04 SHOP DRAWINGS AND MANUFACTURERS' LITERATURE

A. The Port will not accept shop drawings that prohibit the Port from making copies for its own use.

B. Shop drawings shall be prepared accurately and to a scale sufficiently large to indicate all pertinent features of the products and the method of fabrication, connection, erection, or assembly with respect to the work.

C. All drawings submitted to the Engineer for approval shall be drawn to scale as ANSI D

D. Required electronic formats for these drawings are as follows:

1. AutoCad DWG
2. PDF - Formatted to print to half-scale using 11x17 paper.

E. Catalog cuts or brochures shall show the type, size, ratings, style, color, manufacturer, and catalog number of each item and be complete enough to provide for positive and rapid identification in the field. General catalogs or partial lists will not be accepted. Manufacturers' original electronic files are required for submitting.

1.05 SUBMITTAL REVIEW

A. After review of each of Contractor's submittals, the submittal will be returned to Contractor with a form indicating one or more of the following:

1. No Exceptions Taken. Means, accepted subject to its compatibility with future submittals and additional partial submittals for portions of the work not covered in this submittal. But it does not constitute approval or deletion of specified or required items not shown in the partial submittal.

2. Make Corrections Noted. Same as Item 1, except that minor corrections as noted shall be made by Contractor.

3. Reviewed – Submittal has been reviewed by the port. Does not constitute approval and The Contractor is responsible for requirements in submittal.

4. Review as Noted – Submittal has to be reviewed by the Port with comments as noted.

5. Revise and Resubmit. Means, rejected because of major inconsistencies or errors. Resolve or correct before next submittal.Submitted material does not conform to the Contract Documents in a major respect (e.g., wrong material, size, capacity, model, etc.).

B. Submittals marked "No Exceptions Taken", "Make Corrections Noted" or “Reviewed as Noted” authorizes Contractor to proceed with construction covered by those data sheets or shop drawings with corrections, if any, incorporated.

C. When submittals or prints of shop drawings have been marked "Revise and Resubmit" or "Rejected-," Contractor shall make the necessary corrections and submit required copies. Every revision shall be shown by number, date, and subject in a revision block, and each revised shop drawing shall have its latest revision numbers and items clearly indicated by clouding around the revised areas on the shop drawing.

D. Submittals authorized by the Engineer do not in any case supersede the Contract Documents. The approval by the Engineer shall not relieve the Contractor from responsibility to conform to the Drawings or Specifications, or correct details when in error, or ensure the proper fit of parts when installed. A favorable review by the Port of shop drawings, method of work, or information regarding material and equipment Contractor proposes to furnish shall not relieve Contractor of its responsibility for errors therein and shall not be regarded as assumption of risk or liability by the Port or its officers, employees, or representatives. Contractor shall have no claim under the Contract on account of failure or partial failure, or inefficiency or insufficiency of any plan or method of work, or material and equipment so accepted. Favorable review means that the Port has no objection to Contractor using, upon its own full responsibility, the plan or method of work proposed, or furnishing the material and equipment proposed.

E. It is considered reasonable that the Contractor’s submittals shall be complete and acceptable by at least the second submission of each submittal. The Port reserves the right to deduct monies from payments due Contractor to cover additional costs for review beyond the second submission.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 PREPARATION OF SUBMITTALS

A. The Contractor shall use the Port supplied transmittal form for all submittals and email submittals in a clear PDF document to the Engineer at crhodes@portoftacoma.com

B. A separate submittal shall be prepared for each product or procedure and shall be further identified by referencing the Specification Section and paragraph number and each submittal shall be numbered consecutively.

C. Product submittals that cannot be accomplished electronically shall be accompanied by a printed version of the transmittal. These submittals will be hand delivered to the Port offices at One Sitcum Plaza, Attention: Engineering Department - Carol Rhodes.

D. Shop and detail drawings shall be submitted in related packages. All equipment or material details which are interdependent or are related in any way must be submitted indicating the complete installation. Submittals shall not be altered once marked “No Exceptions Taken” Revisions shall be clearly marked and dated. Major revisions must be submitted for approval.

E. The Contractor shall thoroughly review all shop and detail drawings, prior to submittal, to assure coordination with other parts of the work.

F. Components or materials which require shop drawings and which arrive at the job site prior to approval of shop drawings shall be considered as not being made for this project and shall be subject to rejection and removal from the premises.

G. All submittal packages including (but not limited to) product data sheets, mix designs, shop drawings and other required information for submittal must be submitted, reviewed and approved before the relevant scheduled task may commence. It is the responsibility of the Contractor to provide the submittal information which may drive a task on the construction schedule to submit items well enough in advance as to provide adequate time for review and comment from the Engineer without adversely impacting the construction schedule.

3.02 MAINTENANCE OF SUBMITTAL LOG

A. Prepare and submit for Port review a detailed submittal log conforming to the requirements of paragraph 1.02 of this section. When approved by the Engineer use the submittal log to track the transmittal of submittals to the Engineer, the receipt of submittal comments from the Engineer, and all subsequent action with respect to each submittal. Provide an updated copy of the submittal log to the Engineer during each weekly progress meeting, unless otherwise approved by the Engineer.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The work includes the requirements for health and safety provisions necessary for all work at the site for this project. The work also includes compliance with all laws, regulations and ordinances with respect to safety, noise, dust, fire and police action, civil disobedience, security or traffic.

B. Some of the work tasks may place workers in the potential position of coming into contact with regulated building materials, waste, or environmental media. Detailed information regarding the known nature and extent of refuse and regulated materials in the project area is included in Section 00 35 43.13 Hazardous Material Information.

C. The Contractor shall monitor site conditions for indications of identified and other potentially hazardous, dangerous, and/or regulated materials (suspicious material). Indicators of suspicious material include, but are not limited to, refuse, oily sheen or coloring on soil or water, or oily or chemical odors. If suspicious materials are encountered, the Contractor shall stop all work in that area and notify the Engineer immediately.

1.02 SUBMITTALS

A. Prior to the start of any Work, the Contractor shall provide a site specific Health and Safety Plan (HASP), which meets all the requirements of local, state and federal laws, rules and regulations. The HASP shall address all requirements for general health and safety and shall include but not be limited to:

1. Description of work to be performed and anticipated chemical and/or physical hazards associated with the work.
2. Map of the site(s) illustrating the location of the anticipated hazards and areas of control for those hazards .
3. Hazardous material inventory and safety data sheets (SDSs) for all chemicals which will be brought on site.
4. Documentation that the necessary workers have completed the required Hazardous Waste Operations and Emergency Response (HAZWOPER) training.
5. Engineering controls/equipment to be used to protect against anticipated hazards.
6. Personal protective equipment and clothing including head, foot, skin, eye, and respiratory protection.
7. Procedures which will be used for:
    a. Lockout/Tagout;
    b. Fall protection;
    c. Trenching and shoring;
    d. Hot work;
    e. Oxygen deficient conditions;
    f. Suspicious materials and/or unidentified materials;
    g. Confined-space entry (could include dewatering storage tanks, manholes, or other items);

h. Confined-space rescue;

8. Site housekeeping procedures and personal hygiene practices.
9. Railroad safety procedures.
10. Administrative controls.
11. Emergency plan including locations of and route to nearest hospital.
12. Medical surveillance program for site personnel before, during, and after completion of site work.
13. Recordkeeping including:
    a. Documentation of appropriate employee training (e.g., Hazardous Waste Operations and Emergency Response [HAZWOPER] 40-hour training for staff involved with excavation and handling of soil)
    b. Rail safety training documentation
14. Name and qualification of person preparing the HASP and person designated to implement and enforce the HASP.
15. Excavation, stockpiling, and truck loading procedures.
16. Lighting and sanitation.
17. Signatory page for site personnel to acknowledge receipt, understanding, and agreement to comply with the HASP.

B. Prior to the start of any Work, the Contractor shall provide a site specific Spill Prevention, Control and Countermeasures (SPCC) Plan, which meets all the requirements of local, state and federal laws, rules and regulations.

C. Contractor may submit the HASP and SPCC Plan as one comprehensive document or may submit the plans as separate documents.

1.03 POTENTIAL CHEMICAL HAZARDS

A. Site Contaminants

1. The Contractor must provide site workers with Hazard Communication standard information for potential site contaminants (in accordance with WAC 296-843). The Contractor shall ensure that all site workers are aware of and understand this information. Additional information shall also be provided by the Contractor, as necessary, to meet the Hazard Communication Standard and HASP requirements as noted in WAC 296-901-14010 and 296-843. Workers shall be instructed on basic methods or techniques to assist in detecting suspicious material.

B. Chemical hazards may also result from Contractor operations resulting in inadvertent release of fuel, oil, or other chemicals in a manner that would expose workers.

1.04 POTENTIAL PHYSICAL AND OTHER HAZARDS

A. The Work of the Contractor is described elsewhere in these specifications. Precautions to prevent all anticipated physical and other hazards, including heavy equipment and trains, shall be addressed in the HASP.

B. Specific aspects of construction resulting in physical hazards anticipated for this project include, but are not limited to the following:

1. Major hazards associated with earthwork impacts from moving construction vehicles and trucks, noise, thermal stress, contact with unguarded machines, excavation hazards (i.e., cave-in, utility, etc.), strains from heavy lifting, and reduced visibility and communications difficulties in work area.
2. Operation of equipment, including excavators, loaders, and related equipment, presenting hazards of entrapment, ensnarement, and being struck by moving parts.
3. Operation railroad locomotives and freight cars within the rail yard and surrounding tracks.

C. Other anticipated physical hazards:

1. Heat stress, such as that potentially caused by impermeable clothing (may reduce the cooling ability of the body due to evaporation reduction).
2. Cold stress, such as that potentially caused during times when temperatures are low, winds are high, especially when precipitation occurs during these conditions.
3. Biological hazards, such as mold, insect stings, or bites, poisonous plants (i.e., poison oak, sumac, etc.).
4. Trips and falls

PART 2 - PRODUCTS

2.01 PRODUCTS SPECIFIED FOR HEALTH AND SAFETY

A. Provide the equipment and supplies necessary to support the work as described in the site-specific HASP. Equipment and supplies may include but are not limited to:

1. A hazardous materials inventory and SDSs for the chemicals brought on site;
2. Fencing and barriers;
3. Warning signs and labels;
4. Trenching equipment;
5. Equipment to support hot work;
6. Equipment to support lockout/tagout procedures;
7. Scaffolding and fall protection equipment;
8. Personal protective equipment (hard hats, foot gear, skin, eye, and respiratory protection);
9. Demolition equipment and supplies;
10. First aid equipment;
11. Spill response and spill prevention equipment; and
12. Field documentation logs/supplies

PART 3 - EXECUTION

3.01 WORK AREA PREPARATION

A. Contractor shall comply with health and safety rules, regulations, ordinances promulgated by the local, state, and federal government, the various construction permits, and other sections of the Contract Documents. Such compliance shall include, but not be specifically limited to: any and all protective devices, equipment and clothing; guards; restraints; locks; latches; switches; and other safety provisions that may be required or necessitated by state and federal safety

regulations. The Contractor shall determine the specific requirements for safety provisions and shall have inspections and reports by the appropriate safety authorities to be conducted to ensure compliance with the intent of the regulations.

B. All Contractor employees expected to work at the jobsite or individuals entering the jobsite shall read the Contractor HASP before they enter the jobsite, and will sign a statement provided by the Contractor that they have read and understand the HASP. A copy of the Contractor's HASP shall be readily available at the site at all times the work is being performed.

C. Contractor shall perform whatever work is necessary for safety and be solely and completely responsible for conditions of the job site, including safety of all persons (including employees of the Engineer, Engineer's Representative, and Contractor) and property during the Contract period. This requirement applies continuously and is not limited to normal working hours.

D. The Engineer's review of the Contractor's performance does not include an opinion regarding the adequacy of, or approval of, the Contractor's safety supervisor, the site-specific HASP, safety program or safety measures taken in, on, or near the job site.

E. Accidents causing death, injury, or damage must be reported immediately to the Engineer and the Port Security Department in person or by telephone or messenger. In addition, promptly report in writing to the Engineer all accidents whatsoever arising out of, or in connection with, the performance of the work whether on, or adjacent to, the site, giving full details and statements of witnesses.

F. If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing within 24 hours after occurrence, to the Engineer, giving full details of the claim.

3.02 SITE SAFETY AND HEALTH OFFICER

A. Contractor shall provide a person designated as the Site Safety and Health Officer, who is thoroughly trained in rescue procedures, has a minimum current 40-hour HAZWOPER certification (minimum), and trained to use all necessary safety equipment, air monitoring equipment, and gas detectors. The person must be available and/or present at all times while work is being performed, and conduct testing, as necessary.

B. The Site Safety and Health Officer shall be empowered with the delegated authority to order any person or worker on the project site to follow the safety rules. Failure to observe these rules is sufficient cause for removal of the person or worker(s) from this project.

C. The Site Safety and Health Officer is responsible for determining the extent to which any safety equipment must be utilized, depending on conditions encountered at the site.

3.03 SPILL PREVENTION AND CONTROL

A. The Contractor shall be responsible for prevention, containment and cleanup of spilling petroleum and other chemicals/hazardous materials used in the Contractor's operations. All such prevention, containment and cleanup costs shall be borne by the Contractor.

B. The Contractor is advised that discharge of oil, fuel, other petroleum, or any chemicals/hazardous materials from equipment or facilities into state waters or onto adjacent land is not permitted under state water quality regulations.

C. In the event of a discharge of oil, fuel or chemicals/hazardous materials into waters, or onto land with a potential for entry into waters, containment and cleanup efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup shall include proper disposal of all spilled material and used cleanup materials.

D. The Contractor shall, at a minimum, take the following measures regarding spill prevention, containment and cleanup.

1. Fuel hoses, lubrication equipment, hydraulically operated equipment, oil drums and other equipment and facilities shall be inspected regularly for drips, leaks or signs of damage, and shall be maintained and stored properly to prevent spills. Proper security shall be maintained to discourage vandalism.

2. All land-based chemical, oil and products' storage tanks shall be diked, contained and/or located so as to prevent spills from escaping into the water. Dikes and containment area surfaces shall be lined with impervious material to prevent chemicals or oil from seeping through the ground and dikes.

3. All visible floating sheen shall be immediately contained with booms, dikes or other appropriate means and removed from the water prior to discharge into state waters. All visible spills on land shall be immediately contained using dikes, straw bales or other appropriate means and removed using sand, sawdust or other absorbent material, which shall be properly disposed of by the Contractor. Waste materials shall be temporarily stored in drums or other leak-proof containers after cleanup and during transport to disposal. Waste materials shall be disposed offsite in accordance with applicable local, state and federal regulations.

4. In the event of any oil or product discharges into public waters, or onto land with a potential for entry into public waters, the Contractor shall immediately notify the Port Security at their listed 24-hour response number:

    a. Port Security: 253-383-9472

E. The Contractor shall maintain the following materials (as a minimum) at each of the project sites:

1. Oil-absorbent booms: 100 feet.

2. Oil-absorbent pads or bulk material, adequate for coverage of 200 square feet of surface area.

3. Oil-skimming system.

4. Oil dry-all, gloves and plastic bags.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. This Section discloses procedures to follow if unknown regulated materials are encountered.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and General Requirements, apply to this work as specified in this section. Work related to this Section is described in, but not limited to:

1. Section 01 35 29 – Health, Safety, and Emergency Response Procedures
2. Section 01 35 43.19 – Export Soil Management
3. Section 02 41 00 – Site Demolition

1.03 NOTIFICATION AND SUSPENSION

A. In the event the Contractor detects the presence of potentially regulated materials not previously identified in this specification, the Contractor shall stop work and immediately notify the Port. Following such notification by the Contractor, the Port shall in turn notify the various governmental and regulatory agencies concerned with the presence of regulated materials, if warranted. Depending upon the type of materials identified, the Port may suspend work in the vicinity of the discovery under the provisions of General Conditions.

1. Following completion of any further testing necessary to determine the nature of the materials involved, the Port will determine how the material shall be managed. Although the actual procedures used in resuming the work shall depend upon the nature and extent of the regulated material, the following alternate methods of operation are foreseen as possible:

a. Contractor to resume work as before the suspension.

b. Contractor to move its operations to another portion of the work until measures to eliminate any hazardous conditions can be developed and approved by the appropriate regulatory agencies.

c. The Port to direct the Contractor to dispose or treat the material in an approved manner.

d. The Port to terminate or modify the Contract accordingly, for unforeseen conditions.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Soils excavated within the project area, as shown on the drawings, may or may not be regulated material; however, should the Contractor identify soil that cannot be reused as part of the project, the Contractor shall notify the Engineer to determine if the soil requires special handling.

1. Soil with unexpected regulated material, as identified by visual and/or olfactory methods, shall be segregated from other excavated material until such time as appropriate testing and analysis can be completed by the Port. Upon completion of the soil profile, the Engineer will inform the Contractor of any special handling requirements based on the results.

2. Soil beyond construction excavation limits will not require excavation unless free draining product is observed or other special conditions exist; in which case the Engineer will direct the Contractor in additional excavation. Soils determined to require special handling will be hauled and disposed of at an approved disposal facility.

B. Soils that cannot be reused onsite and are anticipated to be exported to an off-site facility must have a soil profile completed prior to export. The Port shall test all material prior to export, however, for unregulated material, the Contractor is responsible for collecting any additional data required to satisfy the requirements of the receiving facility.

C. No soil shall be removed from the site without prior notification to the Engineer. The notification shall include:

1. An estimate of the number of truck-trips, the haul destination, and the period in which these trips will be made (e.g., 20 truck-trips to the Waste Management Facility over the two-week period beginning on March 1, 2012).

1.02 DEFINITIONS

A. Olfactory Indications (methods): Of or relating to the sense of smell. Soils containing petroleum and other volatile constituents typically exhibit characteristic odors that can be detected (and sometimes identified) by smell.

B. Regulated Material: Any chemical, physical, biological, or radiological substance that does not occur naturally in the environment, or that occurs at concentrations higher than natural background levels, and is regulated by agencies as to the disposal/recycling facility(ies) the material can and cannot go (i.e., EPA, Department of Ecology, Tacoma-Pierce County Health Department).

C. Soil (waste) Profile: A characterization of the chemical and physical properties of soil material designated for off-site disposal, including the presence of pollutants and their concentrations as measured by approved laboratory analytical methods. A profile is required by the receiving permitted disposal or recycling facility.

D. Special Handling: Refers to hauling and disposal of soils that cannot be reused in place as backfill or as general fill at another (off-site) location due to the presence of pollutants in concentrations above allowable limits. Such soils must be hauled to and managed at a permitted disposal facility.

E. Type A Regulated Soil: Soil that must be removed from the Project site and has been determined by the Engineer to contain pollutants in concentrations that exceed state or federal dangerous or hazardous designations (respectively), or other special Port-determined criteria. Type A Regulated Soil requires disposal at an approved Subtitle C hazardous waste landfill.

F. Type B Regulated Soil: Soil that must be removed from the Project site and has been determined by the Engineer to contain pollutants in concentrations that are below dangerous or hazardous levels, but could negatively impact the quality of air, waters of the state, soils or sediments, or pose a threat to the health of humans or other living organisms, depending on where the soil is disposed. Type B Regulated Soil requires disposal an approved Subtitle D solid waste landfill and shall be disposed of at Pierce County Recycling, Composting and Disposal, LLC dba LRI in accordance with the Port of Tacoma's Contract for Waste Disposal. See Appendix for LRI Contract and Solid Waste Disposal Agreement.

G. Type C Unknown, Potentially Regulated Soil: Soil that must be removed from the Project site and has been determined by Engineer to potentially contain unknown constituent(s) and/or in unknown concentration(s) and requires further analysis and characterization. Type C Regulated soil will require disposal at an approved Subtitle C hazardous waste landfill or Subtitle D solid waste landfill if additional soil characterization indicates special handling is required, otherwise it shall be classified as Type D Soil.

H. Type D Soil: Soil determined by the Engineer not to require special handling with regard to this Contract. Classification of material as Type D Soil by the Port is not a certification nor does it release the Contractor of liability or obligation to meet any disposal or storage facility acceptance or testing requirements.

I. Unexpected Regulated Material: Regulated material unexpectedly found in an excavation or in other locations where there is no prior knowledge, information, or history to indicate possible spills or releases of regulated material.

J. Visual Indications (methods): A preliminary evaluation of the potential presence of contamination based on visual observation. For example, soils containing petroleum are frequently discolored or stained relative to non-petroleum impacted native soils or clean fill.

1.03 HEALTH AND SAFETY

A. The Contractor is required to implement all health and safety provisions as required by Specification 01 35 29 – Health, Safety and Emergency Response. These provisions include any special monitoring, personal protective equipment, or work plans to accommodate regulated soil or material special handling. Use of environmental characterization data may not be appropriate for health and safety purposes.

1.04 SUBMITTALS

A. Prior to excavation of any subsurface materials, the Contractor shall submit a Soils Management Plan to the Engineer. The Soils Management Plan must be approved by the Engineer prior to any excavation of subsurface materials. The Soils Management Plan must include the following:

1. Identification of all soil disposal facilities anticipated to be used for soils that are determined to be Type A or Type B Regulated Soil. Type B Regulated Soil disposal shall be in accordance with the Port and Pierce County Recycling, Composting and Disposal, LLC dba LRI Contract for Waste Disposal.

2. Identification of all fill sites, disposal/recycling facilities and/or end uses anticipated to be used for soil determined to be Type D Soil in accordance with paragraph 3.02 of this section.

3. Contingency for delivery and placement of Type C Unknown, Potential Regulated Soil at an on-site soil stockpile area.

4. Contingency for managing soil/debris encountered during excavation that may disqualify soil for disposal or recycle at the anticipated facilities.
5. General description of how equipment operators, safety staff and other applicable on-site personnel will identify and respond to soil containing potentially regulated material.
6. Contractor shall coordinate with the Engineer to facilitate handling of regulated soil in accordance with this specification.
7. Description of all haul routes to be used on the project.

B. A completed soil profile which satisfies the requirements of the off-site receiving facility identified for Type D Soil, prior to export to that receiving facility.

C. Copies of all hauling receipts from the disposal facility(ies) for all Type A, B and/or D soil at least weekly.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 EXCAVATION/TESTING

A. The initial field-testing for soil to be exported offsite will be performed by the Port and will result in the following classification of material:

1. Type A Regulated Soil as defined in 1.02(E) of this Section
2. Type B Regulated Soil as defined in 1.02(F) of this Section
3. Type D Soil as defined in 1.02(H) of this Section

B. Material for export shall be stockpiled for testing as approved by the Engineer to allow for sampling. Suspect material shall be stockpiled separately to minimize Type A and B disposal of Type D materials.

C. The Port shall perform characterization testing on all Type C Soil including:

1. Total Petroleum Hydrocarbons (TPH diesel/oil)
2. Polynuclear Aromatic Hydrocarbons (PAHs)
3. Total RCRA 8 metals (Resource Recovery and Conservation Act (RCRA)

D. Contractor may obtain disposal characterization test results from the Engineer. Any other testing required for the receiving facility identified for Type D soil shall be the responsibility of the Contractor

E. Contractor shall give Port no less than 21 days' notice to sample, characterize and, obtain Waste Disposal Authorization as required, for export soil prior to disposal offsite.

F. Laboratory turnaround times may require additional time for analytical results; therefore, Contractor should coordinate with Engineer well in advance of anticipated disposal date. Samples that are required to have “rush” analysis performed due to the Contractor’s failure to disclose the anticipated disposal date shall have the difference in service fees paid by the Contractor, or the Contractor may delay the disposal until the standard analysis turnaround time is complete, at no additional cost to the Port.

3.02 TRANSPORTATION AND OFF-SITE DISPOSAL OF SOILS

A. The Contractor shall be responsible for handling, re-handling, loading, transporting, and legal off-site removal of all waste materials and excavated soils not reused onsite.

   1. Contractor shall ensure that transport truck gross weight meets federal and/or state Department of Transportation (DOT) requirements and the requirements of the receiving facility, whichever is more stringent.

   2. Contractor shall take measures to prevent debris from being spilled from trucks or tracked from the site to local streets. All trucks shall be covered. Contractor shall sweep streets adjacent to the site as necessary or as directed by the Engineer.

   3. Contractor shall ensure that any vehicle transporting materials offsite are properly labeled and placarded in accordance with federal and state DOT requirements.

B. Type A Regulated and Type B Regulated Soil shall be hauled to an approved facility by the Contractor for disposal. Type B Regulated soil disposal shall be disposed of in accordance with the Port and Pierce County Recycling, Composting and Disposal, LLC dba LRI Contract for Waste Disposal.

C. Type C Unknown, Potentially Regulated Soil is of unknown origin or special circumstances. Type C soil shall be hauled to an on-site segregated stockpile area. The Contractor shall protect the material from weather and other disturbances once stockpiled. The Port will inform the Contractor of the soil profile following additional analysis of the suspect material (as needed), and the soil will be categorized as either Type A Regulated, Type B Regulated or Type D Soil and disposed of accordingly.

D. Type D Soil that is not reused onsite shall be hauled by the Contractor to a site determined by the Contractor. If the receiving/disposal facility requires additional testing or certification of this soil, the Contractor shall complete these requirements, at no additional cost to the Port. The Port will not certify or otherwise declare the material suitable for unrestricted use.

3.03 OTHER REQUIREMENTS

A. Type A, Type B, Type C or Type D Soils shall be temporarily stockpiled within the construction area. Contractor shall place an impervious liner beneath the soil and securely cover the stockpile with waterproof covering (e.g., plastic sheeting). Additional measures (e.g., berm, jersey barriers, silt fence, etc.) may be required to minimize soil runoff from the stockpile area. The soil shall be removed prior to completion of Work.

B. Contractor shall provide the Engineer with all hauling receipts (or copies of receipts) from the disposal facility for all Type A, Type B or Type D Soils at least weekly.

C. The Engineer may shut down excavation activities should unexpected regulated material be encountered during excavation.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Work includes the requirements to provide air and noise control measures until Final Completion of the Work.

1.02 SUBMITTALS

A. Prior to Notice to Proceed, the Contractor shall submit of a list of equipment to be used on the project and certify in writing that all equipment on the list and any additional equipment, including Contractor's, subcontractors or supplier's equipment, shall meet the requirements of 3.01 below.

PART 2 - PRODUCTS - NOT USED

PART 3 – EXECUTION

3.01 AIR POLLUTION CONTROL

A. The Contractor shall meet or exceed EPA Tier 2 off-road diesel engine emission standards for off-road equipment >= 25hp and meet or exceed EPA 1994 on-road diesel engine emission standards for on-road equipment except as follows:

1. Equipment being used in an emergency or public safety capacity

B. The Contractor shall not discharge smoke, dust, and other hazardous materials into the atmosphere that violate local, state or federal regulations.

C. No vehicles can idle for more than 5 consecutive minutes, except as follows:

1. Idling is required to bring or maintain the equipment to operating temperature;

2. Engine idling is necessary to accomplish work for which the equipment was designed (i.e. operating a crane)

3. Idling vehicles being used in an emergency or public safety capacity.

D. The Contractor shall minimize nuisance dust by cleaning, sweeping, vacuum sweeping, sprinkling with water, or other means. Equipment for this operation shall be on the job site or available at all times.

3.02 NOISE CONTROL

A. The Contractor shall comply with all local controls and noise level rules, regulations and ordinances which apply to work performed pursuant to the Contract.

B. All internal combustion engines used on the job shall be equipped with a muffler of a type recommended by the manufacturer.

END OF SECTION

PART 1 - GENERAL

1.01 PERMITS, CODES AND REGULATIONS

A. The following permits/approvals have been applied for (or are on file) and incorporated into the Contract:

1. State Environmental Policy Act (SEPA) Compliance
2. Section 404 of CWA and Section 10 of RHA Compliance
3. Section 401 of CWA Water Quality Certification
4. Section 106 of NHPA Compliance
5. National Pollution Discharge Elimination System (NPDES)
6. City of Tacoma Grading, Excavation, Erosion Control Permit
7. City of Tacoma Storm Permit

B. Conform with the requirements of listed permits and additional or other applicable permits, codes, and regulations as may govern the Work.

C. Obtain and pay fees for licenses, permits, inspections, and approvals required by laws ordinances, and rules of appropriate governing or approving agencies necessary for proper completion of Work (other than those listed under item 1.01A above and Special Inspections called for by the International Building Code).

D. Conform with current applicable codes, regulations and standards, which is the minimum standard of quality for material and workmanship. Provide labor, materials, and equipment necessary for compliance with code requirements or interpretations, although not specifically detailed in Drawings or specifications. Be familiar with applicable codes and standards prior to bidding.

E. Process through Engineer, request to extend, modify, revise, or renew any of the permits (listed in 1.01.A above). Furnish requests in writing and include a narrative description and adequate Drawings to clearly describe and depict proposed action. Do not contact regulatory agency with requests for permit extensions, modifications, revisions, or renewals without the prior written consent of the Engineer.

1.02 VARIATIONS WITH CODES, REGULATIONS AND STANDARDS

A. Nothing in the Drawings and specifications permits Work not conforming to codes, permits or regulations. Promptly submit written notice of the Engineer of observed variations or discrepancies between the Contract Documents and governing codes and regulations.

B. Appropriate modifications to the Contract Documents will be made by Change Order to incorporate changes to Work resulting from code and/or regulatory requirements. Contractor assumes responsibility for Work contrary to such requirements if Work proceeds without notice.

C. Contractor is not relieved from complying with requirements of Contract Documents which may exceed, but not conflict with requirements of governing codes.

1.03 COORDINATION WITH REGULATORY AGENCIES

A. Coordinate Work with appropriate governing or regulating authorities and agencies.

B. Provide advance notification to proper officials of Project schedule and schedule revisions throughout Project duration, in order to allow proper scheduling of inspection visits at proper stages of Work completion.

C. Regulation coordination is in addition to inspections conducted by Engineer. Notify Engineer at least 48 hours in advance of scheduled inspections involving outside regulating officials, to allow Engineer to be present for inspections.

PART 2 - PRODUCTS - NOT USED

PART 3 – EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Requirements relating to referenced standards.

1.02 QUALITY ASSURANCE

A. For products or workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue specified in this section, except where a specific date is established by applicable code.

C. Should specified reference standards conflict with Contract Documents, request clarification from the Engineer before proceeding.

D. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of the Engineer shall be altered by the Contract Documents by mention or inference otherwise in any reference document.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 QUALITY CONTROL FOR COMPLIANCE:

A. All work described in the Contract Documents must be fully tested in accordance with applicable sections of these Specifications. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions and General Requirements, apply to this work as if specified in this Section.

B. The Contractor shall perform such detailed examination, inspection and quality control and assurance of the Work as to ensure that the Work is progressing and is being completed in strict accordance with the Contract Documents. The Contractor shall plan and lay out all Work in advance of operations so as to coordinate all Work without delay or revision. The Contractor shall be responsible for inspection of portions of the Work already performed to determine that such portions are in proper condition to receive subsequent Work. Under no conditions shall a portion of Work proceed prior to preparatory work having been satisfactorily completed. The Contractor shall ensure that the responsible Subcontractor has carefully examined all preparatory work and has notified the Contractor (who shall promptly notify the Port in writing) of any defects or imperfections in preparatory work that will, in any way, affect completion of the Work.

1.02 QUALITY ASSURANCE - CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform Work by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop Drawings or as instructed by the manufacturer.

G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.03 TOLERANCES

A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.

C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.04 REFERENCES AND STANDARDS

A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. Neither the contractual relationships, duties or responsibilities of the parties in Contract, nor those of the Engineer, shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.05 TESTING SERVICES

A. Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities.

1. Neither observations by an inspector retained by the Port, the presence or absence of such inspector at the site, nor inspections, tests, or approvals by others, shall relieve the Contractor from any requirement of the Contract Documents, nor is any such inspector authorized to change any term or condition of the Contract Documents.

B. Necessary materials testing shall be performed by an independent testing laboratory during the execution of the Work and paid for by the Port of Tacoma, unless otherwise specified. Access to the area necessary to perform the testing and/or to secure the material for testing, shall be provided by the Contractor.

C. Testing does not relieve Contractor to perform work to contract requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm. Payment for re-testing will be charged to the Contractor by deducting testing charges from the Contract Sum.

E. Material testing for initial material approval will be performed by an independent, certified laboratory and paid for by the Contractor. These tests must be dated within six (6) months of the submittal date.

F. Subsequent sampling and testing, required as the work progresses to ensure continual control of materials and compliance with all requirements of the Contract documents, shall be the responsibility of the Port, except as required by other sections of these Specifications.

1.06 MANUFACTURER'S FIELD SERVICES

A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up equipment, test, and adjust and balance equipment as applicable, and to initiate instructions when necessary.

B. Submit qualifications of observer to Engineer 30 days in advance of required observations. Observer subject to approval of Engineer.

C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Field offices and Laydown Facilities

1.02 TEMPORARY UTILITIES

A. Provide and pay for all electrical power, temporary lighting, water, heating and cooling, and ventilation required for construction purposes.

B. Use trigger-operated nozzles for water hoses, to avoid waste of water.

1.03 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.

B. Telecommunications services shall include:

1. Windows-based personal computer dedicated to project telecommunications, with necessary software and laser printer.

2. Telephone Land Lines: One line, minimum; one handset per line.

3. Internet Connections: Minimum of one; DSL modem or faster.

4. Email: Account/address reserved for project use.

1.04 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

C. At end of construction, return facilities to same or better condition as originally found.

1.05 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public to allow for Port's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.06 FENCING

A. Construction: Contractor's option.

1.07 FIELD OFFICES AND TEMPORARY LAYDOWN AREA

A. The Port will provide an approximate 2 acre laydown area for owner supplied material laydown and contractor staging at 2114 N. Marshall Ave, immediately adjacent to the project site.

B. Provide field office: Weathertight, with lighting, electrical outlets, heating, cooling equipment, and equipped with sturdy furniture, drawing rack and drawing display table. Field office shall include a room, table and chairs suitable for meetings of up to 6 people.

C. The property at 2114 N. Marshall Ave is fenced on three sides. Contractor shall be responsible for securing the property and providing 6 ft (1.8M) high fence and gates with locks.

1.08 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Final Inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition.

D. Restore new permanent facilities used during construction to specified condition.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Access roads.

B. Parking.

C. Construction parking controls.

D. Traffic Control

E. Haul routes.

F. Maintenance.

G. Removal, repair.

H. Mud from site vehicles.

PART 3 - EXECUTION

2.01 ACCESS TO SITE

A. Contractor shall conduct all business through the gate assigned by the Engineer.

1. The Contractor may be required to relocate entry and related work areas as required by Port Operations.

B. Provide unimpeded access for emergency vehicles.

C. Provide and maintain access to fire hydrants free of obstructions.

2.02 PARKING

A. All Contractor's employee cars and work vehicles will be parked in the staging area at 2114 N. Marshall Ave and on-site as designated by the Engineer.

2.03 TRAFFIC CONTROL

A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

B. The Contractor shall erect and maintain all construction signs, warning signs, detour signs, flaggers and other traffic control devices necessary for the safe ingress and egress of the Project Site. Traffic control shall include but is not limited to:

1. Flaggers to direct traffic as required to accommodate the Contractor's work.

2.04 HAUL ROUTES

A. Confine construction traffic to designated haul routes. Access routes to the site will primarily be from Milwaukee Way and Marshall Ave onto maintenance roadways in the rail yard. Access to the site from Alexander will be permitted as required. Access from Alexander shall not impact the PCT truck gate on Alexander.

2.05 MAINTENANCE

A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, Products, mud, snow, and ice.

B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

2.06 REMOVAL, REPAIR

A. Repair existing facilities damaged by use, to original condition.

2.07 PUBLIC STREET AND ONSITE ROADWAY CLEANING

A. The Contractor shall be responsible for preventing dirt and dust escaping from trucks and other vehicles operating on or departing the project site by sweeping, covering dusty loads, washing truck tires and all other reasonable methods.

B. When trucks and other equipment are operating on paved public streets and site roadways/paved surfaces, the Contractor will be required to clean said streets, roadways and other paved surfaces at least daily, and at other times if required by the Engineer.

C. In the event that the above requirements are violated and no action is taken by the Contractor after notification of infraction by the Engineer, the Port reserves the right to have the streets, roadways and other paved surfaces in question cleaned by others and the expense of the operation charged to the Contractor.

END OF SECTION

PART 1 – GENERAL

1.01 WORK DESCRIPTION

A. The Work shall consist of planning, installing, inspecting, maintaining and removing Temporary Erosion and Sediment Control (TESC) Best Management Practices (BMPs) to prevent pollution of air and water; and to control, respond to, and dispose of eroded sediment and turbid water during the term of the Contract.

B. These TESC requirements shall apply to all areas associated with the Work, including but not limited to the following:

1. Work areas
2. Equipment and material storage areas
3. Staging areas
4. Stockpiles
5. Discharge points within or adjacent to the work areas that are impacted by stormwater runoff from the site.

C. Acceptance of TESC plans does not constitute an approval of permanent Work or drainage design (e.g., size and location of roads, pipes, restrictors, channels, retention facilities, utilities, etc.).

D. Contractor shall read and conform to all requirements set forth in Washington Department of Ecology's (Ecology) NPDES General Permit for Discharges Associated with Construction Activities (CSGP).

1.02 REFERENCES

A. The rules, requirements, and regulations that apply to this Work include, but are not necessarily limited to the following:

1. Washington Department of Ecology, "Stormwater Management Manual for Western Washington," 2012.
2. Department of Ecology NPDES General Permit for Discharges Associated with Construction Activities, 2016.
3. Washington State Department of Transportation 2012 Standard Specification M41-10, Division 8-01 Erosion Control and Water Pollution Control.
4. Pierce County Stormwater and Site Development Manual, 2012.
5. City of Tacoma, "Surface Water Management Manual," Tacoma Public Works, Environmental Services, February 2012.

1.03 SUBMITTALS

A. A Construction Stormwater Pollution Prevention Plan (SWPPP), as required by NPDES permit.

1. Contractor may elect to adopt and comply with a Port project SWPPP, or provide an alternative project SWPPP.
2. Contractor shall be responsible for updating the project SWPPP during construction to reflect the required changes to BMPs, as needed, to comply with the CSGP at no additional cost to the Port.

B. Safety Data Sheet (SDS) for any dust palliative product.

C. A copy of all Contractor site inspection logs and monthly Discharge Monitoring Reports (DMRs).

D. Water Management Plan/Temporary Dewatering Plan.

1.04 AUTHORITY OF ENGINEER

A. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and fill operations, as determined by analysis of project conditions; and to direct the Contractor to provide immediate permanent or temporary pollution control measures to minimize impacts to adjacent streams or other watercourses, lakes, ponds, and other areas of water impoundment.

B. In the event that areas adjacent to the work area are suffering degradation due to erosion, sediment deposit, water flows, or other causes, the Engineer may stop construction activities until the Contractor rectifies the situation.

PART 2 – PRODUCTS

2.01 DUST CONTROL

A. Dust palliative for dust control proposed by the Contractor and approved by the Engineer.

PART 3 – EXECUTION

3.01 GENERAL

A. The Port has obtained the CSGP. The permit shall be transferred to the Contractor prior to ground disturbing activities. The Contractor shall be the responsible Operator/Permittee for the duration of the project.

B. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, the more restrictive laws, rules, or regulations shall apply as determined by the Engineer.

C. No project discharge of water shall be allowed that exceeds the regulated pollutant levels in Ecology's CSGP and any CSGP-associated Administrative Orders.

D. Contractor shall be solely responsible for all BMP modifications and upgrades to comply with the CSGP and the requirements of this Section, at no additional cost to the Port.

E. Contractor shall be solely responsible for any damages and fines incurred because of Contractor, subcontractor, or supplier actions in implementing the requirements of this Section.

F. The Contractor shall be solely responsible for schedule impacts incurred because of Contractor, subcontractor, or supplier actions in implementing the requirements of this Section.

3.02 TEMPORARY EROSION AND SEDIMENT CONTROL DEVELOPMENT

A. The Port has prepared a project SWPPP that complies with the CSGP requirements. The Port project SWPPP is Appendix B of this Project Manual.

1. The SWPPP shall describe construction activities and sequencing, and the proposed Temporary and Permanent Erosion and Sediment Control measures.

2. The SWPPP shall consist of planning, installing, inspecting, maintaining, and removing TESC BMPs per Volume II of the Stormwater Management Manual for Western Washington (2012) or equivalent. The BMPs shown in the Drawings are the minimum required to prevent pollution of air and water, to control peak volumetric flow rates and velocity of stormwater, and to control, respond to, and dispose of eroded sediment and turbid water during the term of the Contract.

3. If Contractor chooses to write a SWPPP separate from the Port-provided SWPPP, it must comply with all of the requirements set forth by the CSGP.

B. Contractor shall develop project-specific TESC BMPs and incorporate them into the SWPPP. Contractor shall address the following issues as part of developing and implementing the BMPs.

1. TESC BMPs must meet the requirements in Ecology's Volume II of the Stormwater Management Manual for Western Washington (2012) or equivalent.

2. TESC notes and details shown in the Drawings and the information in this Section form a basis of the minimum requirements for a TESC Plan. Contractor shall develop a TESC Plan specific to the construction schedule and proposed means and methods prior to commencing construction activities for the duration of the Project.

3.03 TEMPORARY EROSION AND SEDIMENT CONTROL IMPLEMENTATION

A. Contractor is responsible for implementing and updating the SWPPP including TESC BMPs.

1. Contractor shall inspect the TESC measures daily and maintain these measures to ensure continued proper functioning for the duration of the Project.

2. Contractor will be responsible for documenting TESC site inspections on a weekly basis in areas of active construction and on a monthly basis in areas that have undergone stabilization. Contractor shall keep records of the inspections on site.

3. During the construction period the Contractor shall, at no additional cost to the Port, upgrade and/or maintain TESC measures as needed, based on Contractor means and methods, work sequencing, and changing site conditions (e.g., changes to impervious surface coverage, proximity of work to storm conveyance systems, storm events, etc.). Contractor shall modify these measures for changing site conditions and update the SWPPP to document all modifications made.

B. Catch basins shall be cleaned when the depth of debris reaches 30% of the sump depth or the debris surface is six (6) inches below the outlet pipe. Contractor shall clean all catch basins, manholes, and conveyance lines, if present, prior to Work completion. The cleaning process shall not flush sediment-laden water into a downstream system.

C. Contractor shall ensure that water, or a dust palliative and a dispensing subcontractor, if needed, is available for project use. It is the responsibility of the Contractor to develop and adhere to appropriate safety measures pertaining to the palliative use. This also includes ensuring the dispensing subcontractor develops and adheres to the appropriate safety measures, if a dispensing subcontractor is used. Water used for dust suppression shall not be applied at such a rate or in a location that it will generate runoff from the site.

D. Areas of exposed soils, including embankments, which will not be disturbed for two days during the wet season (October 1 through April 30) or seven days during the dry season (May 1 through September 30), shall immediately be stabilized by the Contractor with an Ecology-approved TESC measure (e.g., seeding, mulching, plastic covering, etc.).

E. TESC measures in an inactive area shall be inspected and maintained by the Contractor until the area is permanently stabilized.

F. In the event that additional temporary erosion and pollution control measures are required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the Work as scheduled or as ordered by the Engineer, such work shall be performed by the Contractor at its own expense.

G. Contractor shall remove all TESC facilities, install permanent site surfacing improvements and permanent BMPs with minimal disturbance, and shall clean stormwater facilities prior to Work completion.

H. Contractor shall terminate the CSGP upon final stabilization of the site.

END OF SECTION

PART 1 - GENERAL

1.01 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 - PRODUCTS

2.01 NEW PRODUCTS

A. Provide new products unless specifically required or permitted by the Contract Documents.

2.02 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3 - EXECUTION

3.01 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.02 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible for inspection.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Prevent contact with material that may cause corrosion, discoloration, or staining.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

PART 1 - GENERAL

1.01 SCOPE

A. The purpose of this section is to provide the framework for transferring Port provided special trackwork materials to the Contractor in a safe, timely and effective manner.

1.02 SUBMITTALS

A. Submit preferred delivery dates within the specified windows for the three separate Owner Furnished material packages.

B. Submit an inspection report or log to the Engineer of the inspection performed on the materials within 2 days of each delivery. Flag any equipment or materials identified as being in unsatisfactory condition or quantity before moving or relocating it from the Location Area described below. Document unsatisfactory condition of equipment photographically, using digital media.

1.03 COORDINATION

A. The materials will be available within the time frames listed below.

B. Contractor shall submit and obtain approval of all pre-work submittals in time to receive the first delivery of materials. The Contractor shall be responsible for receiving and unloading all Owner furnished material.

C. Contractor may request specify specific delivery date which falls with the windows provided below within 14 days of Contract Award or the Port of Tacoma shall determine. Any costs associated with the Contractor's request for delivery outside of specified windows shall be paid by the Contractor.

1.04 LOCATION

A. The materials are be delivered to Contractor's staging area at 2114 Marshall Ave, Tacoma WA adjacent to the Port of Tacoma rail yard. .

PART 2 - PRODUCTS

2.01 ITEMS

A. Special track work items are manufactured and supplied by Progress Rail Services. Assume all items are in satisfactory condition. Report in writing to the Engineer materials found to be in unsatisfactory condition or quantity.

B. Material required for Phase

Delivery date window	Item - Description	Notes
06/06/16 - 07/01/16	Delivery 1 - Turnout and Crossovers identified on Plan Sheet R14	Material required for Phases 1 - 3A
10/25/16 - 11/21/16	Delivery 2 - Crossings, Turnout and Crossovers identified on Plan Sheet R14	Material required for Phases 3B - 4

12/15/16 - 01/13/17	Delivery 3 - Turnouts identified on Plan Sheet R14	Material required for Phases 5 - 6

PART 3 - EXECUTION

3.01 REMOVAL OF EQUIPMENT FROM STORAGE LOCATION

A. Protect, transport and install where indicated within the Contract Documents.

3.02 FIELD QUALITY CONTROL

A. Equipment Inspection

1. Examine each piece or component for visual defects with in 48 hours of delivery.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Cutting and patching.

1.02 SUBMITTALS

A. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:

1. Structural integrity of any element of Project.
2. Integrity of weather exposed or moisture resistant element.
3. Efficiency, maintenance, or safety of any operational element.
4. Visual qualities of sight exposed elements.
5. Work of the Port or separate Contractor.

B. Project As-Built Documents: Accurately record actual locations of capped and active utilities.

PART 2 - PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

3.04 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:

1. Complete the work.
2. Fit products together to integrate with other work.
3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove and replace defective and non-conforming work.

C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

D. Restore work with new products in accordance with requirements of Contract Documents.

3.05 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE

A. The provisions and intent of the Contract, including the General Conditions, Supplementary Conditions, and other sections of the General Requirements apply to this work as if specified in this section. Work related to this section is described throughout the specifications.

PART 3 - EXECUTION

2.01 PROGRESS CLEAN-UP

A. The Contractor shall clean the project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with all requirements for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F.
3. Containerize unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    a. Use containers intended for holding waste materials for the type of material to be stored.

B. Site: Maintain Project site free from waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.

1. Remove liquid spills promptly.

D. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

F. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.

G. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

2.02 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning:

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    a. Clean Project site, yard, and grounds. in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    b. Remove tools, construction equipment, machinery, and surplus material from Project site.

2.03 REPAIR OF WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surface, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Touch up and otherwise repair and restore marred or exposed finishes and surface. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

END OF SECTION

PART 1 GENERAL

1.01 SUMMARY

A. This section includes construction waste management requirements.

1.02 DEFINITIONS

A. Co-mingled or Off-site Separation: Collecting all material types into a single bin or mixed collection system and separating the waste materials into recyclable material types at an off-site facility.

B. Construction, Demolition and Land-Clearing (CDL) Waste: Includes all nonhazardous solid wastes resulting from construction, remodeling, alterations, repair, demolition, and land clearing. Includes material that is recycled, reused, salvaged or disposed as garbage. This also includes uncontaminated soils that are designated as geotechnically unsuitable or excess excavation.

C. Hazardous/Dangerous Waste: As defined by Chapter 70.105.010 Revised Code of Washington and 40 Code of Federal Register 261 and by Washington Administrative Code 173-303.

D. Proper Disposal: As defined by the jurisdiction receiving the waste.

E. Recyclable Materials: Products and materials that can be recovered and remanufactured into new products.

F. Recycling: The process of sorting, cleaning, treating and reconstituting materials for the purpose of using the material in the manufacture of a new product. Can be conducted on-site (as in the grinding of concrete).

G. Recycling Facility: An operation that is permitted to accept materials for the purpose of processing the materials into an altered form for the manufacture of a new product.

H. Salvage for Reuse: Existing usable product or material that can be saved and reused in some manner on the project site or other projects off-site.

I. Salvage for Resale: Existing usable product or material that can be saved and removed intact (as is) from the project site to another site for resale to others without remanufacturing.

J. Source-Separated Materials: Materials that are sorted at the site into separate containers for the purpose of reuse or recycling.

K. Sources Separation: Sorting the recovered materials into specific material types with no, or a minimum amount of, contamination on site.

L. Time-Based Separation: Collecting waste during each phase of construction or deconstruction that results in primarily one major type of recovered material. The material is removed before it becomes mixed with the material from the next phase of construction.

M. Garbage: Product or material typically considered to be trash or debris that is unable to be salvaged for resale, salvaged and reused, returned, or recycled.

1.03 SUBMITTALS

A. Waste Management Plan

B. Waste Management Final Report

C. Documentation and invoices of salvage of rail materials.

1.04 PERFORMANCE GOALS

A. General: Divert CDL waste to the maximum extent practicable from the landfill by one or a combination of the following activities:

1. Salvage
2. Reuse
3. Source separated CDL recycling
4. Co-mingled CDL recycling

B. CDL waste materials that can be salvaged, resold, reused or recycled, include, but are not limited to the following:

1. Clean dimensional wood, pallet wood, plywood, OSB, and particleboard
2. Asphalt
3. Concrete
4. Ballast
5. Ferrous and non-ferrous metals
6. Field office waste paper, aluminum cans, glass, plastic, and cardboard

C. Hazardous/Dangerous Wastes, contaminated soils and other hazardous materials such as paints, solvents, adhesives, batteries, and fluorescent light bulbs and ballasts shall be disposed of at applicable permitted facilities.

1.05 WASTE MANAGEMENT PLAN

A. Submit to the Engineer a Waste Management Plan narrative in accordance with these specifications. Provide a Waste Management Plan in a format as approved by the Engineer.

B. The Waste Management Plan shall include the following:

1. Name of designated Recycling Coordinator
2. A list of waste materials that will be salvaged for resale, salvaged for reuse, recycled, and disposed.
3. Identify waste handling methods to be used, including one or more of the following:
    a. Method 1 - Contractor or subcontractor(s) hauls recyclable materials to an approved recycling facility.
    b. Method 2 - Contracting with diversion/recycling hauler to haul recyclable material to an approved recycling or material recovery facility.
    c. Method 3 - Recyclable material reuse on-site.
    d. Method 4- Recyclable material salvage for resale.
4. Identification of each recycling or material recovery facility to be utilized, including name, address and types of materials being recycled at each facility
5. Description of the method to be employed in collecting, and handling, waste materials.
6. Description of methods to communicate Waste Management Plan to personnel and subcontractors.

1.06 WASTE MANAGEMENT FINAL REPORT

A. Provide a Waste Management Final Report, in a format approved by the Engineer. The Waste Management Final Report shall list the following for the project:

1. A record of each waste material type and quantity recycled, reused, salvaged, or disposed from the Project. Include total quantity of waste material removed from the site and hauled to a landfill.

2. Percentage of total waste material generated that was recycled, reused, or salvaged.

B. Quantities shall be reported by weight (tons) unless otherwise approved by the Engineer.

C. Submit copies of manifests, weight tickets, recycling/disposal receipts or invoices, which validate the calculations or a signed certification of completeness and accuracy of the final quantities reported.

1.07 SALVAGE OF RAIL MATERIALS

A. The Contract Documents identify existing track materials to be salvaged and reused on the project, salvage for Port use and salvaged by the Contractor.

1.08 QUALITY ASSURANCE

A. Regulatory Requirements: The Contractor shall maintain compliance with all applicable Federal, State, or Local laws that apply to Construction Waste Management and material salvage, reuse, recycling and disposal.

B. Disposal Sites, Recyclers and Waste Materials Processors: All facilities utilized for management of any materials covered under this specification must maintain all necessary permits as required by federal, state and local jurisdictions.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 SOURCE-SEPARATED CDL RECYCLING

A. Provide individual containers for separate types of CDL waste to be recycled, clearly labeled with a list of acceptable and unacceptable materials.

3.02 CO-MINGLED CDL RECYCLING

A. Provide containers for co-mingled CDL waste to be recycled, clearly labeled with a list of acceptable and unacceptable materials.

3.03 LANDFILL

A. Provide containers for CDL waste that is to be disposed of in a landfill clearly labeled as such.

3.04 REMOVAL OF CDL WASTE FROM PROJECT SITE

A. Transport CDL waste off Port's property and legally dispose of them.

END OF SECTION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Substantial Completion procedures
2. Final completion procedures
3. Warranties
4. As-Built Drawings

1.02 ACTION SUBMITTALS

A. Contractor’s List of Incomplete Items: Initial submittal at Substantial Completion.

1.03 PROJECT SUBMITTALS

A. Submittal of Project Warranties

B. Record Drawings

1. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous recordkeeping requirements and submittals in connection with various construction activities.

C. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.04 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor’s punch list) indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
2. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by the Contract Document or Engineer. Label with manufacturer's name and model number where applicable.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Complete startup and testing of systems and equipment
2. Terminate and remove temporary facilities from Project site
3. Complete final cleaning requirements

D. Submit a written request for inspection to determine Substantial Completion a minimum of 5 days prior to days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Notice of Substantial Completion after inspection or will notify Contractor of items, either on the Contractor's list or additional items identified by the Engineer, that must be completed or corrected before notice will be issued.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

2. Results of completed inspection will form the basis of requirements for final completion.

1.05 PUNCH LIST (LIST OF INCOMPLETE ITEMS)

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of Construction.

1. Organize list of spaces in sequential order.

2. Organize items applying to each space by major elements.

1.06 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete and submit the following:

1. Submittal of all remaining items, including as-built documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, surveys, and similar final record information and all other submittals defined in the Contract Documents.

2. List of Incomplete Items: Submit copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (Punch List). Copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 3 days prior to date the work will be complete and ready for final inspection and tests. On receipt of request, the Engineer will either proceed with inspection or notify contractor of unfulfilled requirements.

1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.07 FINAL ACCEPTANCE PROCEDURES

A. Submittals Prior to Final Acceptance:

1. Receipt and approval of application for final payment; due within seven (7) days of receipt of Final Completion by the Engineer.

2. Execution of all Change Orders.

3. Contractor's signed waiver and release of claims on the Engineer provided form.

4. Contractor's submittal of list of all suppliers and subcontractors and the total amounts paid to each on the Engineer provided form;

5. Contractor's submittal of a list of all subcontractors and suppliers requiring Affidavits of Wages paid on the Contract and certify that each of companies will submit an approved Affidavit of Wages paid to the Port within 30 days.

B. The Engineer will issue the Final Acceptance Memo upon receipt of the required submittals.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S WARRANTY

A. The Contractor warrants the labor, materials and equipment delivered under the contract to be free from defects in design, material, or workmanship, and against damage caused prior to final inspection. Unless otherwise specified, this warranty extends for a period of one (1) year from the date of Substantial Completion.

1. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit the Port's rights under warranty.

2. Provide additional copies of each warranty in Operation and Maintenance Manuals as described in 01 78 23 – Operation and Maintenance Manuals.

2.02 AS-BUILT DRAWINGS

A. Project As-Built Drawings: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

B. Project As-Built Drawings shall be compiled by the Contractor and submitted to the Engineer for translation to the Record Drawings on a monthly basis.

1. The Project As-Built Drawings will be submitted on paper full-sized (ANSI D) copy.

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

a. Additions – Red

b. Deletions – Green

c. Comments – Blue

d. Dimensions – Graphite

3. Project As-Built Drawings must be complete and accepted by the Engineer before Final Completion is issued.

4. As-Built Drawings shall be in accordance with horizontal and vertical control as shown on the drawings.

PART 3 – EXECUTION

3.01 MAINTENANCE OF AS-BUILT DRAWINGS

A. The Contractor shall maintain at the Project site, in good order for ready reference by the Engineer, one complete copy of the Contract Documents, including Addenda, Change Orders, other documents issued by the Port, a current Progress Schedule, and approved Submittals.

The Contractor shall also generate and keep on site all documents and reports required by applicable permits.

B. The Contractor's As-Built Drawings shall be updated to record all changes made during construction. The location of all existing or new underground piping, valves and utilities, and obstructions located during the Work shall be appropriately marked until the Contractor incorporates the actual field dimensions and coordinates into the as-built drawings. The as-built drawings shall be updated at least weekly and before elements of the Work are covered or hidden from view. After the completion of the Work, the as-built drawings shall be provided to the Port.

END OF SECTION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Operation and Maintenance Manual Submittal

1.02 SUBMITTALS

A. Operation and Maintenance Data:

1. For equipment, or component parts of equipment put into service during construction and operated by the Port, submit completed documents within ten days after acceptance.
2. Submit 1 copy of completed documents 14 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Engineer comments. Revise content of all document sets as required prior to final submission.
3. Submit 2 sets of revised final documents in final form by Final Completion.

PART 2 - PRODUCTS

2.01 OPERATION AND MAINTENANCE MANUALS

A. For large equipment (such as pumps, generators, machinery),the following information (minimum of 3 printed copies, plus one electronic copy on CD) shall be furnished for all items on the Project requiring operational and/or maintenance procedures and for any additional items indicated by the Engineer. Printed information shall be organized by the Contractor into appropriately sized 3-ring binders (no larger than 3”).The binders shall be sized for material approximately 8-1/2 by 11 inches, and the material in the binders shall not protrude beyond the covers. The binder(s) shall be divided with coversheets for each major item of equipment. The cover sheets shall be typewritten to indicate the name, type of equipment, and location(s) within the Project where installed. A neatly typewritten index shall be provided. Electronic information shall be in PDF format (additional formats where specified) and shall be organized with folders with appropriate file names so information is easily accessible:

1. Equipment Maintenance Summary:
    a. Provide the following information (as applicable, indicate ‘N/A’ where an item does not apply) in Excel spreadsheet format:
        1) Description
        2) Vendor
        3) Manufacturer
        4) Model Year
        5) Serial Number
        6) Warranty – Start Date; Finish Date
        7) Required Preventative Maintenance
        8) Make
        9) Model
        10) Capacity
2. Lubrication Information: This shall consist of the manufacturer’s recommendations regarding the lubricants to be used and the lubrication schedule to be followed. Lubricants

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

3. Control Diagrams: Diagrams shall show internal and connection wiring and as-built wiring diagrams (where applicable).
4. Start-up Procedures: These instructions consist of equipment manufacturer's recommendations for installation, adjustment, calibration, and troubleshooting.
5. Operating Procedures: These instructions consist of the equipment manufacturer's recommended step-by-step procedures for starting, operating, stopping the equipment under specified modes of operation, and for long-term shut-down (moth-balling).
6. Preventative Maintenance Procedures: These instructions consist of the equipment manufacturer's recommended steps and schedules for maintaining the equipment.
7. Overhaul Instructions: These instructions consist of the manufacturer's directions for the disassembly, repair and reassembly of the equipment and any safety precautions that must be observed while performing the work.
8. Parts List: This list consists of the generic title and identification number of each component part of the equipment. This list shall include weights of individual components of each item of equipment weighing over 100 pounds.
9. Spare Parts List: This list consists of the manufacturer's recommendations of number of parts which should be stored by the Owner and any special storage precautions which may be required.
10. Specific Information: Where items of information not included in the above list are required, they will be provided as described in the specifications for the equipment.
11. Complete identification, including model and serial numbers.
12. Warranty Information: This information consists of the name, address, and telephone number of the manufacturer's representative to be contacted for warranty, parts, or service information.
13. All operation and maintenance information shall be comprehensive and detailed and shall contain information adequately covering all normal operation and maintenance procedures.
14. All information shall be specific for the items of equipment installed on the project. Material not directly applicable shall be removed, omitted, or clearly marked as inapplicable.
15. If manufacturer's standard brochures and manuals are used to describe operating and maintenance procedures, such brochures and manuals shall be modified to reflect only the model or series of equipment used on this project.
16. Extraneous material shall be crossed out neatly or otherwise annotated or eliminated. It shall be the responsibility of the Contractor to ensure that all operation and maintenance materials are obtained. Material submitted must meet the approval of the Engineer prior to project final acceptance.

PART 3 - EXECUTION - NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The extent and location of the demolition work is indicated on the Drawings and in the specifications. The work includes, but is not limited to:

1. The requirements for the removal, wholly or in part, and satisfactory disposal of ballast, subgrade materials, special trackwork, trackwork other track materials, pavements, retaining walls, fencing, storm drainage and utility pipelines and structures, miscellaneous site debris, and other obstructions which are designated to be demolished on the Drawings or within these Specifications.

2. Payment of all costs required for disposal of items at legal disposal sites, including all permit fees and related costs.

3. Salvaging items as indicated on the Drawings and in the specifications.

4. Backfilling and compaction of holes, voids, trenches or pits that result from such removal.

B. All demolition items not identified for salvage by the Engineer shall become the property of the Contractor. Disposal of all demolition items shall be in accordance with the specifications, local, state and federal requirements.

1.02 SUBMITTALS

A. Demolition Management Plan (DMP)

1. The DMP shall provide the procedures proposed for the complete accomplishment of the demolition work and management of the demolition wastes and documentation. The procedures shall provide for safe conduct of the work, careful removal and disposition of materials specified to be salvaged or disposed, protection of property to remain undisturbed, and coordination with other work in progress. The procedures shall include a detailed description of the methods, staff, and equipment to be used for each operation, the sequence of operations, and quality control measures to ensure compliance with the Contract and regulatory requirements.

2. Submittal requirements in Section 01 35 43.19, Export Soil Management plan and 01 74 19 Waste Management Plan may be included as part of DMP plan or submitted separately.

PART 2 - PRODUCTS

2.01 SALVAGE ITEMS FOR PORT OF TACOMA

A. All material designated to be salvaged for the Port of Tacoma shall be placed and stored by the Contractor within Contractor Laydown area(s) as indicated on the Drawings or as otherwise directed by the Engineer in a location within 2,500 feet of the project limits. All salvaged material delivered to the Port shall be stacked on Contractor supplied pallets where practical, or stored by blocking larger items on Contractor supplied dunnage in a neat and orderly manner.

B. The following materials shall be salvaged for the Port by the Contractor:

1. The following materials from turnouts identified for removal:

a. All frogs, including frog tie plates.

b. All hook tie plates.

2. 2,600 linear feet of salvage rail in 80 foot segments, conforming to AREMA specifications for Class I relay rail.
3. All joint bars and compromise joint bars, excluding joint bars used for salvage rail for relay within the limits shown on the Drawings.
4. Power switch machines.
5. Manual switch stands.
6. Wheel sensor connection wiring to be pulled back to nearest junction box and neatly stored. Junction box locations to be identified in record drawings.

2.02 SALVAGE MATERIALS FOR RELAY OR REINSTALLATION WITHIN THE PROJECT

A. All material designated for removal, salvage and relay or reinstallation within the limits shown on the Drawings shall be placed within Contractor Laydown area(s) as indicated on the Drawings or adjacent the location of reinstallation. All salvaged material shall be stacked on Contractor supplied pallets where practical, or stored by blocking larger items on Contractor supplied dunnage in a neat and orderly manner.

B. The following materials shall be salvaged for relay or reinstallation within the project:

1. All turnouts marked for salvage and reinstallation. Refer to Drawings for materials to be replaced on turnouts salvaged for reinstallation.
2. Salvage rail and joint bars for relay within the limits shown on the Drawings and conforming to AREMA specifications for Class I relay rail. All other track material for track constructed with salvage rail for relay shall be new, including but not limited to spikes, plates, clips, bolts, nuts and washers.

2.03 RAIL MATERIALS FOR OFFSITE RELAY OR RECYCLE

A. All rail material designated for removal and salvage which are not used for relay or reinstallation within the limits shown on the Drawings and not salvaged for the Port shall be shall be salvaged for offsite relay or recycle by the Contractor. All salvaged material shall be stacked on Contractor supplied pallets where practical, or stored by blocking larger items on Contractor supplied dunnage in a neat and orderly manner.

B. The following materials shall be salvaged for offsite relay or recycle:

1. All turnouts marked for removal, excluding turnout components salvaged for the Port.
2. Salvaged rail not incorporated in the constructed track as relay rail and not salvaged for the Port, and conforming to AREMA specifications for Class I and Class II for relay rail.
3. Scrap rail, including all rail removed which does not conform to AREMA specifications for Class I and Class II for relay rail.

PART 3 - EXECUTION

3.01 PREPARATION

A. Utility locates shall be performed prior to start of demolition. Coordinate and resolve with the Engineer to turn off or de-energize affected services before starting demolition.

B. Verify all items for demolition, disposal, and salvage as early as practicable prior to start of the work. Notify the Engineer immediately if observed conditions differ from anticipated conditions.

C. Pothole investigations:

1. Perform pothole investigations to determine the alignment and horizontal and vertical position of utilities at the locations indicated on the Drawings.
2. Potholes shall be 12-inch diameter air vacuum excavations.
3. Survey utilities located by potholing and provide survey data to the Engineer within 5 days of completing pothole investigations.
4. Backfill pothole excavations with Gravel Backfill for Pipe Zone Bedding.

3.02 REMOVAL OF RAIL

A. Rail identified on the Drawings for salvage or removal shall be removed to the nearest joint at or beyond the length shown on the Drawings.

3.03 DISPOSAL AND DISPOSITION OF MATERIALS

A. Disposition of Materials

1. All materials and equipment removed, and not used for relay or reinstallation within the project, shall become the property of the Contractor and shall be removed from Port property.
2. The Contractor assumes full responsibility for the proper disposal of all demolition materials under this Contract in a manner that meets the requirements of federal, state and local regulations for protecting the health and safety of employees, the public, and for protecting the environment.
3. Existing ballast, excavated base course and excavated soil to be disposed of off site in accordance with Section 01 35 43.19 Export Soil Management.

B. Cleanup:

1. Haul route and paved site areas will be swept to remove any construction debris or soil tracked out by construction equipment and vehicles.
2. There shall be no debris, rubble or litter left at the site from any of the demolition operations and the site shall be clean.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The Work includes furnishing of all necessary material, labor, and equipment for providing the support and forms for all concrete work. Also included in this section are the requirements for removal of the forms and their support.

1.02 QUALITY ASSURANCE

A. Concrete forms shall be designed by the Contractor to meet the requirements of the type of concrete, sequence of placing schedule, control of dimensions of the hardened concrete, and other conditions of the project.

B. Concrete Forms: Clean concrete forms of all material or other objects considered deleterious to the concrete structure or surface.

C. The reference standards for formwork are ACI 347 and ACI 301.

1.03 SUBMITTALS

A. Prior to commencement of other work in this section, the Contractor shall submit the following items to the Engineer in accordance with Section 01 33 00 “Submittal Procedures.”

1. Formwork and shoring design calculations and shop drawings shall be submitted to the Engineer for review prior to erecting formwork. Design calculations and shop Drawings shall bear the seal and signature of the responsible licensed Engineers. Submitted documents not bearing the seal and signature will be rejected without review.

PART 2 - PRODUCTS

2.01 GENERAL

A. Materials for concrete forms may be new or used. The quality of the materials, not the age or previous usage, will be the determining factor as to their suitability.

2.02 JOB-BUILT FORMS

A. WOOD FORMS

1. Framing lumber shall be of standard dimensions and of such quality as to meet the requirements of the stresses applied.

2. Use Plyform Plywood for all exposed concrete forms.

3. Shiplap, square-edged boards, or tongue-and-groove sheathing may be used for forming unexposed concrete surfaces.

4. Use metal, fiberglass, or other special form lining where indicated on the Drawings.

B. STEEL FORMS

1. Steel forms to be fabricated at the site shall be approved by the Engineer prior to construction.

2. Forms for round columns or shafts shall consist of self-supporting metal shell or tube which will give a smooth, even surface. Forms which produced a spiral appearance or those made of wood shall not be used except as approved by the Engineer.

C. MISCELLANEOUS FORMS

1. Paper, fiberglass, micarta, asphalt-impregnated fiber, and other miscellaneous form materials shall be approved by the Engineer prior to construction.

2.03 PREFABRICATED FORMS

A. All prefabricated forms, whether they are part of a patented system or custom-fabricated, shall be approved by the Engineer prior to assembly.

2.04 FORM LINERS AND COATINGS

A. Line, coat, or treat forms with a suitable bond-breaker to ensure their timely removal with minimum damage to the concrete. Bond-breaker material shall be noncoloring and shall not leave a film on the concrete surface that will prohibit the subsequent finishing activities required to attain the desired appearance.

2.05 FORM TIES AND ACCESSORIES

A. Form ties shall be manufactured items with premeasured, break-back, weakened areas so that ties can be removed within (3/4)-inch of the concrete surface.

B. Tie rods for use with she-bolts shall be set back (1-1/2 inches) from the concrete surface.

C. Wire ties and wood spacers shall not be used.

D. Corner brackets, friction collars, column clamps, and other specialized accessories shall be utilized in accordance with the manufacturer's recommendations.

PART 3 - EXECUTION

3.01 GENERAL

A. Forms shall be cleaned before assembly of all material that would be considered harmful to the concrete structure/surface.

3.02 FORM INSTALLATION

A. Forms shall be built to the exact size and shape of the concrete member or part shown or specified. Forms shall be constructed as to be unyielding, true to line and level, and sufficiently tight to prevent escape of mortar, and shall be properly and effectively braced to prevent collapse or deformation of the member being cast. Openings in concrete shall be placed at the location shown on the Drawings. All openings shall be formed and fastened securely in position to maintain the specified concrete cover of all reinforcement and to leave a smooth and true opening after the forms are removed.

B. Prior to final setting or placing reinforcing steel, forms shall be treated with a bond breaker or parting compound. The compound shall be applied at a rate recommended by the manufacturer which will provide a smooth surface free of dusting action caused by the chemical reaction of the compound.

C. Forms may be set with a slight bevel or draft for easy removal, where approved by the Engineer. Corners shall be chamfered 3/4-inch.

D. All forms shall be mortar-tight. Standing water in the forms will not be permitted. Immediately prior to placing concrete, the forms shall be cleaned and wetted.

3.03 REMOVAL OF FALSEWORK AND FORMS

A. Forms shall remain in place a minimum length of time as follows, during which the temperature averages 40° F or higher:

Type I-II	Type III Cement
Cement	High-Early-Strength Concrete
7-days	72-hours

Where lower temperatures prevail, forms shall remain in place longer, at the Port's discretion. All periods during which the ambient air temperature is below 40°F shall be disregarded in estimating the total time required prior to form removal during which artificial heat is not applied.

B. In lieu of the above methods for determining the time at form removal, forms may be removed when concrete cylinder tests indicate a compressive strength equal to 80 percent of the specified 28-day strength for the concrete. Additional concrete cylinder testing beyond the Port protocol and for the purpose of ascertaining the 80 percent threshold shall be at the Contractor's expense.

C. The removal of forms, as herein stipulated, shall in no case relieve the Contractor of responsibility for the final acceptability or appearance of the work.

D. All form removal shall be accomplished in a manner which will prevent injury to the concrete.

E. Removal of formwork shall be considered incidental to the Work performed and no separate payment will be allowed for this work.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK:

A. The Work includes the requirements for furnishing, detailing, cutting, bending, transporting, and placing of all concrete reinforcement and associated items required or indicated on the Drawings.

1.02 QUALITY ASSURANCE:

A. QUALIFICATIONS OF WORKMEN:

1. Provide at least one (1) person who shall be present at all times during execution of this portion of the Work and who shall be thoroughly familiar with the type of materials being installed and the best methods for their installation and who shall direct all work performed under this section.

B. REFERENCE STANDARDS:

1. ACI 318, Building Code Requirements for Rein-forced Concrete
2. ACI 315, Manual of Standard Practice for Detail-ing Rein-forced Concrete Structures
3. ACI 301, Specifications for Structural Concrete for Buildings
4. Washington State Department of Transportation (WSDOT) Standard Specifications, 2014 Edition
5. American Welding Society (AWS) D1.4 Structural Welding Code - Reinforcing Steel
6. Concrete Steel Reinforcing Institute (CRSI), Manual of Standard Practice, 27th Edition.
7. WABO Standard No. 27-13, “WABO Welder and Welding Operator Performance Qualification Standard for Structural Steel, Sheet Steel, and Reinforcing Steel”.

1.03 SUBMITTALS:

A. Before materials are delivered to the job site, submit the following items to the Engineer in accordance with Section 01 33 00 "Submittal Procedures."

1. Submit complete shop drawings for the Engineer's review, prior to fabrication.
2. Submit mill certificates for each heat of steel, indicating Specification compliance regarding strength and chemistry of steel to be furnished.

1.04 PRODUCT HANDLING:

A. PROTECTION:

1. Protect reinforcement before, during, and after installation and protect the installed work and materials of other trades.
2. Store in a manner to prevent fouling with dirt, grease, and other bond-breaking coatings.
3. Use all necessary precautions to maintain identification after the bundles are broken.

B. REPLACEMENTS:

1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer at no additional cost to the Port.

PART 2 - PRODUCTS

2.01 REINFORCEMENT:

A. All reinforcement material shall be new and free from rust.

B. All reinforcing bars, except as noted below shall be deformed billet steel bars, conforming to ASTM A 615, Grade 60.

C. Spiral reinforcing bars shall be undeformed plain bars or wire conforming to ASTM A 615, Grade 60, ASTM A 706, or ASTM A 82 as indicated on the Drawings.

D. Mechanical splices for reinforcing bars shall be Lenton Standard Couplers or approved equivalent. Couplers shall develop 125 percent of the minimum yield strength of reinforcing bar.

E. Mechanical anchors for reinforcing bars shall be Lenton Terminator or approved equivalent. Anchor shall develop the yield strength of the reinforcement without damaging the concrete.

2.02 OTHER MATERIALS:

A. All other materials not specifically described but required for a complete and proper installation of reinforcement, shall be as selected by the Contractor, subject to the approval of the Engineer.

PART 3 - EXECUTION

3.01 GENERAL:

A. Prior to installation of this section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.

B. Details of bending, placing, and splicing of all reinforcing steel shall conform to ACI 318, except as modified herein.

3.02 REINFORCING STEEL BARS:

A. Order Lists: Before ordering material, furnish all order lists and bending diagrams for approval by the Engineer; reinforcement placing Drawings submitted for approval shall conform to CRSI detailing practice. Do not order material until such lists and bending diagrams have been approved.

The approval of order lists and bending diagrams by the Engineer shall in no way relieve the Contractor of responsibility for the correctness of such lists and diagrams.

B. FABRICATION:

1. Bend all bars cold to the shapes indicated on the Drawings unless otherwise approved by the Engineer. Do not field-bend bars partially embedded in concrete except as indicated on the Drawings or as approved by the Engineer. Make bends and hooks in accordance with the applicable portions of the Concrete Reinforcing Steel Institute.

C. PLACING AND FASTENING:

1. Place all steel reinforcement accurately and hold firmly in the position indicated on the Drawings during the placing and setting of concrete. Tie bars at all intersections.

2. Minimum concrete cover shall be in accordance with ACI 315 and ACI 318 unless otherwise noted on the Drawings.

3. Distance from the forms shall be maintained by means of stays, blocks, ties, hangers, or other approved supports. Blocks for holding reinforcement from contact with the forms shall be pre-cast mortar blocks of not less than 3750 psi compressive strength, of approved shape and dimensions, or approved metal chairs. Metal chairs which are in contact with the exterior surface of the concrete shall be plastic coated. Layers of bars shall be separated by spacer bars, plastic-coated chairs, precast mortar blocks of not less than 3750 psi compressive strength or other equally suitable devices.

4. In the event that conduits, piping, inserts, sleeves, or other items interfere with placing reinforcement as indicated on the Drawings or as otherwise required, immediately consult the Engineer and obtain approval of new procedure before placing concrete.

3.03 SPLICING:

A. All reinforcement, except as noted below, shall be furnished in the full lengths as indicated on the Drawings. Splicing of bars, except when indicated on the Drawings, will not be permitted without written approval of the Engineer.

3.04 CLEANING REINFORCEMENT:

A. Steel reinforcement, at the time concrete is placed around it, shall be free from loose rust or mill scale, oil, paint, and all other coatings which will destroy or reduce bond between steel and concrete.

3.05 INSPECTION:

A. Reinforcement in any member shall be placed and then inspected by the Engineer before the placing of concrete may begin. Concrete placed in violation of this provision may be rejected, and the Contractor will be required to remove the rejected concrete at no additional cost to the Port.

B. The Contractor shall notify the Engineer at least 24 hours in advance of any concrete pour, to allow for proper inspection.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The extent and location of the cast-in-place concrete work are indi-cated on the Drawings. The work includes furnishing of all labor, ma-terial, and equipment for providing cast-in-place concrete and asso-ciated work, all as indicated in the Drawings, notes, and this Specification.

1.02 GENERAL

A. All concrete work shall conform to the requirements of ACI 301 unless other-wise noted in the Drawings and/or this Specification.

1.03 QUALITY ASSURANCE

A. INSPECTION AND TESTING

1. The Port will provide for necessary inspection and testing as required. The Contractor shall provide all necessary assis-tance in carrying out such inspections and tests, including sufficient mixed concrete and constituent materials required for testing and inspection, at no additional cost to the Port.

B. QUALIFICATION OF WORKMEN

1. Provide at least one person who shall be present at all times during execution of this portion of the work, who shall be thoroughly trained and experienced in concrete work, and who shall direct all work performed under this section.

2. Trained and experienced journeyman concrete finishers shall be responsible for finishing of exposed surfaces.

C. REFERENCE STANDARDS

1. ACI 318, Building Code Requirements for Reinforced Concrete
2. ACI 301, Specification for Structural Concrete for Buildings
3. ACI 302, Concrete Floor and Slab Construction
4. ACI 305, Hot Weather Concreting
5. ACI 306, Cold Weather Concreting
6. ACI 308, Standard Practice for Curing Concrete
7. ACI 315, Manual of Standard Practice for Detailing Reinforced Concrete Structures.
8. International Building Code (IBC), 2003, as amended and adopted by the City of Tacoma.

1.04 SUBMITTALS

A. All cast-in-place concrete shall be proportioned on the basis of field experience or laboratory trial mixtures.

The following documents shall be submitted to and approved by the Engineer, in accordance with Section 01 33 00 "Submittal Procedures," before any concrete can be placed on the job:

1. Certificates of Specification compliance for materials to be used.
2. Proposed concrete design mix, indicating constituent material contents per cubic yard of concrete.

3. Test certificates for compressive strength, yield, air content, and slump of the proposed concrete mix. As a minimum, compressive strength test results at 7, 14, and 28-days shall be provided in accordance with ACI 318 5.3.
4. Manufacturer's name and Specifications and certificates of compliance with applicable standards shall be provided for all admixtures, con-crete bonding agents, curing compounds, etc., proposed for use on the job.
5. Manufacturer’s data for pre-fabricated construction joint systems and hardware.

PART 2 - PRODUCTS

2.01 GENERAL

A. All concrete, unless specifically permitted by the Engineer, shall be ready-mix. Batching, mixing, transportation, and delivery of ready-mix concrete shall conform to ASTM C 94.

2.02 MATERIALS

A. Portland cement for use in mixes without fly ash shall be Type I-II or Type II conforming to ASTM C 150 and ASTM C 595. Upon written authorization of the Port, Type III cement may be used for mixes without fly ash.

   The C3A content of the cement shall be no less than 4% nor more than 10%. Portland cement for use in mixes with fly ash shall be Type I or Type I-II conforming to ASTM C 150. If fly ash is used, it shall meet the requirements of ASTM C 618, Type F, with the added provisions that the loss on ignition shall not exceed 1 percent, and that the fly ash is stored in a separate silo from that of cement. Split bins are not acceptable.

B. All coarse and fine aggregate shall consist of hard, tough, durable, particles free from foreign materials, and shall be stored in such a manner as to prevent segregation, excessive breakage, and the introduction of foreign material. Aggregate shall conform to ASTM C 33 and additionally shall have a minimum of two fractured face. The maximum size of coarse aggregate shall not be larger than three fourths of the minimum clear spacing between reinforcing steel bars and/or between bars and side forms and/or between bars and top or bot-tom surface of the concrete. Lightweight aggregate or aggre-gate larger than 1-1/2 inch shall not be used without written per-mission from the Port. The maximum size of coarse aggregate for "pea gravel" concrete shall be 3/8-inch.

C. Water-reducing admixtures shall be used and conform to the requirements of ASTM C 494. Dosage rates shall be in accordance with the manufacturer's recommendations.

D. Air-entraining admix-tures shall conform to ASTM C 260. Dosage rates shall be in accordance with the manufacturer's recommendations to meet the air content specified herein. The air-entraining admixture shall be added directly to the concrete materials either before or during mixing.

2.03 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation of cast-in-place concrete, shall be as selected and provided by the Contractor subject to the approval of the Port.

2.04 MIX PROPORTIONS AND STRENGTH

A. The proportions of aggregate to cement for any concrete shall be such as to produce a mixture which will work readily into the corners and angles of the forms, around reinforcement and

embedded items, with the least possible segregation of the material and preventing excess free water to collect on the surface.

B. The mix proportions shall be selected in accordance with ACI 318. Test data representing 30 recent con-secutive tests for each mix shall be submitted to establish the stan-dard deviation used in Section 5.3.1. The criteria for accep-tance of submitted tests shall be in accordance with Section 5.3.1.1. Where 30 recent consecutive tests are not available, the standard deviation may be determined by records based on no less than 15 tests as described in Section 5.3.1.2. Where no previous data are avail-able, the mix or mixes shall be overdesigned in accor-dance with Section 5.3.2.2. When consecutive test data have representing compliance under these Specifications has been established during this project, the overdesign may be relaxed in accordance with Section 5.5 at the discretion of the Engineer. Deviation from any reviewed design mix without written authorization of the Engineer will not be permitted.

C. All concrete, except as otherwise noted in the Drawings, shall develop a minimum compressive strength of 4000 psi in 28-days and shall meet the following requirements:

1. Minimum Cementitious Material

Concrete without fly ash	611 lbs./cy
Concrete with fly ash	517 lbs./cy and
	100 lb fly ash/cy

2. Maximum Water/Cement Ratio

(by weight, including free

moisture on aggregate) 0.40*

*If fly ash is used, the water/cement ratio shall be calcu-lated as the weight of water divided by the weight of cement plus the weight of the fly ash.

3. Air Content 5% $\pm$ 1 1/2%

4. Water-reducer admixture shall be Type A, D, F, or G. The amount shall be such to control the desired workability and water/cement ratio of the mix.

5. Slump: 3 to 5-inches with Type A or D admixtures, 4 to 8-inches with Type F or G admixtures. The slump shall be chosen to enhance workability without violating the specified maximum water/cement ratio.

PART 3 - EXECUTION

3.01 PREPARATORY WORK

A. INSPECTION

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

2. Verify that all items to be embedded in concrete are in place, properly oriented, located, and secured.

3. Verify that concrete may be placed to the lines and elevations indicated on the Drawings, with all required clearance for reinforcement.

B. General

1. All areas in which concrete is to be placed shall be thoroughly cleaned to remove all wood debris, sawdust, tie wire cuttings, and all deleterious materials. Existing concrete or concrete from a previous pour shall be cleaned and roughened to provide a bondable surface. Concrete forms which have not been treated with oils, waxes, or other bond breakers shall be thoroughly wet prior to placing concrete.
2. All transporting and handling equipment shall be cleaned of all hardened concrete.

C. Notification

Notify the Engineer at least 24-hours in advance of concrete placement.

3.02 TRANSPORTING AND PLACING CONCRETE

A. Concrete shall be placed as soon as possible after mixing and shall be plastic and readily workable when placed in the forms. Partially set concrete shall not be retempered for use.

B. The method and manner of placing concrete shall avoid segre-gation of the aggregate, or displacement of reinforcement.

C. Conveyor belts, when used, shall be limited to approximately 300-feet in length to prevent segregation and shall be covered to protect the concrete from sun or rain.

D. Aluminum conduits or tremies shall not be used for pumping or placing concrete.

E. Concrete shall be placed in continuous horizontal layers not exceeding 18-inches, and so compacted that there will be no line of separation between layers. Care shall be taken to fill each part of the form by depositing concrete directly to or as near the final position as possible.

F. When concrete must be dropped more than 5-feet into the forms, it shall be deposited through an approved conduit (tremie). The tremie conduit shall also be used to place concrete in sloping forms or in other locations, as directed, to prevent concrete from segregation caused by sliding around reinforcing or other embedments.

G. In general, the method of depositing and compacting concrete shall be conducted so as to form a compact, dense, impervious concrete with the required surface finish without rock-pockets, and a minimum of segregation. Defective concrete shall be removed at the Con-tractor's expense.

H. Concrete shall not be placed where other work in the area, such as driving piling or sheets, or other vibratory action will ad-versely affect the initial set or strength of the concrete. To the maximum extent possible, cast-in-place concrete shall not be placed within 100-feet of concrete or sheet pile driving.

I. Mechanical vibrators shall not be used for transporting concrete.

J. Water shall not be added to concrete on-site without approval of the Engineer.

K. Contractor shall ensure that washout of concrete trucks is performed with all applicable codes and regulations. Contractor may establish a contained truck washout area using washout pans or perform washout at an existing offsite washout and disposal facility. Washout area shall be sealed to prevent discharge of concrete, slurry or residuals to waters of the State. Wash out concrete truck chutes, pumps, and internals into formed areas only. Do not wash out concrete trucks onto the ground, or into storm drains, open ditches, streets, or streams. Return unused concrete remaining in the truck and pump to the originating batch plant for recycling. Do not dump excess concrete on site, except in designated concrete washout areas. At the completion of work the Contractor shall remove all washout debris from the site and restore the washout area to preconstruction condition.

3.03 CONSTRUCTION JOINTS

A. Joints and stoppages, except as specifically shown on the Drawings, shall generally conform to ACI 318. Joints shall be located so as not to significantly impair the strength of the structure and only as approved by the Port. Thoroughly clean all joints to remove all loose concrete and laitance. Roughen joint surface to a 1/4" amplitude. Unless otherwise noted, wet and coat all cleaned joints with neat cement bond grout immediately before placing fresh con-crete.

Pre-fabricated construction jointing systems and products shall be submitted for review and approval by the Port prior to use.

3.04 COLD/HOT WEATHER CONCRETING

A. Do not place concrete when the atmospheric temperature drops below 40°F or rises above 90°F, unless special procedures are followed. Procedures for production, delivery, placing, curing, inspection, and testing of concrete under hot or cold weather conditions shall follow the recommendations of ACI 305, “Hot Weather Concreting” or ACI 306, “Cold Weather Concreting”.

If concrete is placed during cold or hot weather conditions, the Contractor shall submit documentation to the Port demonstrating how the procedures described in the above referenced ACI documents will be followed. The Contractor’s documentation shall be received by the Port no later than 72 hours prior to concrete placement. The Port’s review of this documentation does not relieve the Contractor’s responsibility to provide concrete per the Contract Documents.

3.05 CONSOLIDATING CONCRETE

A. The Contractor shall provide suitable internal vibrators for use in compacting all concrete. The vibrators shall be of the type designed to be placed directly in the concrete and their frequency of vibration shall be not less than 7000 impulses per minute when in actual operation.

B. Vibration shall be such that the concrete becomes uniformly plastic. Vibrators shall be inserted to a depth sufficient to vibrate the bottom of each layer effectively, but shall not be allowed to penetrate partially hardened concrete. The vibrators shall not be applied directly to steel which extends into partially hardened concrete. The intervals between points of insertion shall not be less than 2-feet nor more than 3-feet.

C. Vibration shall not continue in any one spot to the extent that pools of grout are formed. In vibrating and finishing top surfaces which are exposed to weather or wear, extreme care shall be exercised to avoid drawing water or laitance to the surface. In relatively high lifts, the top layer shall be comparatively shal-low and the concrete mix shall be as stiff as can be effectively vibrated into place and properly finished. Vibrators shall not be used to transport or move concrete inside the form.

D. The Contractor shall supply a sufficient number of vibrators to effectively vibrate all of the concrete placed. Hand tamping shall be required wherever necessary to secure a smooth and dense concrete on the outside surfaces.

3.06 CURING CONCRETE

A. Refer to ACI 308 for recommended practices for curing concrete.

B. Concrete (other than high-early strength) shall be maintained above 50°F and in a moist condition for at least the first seven days after placement.

C. High-early strength concrete shall be maintained above 50°F and in a moist condition for at least the first three days after placement.

D. All concrete shall be protected from mechanical injury and accelerated drying. No fire or excessive heat shall be permitted near the concrete at any time.

E. Accelerated curing methods, if used, must be approved by the Engineer.

3.07 FINISHING CONCRETE

A. General:

All permanently exposed surfaces, unless specifically noted otherwise, shall be free from local bulging and all unsightly ridges or lips shall be removed to leave a smooth, flat surface. Excessive rubbing will not be permitted. Patching mortar, if used, shall be of the same color as the surrounding concrete. White Portland cement shall be added to patching mortar for color matching purposes.

B. Walls and Vertical Surfaces:

1. Immediately after removal of form or absorptive form lining, con-crete surfaces shall be inspected for defects. All defects, voids, defective concrete, and tie rod holes shall be repaired immediately after the forms are removed unless otherwise directed by the Port. All exposed tie wire shall be removed (chipped out) and patched. The concrete used for repairing shall be of such quality that it can be thoroughly bonded to the adjacent concrete.

   All defects shall be repaired no later than 48-hours after form removal.

C. Horizontal Surfaces:

1. All horizontal surfaces that will carry additional con-crete shall be thoroughly roughened to an amplitude of 1/4-inch and cleaned of all laitance and unsatisfactory concrete.

2. Other horizontal surfaces that will not receive any additional concrete shall have a smooth wood float finish except for the top of the bullrail which shall have a broom finish. The broom strip shall be approximately 1/16-inch.

D. Protection of Finish:

1. Every precaution shall be taken by the Contractor to protect finished surfaces from stains or abrasions. Surfaces or edges likely to be injured during the construction period shall be properly protected.

3.08 TESTING

A. Testing of concrete material will be done by the Engineer. Methods of sampling, testing, evaluation, and acceptance will conform to ACI 301. All fresh concrete samples intended for testing will be taken at the point of deposit into the formwork.

B. Testing, as described above, will be at Port’s discretion and in no way relieves the Contractor of any obligations.

C. Tests will be performed at no cost to the Contractor, except as noted. The following services shall be performed, when necessary, at Contractor's cost:

1. Additional testing and inspection required because of changes in materials, proportions, and procedures requested by the Contractor.

2. Additional testing of materials or concrete occasioned by their failure by test or inspection to meet Specification requirements.

D. Any delivered load of concrete that is rejected shall be completely disposed of off-site. Any truck rejected shall not be permitted to return to the project site for the duration of the workday.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work under Division 22 includes furnishing materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of mechanical work for this project, as shown on the Drawings and defined in Division 22 of the Specifications.

1.02 QUALITY ASSURANCE

A. Tests: Demonstrate that equipment operates as indicated as specified, and in accordance with the manufacturer's recommendations. Perform tests in the presence of the Engineer. Provide instruments and personnel required to conduct the tests.

B. Qualifications: Use sufficient journeymen and competent supervisors in the execution of the Work to ensure proper and adequate installation throughout. In the acceptance of installed work, no allowance will be made for lack of skill on the part of the workmen.

1.03 WORK OF OTHER TRADES

A. Refer to the architectural, structural, civil, and electrical Drawings for those details which may affect the execution of this Work. Specific locations of structural or architectural features or equipment items shall be obtained from field measurements or the trade providing the material or equipment. No extra payments will be allowed for failure to obtain this information.

1.04 EXISTING CONDITIONS

A. Demolition work required is noted on the Drawings. Specific scope of demolition work and operating conditions to be encountered shall be verified from on-site review and coordination with the Engineer. Maintain service to existing equipment and devices to be retained in area adjacent to the existing areas scheduled for renovation. Provide temporary services as necessary to meet these conditions.

B. Special Protection: Exercise maximum precaution to provide positive protection for the existing building and equipment from damage of any kind, and in particular prevent any water and dust seepage into the existing building.

1.05 CODES, PERMITS, INSPECTIONS, AND FEES

A. Work and materials shall be in accordance with requirements of applicable codes, regulations, ordinances, and local amendments including, but not limited to, the following.

1. 2012 International Building Code.
2. 2012 International Mechanical Code.
3. 2012 Uniform Plumbing Code.
4. 2012 International Fire Code.
5. 2012 Washington State Energy Code.
6. National Electrical Code.
7. State of Washington standards, WAC-296-24, General Safety and Health Standards.
8. NFPA 13, Sprinkler Systems.
9. NFPA 30, Flammable and Combustion Liquids Code.
10. NFPA 90A, Installation of Air Conditioning and Ventilating Systems.

11. American National Standard Code for Pressure Piping, Chapter V (ANSI B31.1).
12. Washington Boilers and Unfired Pressure Vessel Laws, RCW 70.79 and WAC 296, Chapter 104, as published by the Washington State Department of Labor and Industries, Division of Boiler Inspection.
13. The Americans with Disabilities Act (ADA).
14. Puget Sound Air Pollution Control Agency.

B. Nothing in Drawings and Specifications shall be construed to permit Work not in conformance with these rules and regulations.

1.06 EQUIPMENT AND MATERIALS APPROVALS

A. Whenever UL listed standards exist for equipment with electrical components, provide UL listed equipment. Otherwise provide equipment certified by the manufacturer as complying with UL standards for similar items.

1.07 INTENT OF DRAWINGS

A. Drawings are diagrammatic and show only approximate locations of piping, ducts, fixtures, and equipment. Take measurements from building or site and verify with Drawings. Because of the small scale of the Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the plumbing, fire protection, electrical, structural, and finish conditions that would affect the Work to be performed and arrange such work accordingly, providing required ductwork and piping offsets, fittings, and accessories to meet such conditions.

B. It is the responsibility of the Contractor to provide equipment that fits into the space allotted and allows adequate acceptable clearances for installation, replacement, entry, servicing, and maintenance. When motors furnished are larger than sizes indicated, provide any required changes to the electrical services as may be necessary and related work as a part of the Work for the Section specifying that motor.

C. Plans and sections generally do not show all isolating valves, control valves, instruments, or other components; refer to diagrams or schematics to obtain a more complete description of systems.

1.08 DETAIL DRAWINGS BY CONTRACTOR

A. Wherever the Work is of sufficient complexity to warrant additional detailing, prepare additional detail drawings to scale 1/4 inch = 1 foot, prepared on AutoCAD Version 2007 or later the same size as Contract Drawings; with these layouts, coordinate work with the work of other trades. All such detailing work shall be clearly identified on the drawings as to the area to which it applies.

B. Do not submit these drawings to the Engineer for approval. At completion, however, include a set of such drawings with each set of as-built drawings for Engineer's record purposes.

1.09 SUBMITTALS

A. List of Manufacturers: Submit a Bill of Materials containing items to be used on this project, listing manufacturer's name and catalog numbers (where applicable) and referenced to the applicable Specification paragraph.

B. Submit Shop Drawings, descriptive bulletins, data sheets, diagrams, catalog cuts or other additional information as required for the items specified hereinafter in other Sections.

1.10 MATERIALS

A. Quality: Materials, products, and equipment shall be in strict accordance with governing codes and ordinances.

B. Quantity: Equipment and items of any one classification which are used in quantity, such as accessories, valves, specialties, cleanouts, drains, fittings, fans, air handling units etc., shall be products of one manufacturer and shall be used only for services recommended by the manufacturer.

1.11 ABBREVIATIONS, DEFINITIONS, AND REFERENCE STANDARDS

A. Reference standards, definitions, and abbreviations are as follows.

AASHTO	American Association of State Highway Transportation Officials
AGA	American Gas Association
AISC	American Institute of Steel Construction
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
AHRI	Air-Conditioning, Heating, and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
as shown	as shown on the Drawings
CAGI	Compressed Air and Gas Institute
CISPI	Cast Iron Soil Pipe Institute
CSA	Canadian Standards Institute
F	Degrees Fahrenheit
FRP	Fiberglass reinforced plastic
FM	FM Global
ICBO	International Conference of Building Officials
IBC	International Building Code
mA	milliamps
iwc	inches water column
MSS	Manufacturer's Standardization Society
mV	millivolts
NEMA	National Electrical Manufacturer's Association

NEC	National Electrical Code
NFPA	National Fire Protection Association
provide	furnish and install
psig	pounds per square inch gage pressure
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SPDT	Single Pole, Double Throw
UL	Underwriters Laboratories, Inc.
V	Volts
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
wp	Working Pressure (psig)
wg	Water Gage

1.12 OPERATION AND MAINTENANCE MANUALS

A. Prepare an operation and maintenance manual for equipment provided under Divisions 22.

1.13 SITE CONDITIONS AND METHODS

A. Measurements: Verify space availability by field measurement prior to submitting Shop Drawings for approval.

B. Roughing-In Dimensions: Obtain roughing-in dimensions for equipment from approved Shop Drawings or actual equipment measurements.

C. Manufacturer's Installation Instructions: Follow manufacturer's written instructions where furnished. If the details are in conflict with the Drawings, notify Engineer for resolution.

D. Accessibility: Install products which require periodic servicing or repair so that products are readily accessible. Otherwise, obtain Engineer’s approval of location.

1.14 TESTING AND DEMONSTRATION

A. Systems Operation Demonstration: Subject systems to such operating tests as are required to demonstrate that the equipment installed will operate within the specified limits through normal ranges and sequences including simulation of possible abnormal conditions. Operate every device manually and automatically, in accordance with its purpose. Operating test duration; not less than 6 hours after major corrections have been made. If tests do not demonstrate satisfactory system performance, correct deficiencies and retest systems.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 NOT USED.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes compressed air piping, pipe specialties and accessories, and seals.

1.02 SUBMITTALS

A. Product Data:

1. Piping and valves.

2. Pipe specialties and accessories.

B. Test and Evaluation Reports:

1. Pressure tests.

2. Demonstration report.

PART 2 - PRODUCTS

2.01 COMPRESSED AIR PIPING AND VALVES

A. Piping Located in Compressed Air Connection Pits: Type L copper, hard drawn conforming to ASTM B88.

1. Fittings:

a. Wrought copper solder fittings and threaded adapters, ANSI B16.22.

b. Cast copper alloy solder joint fittings and threaded adapters, ANSI B16.18.

B. Buried Pipe and Fittings: High Density Polyethylene (HDPE) pipe and fittings shall conform to ASTM D2513. Material shall be made of the high density polyethylene in accordance with ASTM D3035. Pipe shall conform to the requirements of ASTM D2837 for establishing a hydrostatic basis. The pipe shall have a dimensional ratio (SDR) pipe and wall thickness that meets or exceeds 230 psi at 68 degrees F. All components shall be molded or extruded in accordance with ASTM D1248.

1. Pipe shall be specifically designed for and commercially marketed for compressed air service.

2. Joints: Pipe and fittings shall be joined using the socket fusion technique in accordance with ASTM D2657 Section 8.

3. Fittings: HDPE fittings specifically designed for use with the compressed air piping shall be standard commercial products manufactured by injection molding from HDPE conforming to this specification.

4. Submit a manufacturer’s certification shall state that the pipe and fittings were manufactured from one specific resin in compliance with these specifications. The certificate shall state the specific resin used, its source, and list its compliance to these specifications.

C. Valves:

1. Ball: Two-piece body conforming to requirements of MSS SP-110; full port; solid ball; bronze body; chrome plated brass ball; brass stem; threaded end connections conforming to requirements of ASME B1.20.1; polytetrafluoroethylene (PTFE) seat and seal. Valve shall meet minimum pressure rating of 150 psig at 230 degrees F.

2. Safety Check Valves: Dixon SCVL series air fuse or equivalent; solid brass with stainless steel springs, minimum pressure rating of 250 psig at 250 degrees F, conforms with OSHA regulation 1926.302(b)(7).

2.02 PIPE SPECIALTIES AND ACCESSORIES

A. Gladhand Hose Couplings: Strato Inc. Model FS-515 E air outlet, railroad glad hand (1-1/4 inch) or approved equivalent of WABCO.

B. Flexible Hoses: Wire reinforced, abrasion resistant, flexible hose with threaded ends; assembly shall be in conformance with Association of American Railroads (AAR) M-618 specification; Strato Inc. or approved equal.

C. Mufflers: Norgren shell type “Quietaire” muffler, Brass mesh screen with aluminum base and shell, minimum pressure rating of 300 psig at 176 degrees F.

2.03 SEGMENTED FLEXIBLE, LEAKPROOF PIPE SEALS FOR PIPES PASSING THROUGH OPENINGS IN CONCRETE WALLS

A. Link-Seal, Innerlynx of Advance Products and Systems, or approved equal; segmented flexible, leakproof type pipe seal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General: Conform to manufacturer’s installation instructions.

B. Piping Located in Compressed Air Connection Pits:

1. Where threaded joints are required, use joint compound.

2. Blow out all piping with clean, dry compressed air at 3500 fpm before attaching terminal outlets.

3. Handle all piping to prevent entry of dirt and contaminants. Provide temporary caps for all pipes and stations during construction.

C. Underground Piping:

1. Joints: Pipe and fittings shall be joined using the socket fusion technique in accordance with ASTM D2657 Section 8. Temperature, times, and pressures of fusion shall be in accordance with the manufacturers recommendations.

2. Pipe shall be installed with a 5 foot minimum depth of cover unless shown otherwise on Drawings.

3. Blow out all piping with clean, dry compressed air at 3500 fpm.

4. Handle all piping to prevent entry of dirt and contaminants. Provide temporary caps for all pipes and stations during construction.

D. Below Grade Air Connection Pit Piping Penetration: Where pipes pass through openings in concrete wall, provide a segmented flexible, leakproof seal in the annular space between the wall and pipe. Size of sleeve or cored opening shall be determined by manufacturer.

3.02 EARTHWORK

A. Provide as required for the installation of mechanical work in the ground in accordance with Section 31 00 00 and as specified herein.

B. Trench Excavation: Provide as necessary for the installation of the work, with trenches of the necessary width for proper laying of pipe, with banks as nearly vertical as possible. Accurately grade trench bottoms to provide uniform undisturbed bedding for each section of pipe along its entire length; form holes and depressions for joints after trench bottom has been graded. Provide temporary pumping equipment to keep the excavation free from water. Provide pipe bedding in rock excavation consisting of not less than 6 inches of sand or equivalent material.

C. Bracing and Shoring: Provide as necessary to maintain stability of excavation.

D. Backfilling: Backfill trenches only after completion of pressure tests and inspection by the Engineer. Use sand, under, around and to 6 inches above top of piping. Fill spaces between pipe and sides of trench by hand and shovel-tamp in place; cover in 6 inch layers to thickness of 6 inches over top of pipe. Fill and tamp remainder of backfill material in 6 inch layers. Provide backfill materials generally of clean earth or sand relatively free of clods or stones. In addition, wherever paving or future paving is indicated over backfill, provide the remainder of the backfill of granular subgrade backfill material.

E. Compacting: Perform compacting individually for each 6 inch layer (maximum) loose thickness of backfill. Where roadway or parking area surfaces will be placed over backfill, provide a moisture condition which will produce a compacted density of 95 percent of maximum density; elsewhere, 90 percent. Measure in accordance with Method D of AASHTO T-180.

F. Installation of Piping in Backfilled Areas: Wherever any piping is to be installed in areas which have been excavated below pipe inverts, for any purpose, install the piping in a manner which will prevent subsequent settlement. Do not install the piping until the backfill is to full compaction and completed up to a level of 18 inches or more above the level of the installed pipe; install piping in trenches which have been re-excavated through the backfill.

G. Underground warning tape shall be buried above the piping during the trench backfilling and shall be buried approximately 12 inches deep. Tape shall be 0.004 inch thick polyethylene tape for metallic pipe and polyethylene tape with metallic core for plastic pipe. Tape shall be 6 inches wide and be printed with repetitive caution warnings along its length. Tapes shall be yellow in color with black letters. Tape color and lettering shall not be affected by moisture or other substances contained in the backfill material.

3.03 FIELD TESTS

A. Tests shall be made in the presence of the Engineer. Provide 5 working days advance notice for all scheduled tests.

B. Test new piping with clean, dry air at 1.1 times the design pressure. Continuously maintain test pressure for a minimum of one hour to inspect joints and connections for leaks. Test for leaks by brushing with a soapy water solution. Conform to requirements of ASME B31.9. Submit test report.

C. Submit a report indicating results of test.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work under this Division includes furnishing materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of electrical work for this project, as shown on the Drawings and defined in this Division of the Specifications.

B. The Work under Divisions 26 includes furnishing materials, equipment, labor, supervision, tools and items necessary for the construction, installation, connection, testing and operation of electrical work for this project, as shown on the Drawings and defined in the Specifications.

1.02 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. IEEE C2 (Institute of Electrical and Electronics Engineers) – National Electrical Safety Code.

D. NECA 1000 (National Electrical Contractors Association) – National Electrical Installation Standards Specification System.

E. NFPA 70 (National Fire Protection Association) – National Electrical Code.

F. NFPA 70A/70E (National Fire Protection Association) – Electrical Safety in the Workplace.

G. Manufacturer’s installation and operating instructions.

H. Tacoma Power Standards - Web Site:
http://www.mytpu.org/tacomapower/electrical-permitting/

1.03 WORK OF OTHER TRADES

A. The Drawings do not show complete details of the building construction. Refer to the structural, civil, and mechanical Drawings for those details which may affect the execution of this work. Specific locations of structural features or equipment items shall be obtained from referenced Drawings, field measurements or the trade providing the material or equipment.

B. Coordination: Failure to coordinate work will be considered sufficient cause for work to be altered at Contractor's expense, as directed by Engineer.

1. Plan and execute Work including, but not limited to, raceways, pathways, in cooperation with other trades and local serving utilities.

2. Yield right-of-way to piping installed at required slope.

3. Provide electrical materials and installation work required to connect, test and operate systems, devices, or equipment shown or described in the Drawings or Specifications of other Divisions.

1.04 EXISTING CONDITIONS

A. Demolition work required is noted on the Drawings. Specific scope of demolition work and operating conditions to be encountered shall be verified from on-site review and coordination with the Engineer. Maintain service to existing equipment and devices to be retained in area adjacent to the existing areas scheduled for renovation. Provide temporary services to meet these conditions. Refer to drawings for temporary generator requirements for Comm Hut 1.4.

B. Utilities and Services:

1. Do not disturb existing utilities without Engineer's written consent. Notify the Engineer not less than 10 days prior to the scheduled work date.

2. Prior to demolition, field-verify and document existing area, conduits, ducts, manholes, and handholes shown for demolition.

3. Prior to trenching and excavation, use a utility locator to locate existing underground utilities. Excavate to avoid underground utilities.

4. Where the Drawings show existing services to be abandoned, terminate in conformance with requirements of the utility and Authority Having Jurisdiction.

5. Install and test new services prior to demolishing existing services unless otherwise shown.

6. Failure to verify the existing conditions or submit re-routing plan will be considered sufficient cause for work to be altered at Contractor's expense, as directed by Engineer.

1.05 CODES, PERMITS, INSPECTIONS, AND FEES

A. Obtain permits and inspections and pay fees required by National, State and Local authorities.

B. Make arrangements for inspections by the Engineer and other authority. Submit 3 copies of certificates of compliance to the Engineer.

C. Work and materials shall be in accordance with requirements of the latest adopted edition of applicable codes, regulations, ordinances, and local amendments including, but not limited to, the following.

1. 2014 National Electric Code, NFPA 70.

2. 2012 National Electrical Safety Code, IEEE C2.

3. 2015 Electrical Safety in the Workplace, NFPA 70E.

4. 2012 International Building Code.

5. 2012 Life Safety Code, NFPA 101.

6. Washington Administrative Code, Chapter 296-46B WAC – Electrical Safety Standards, Administration, and Installation.

D. Changes in the work after initial installation due to requirements of code enforcing agencies shall be performed by the Contractor at no additional cost to the Owner.

E. Coordination: Coordinate with the appropriate "Authorities Having Jurisdiction" for this project.

1. Arrange plans and shop drawing reviews.

2. Schedule inspections in a timely manner.

3. Notify the Engineer of non-conformance issues.

4. Proceed with changes suggested by the Authorities Having Jurisdiction only with written authorization by the Engineer.

5. Make necessary corrections required by the Authorities Having Jurisdiction.

F. Utilities: Comply with rules and requirements of local utility companies; coordinate and pay for connections.

1. Tacoma Power, Attn: Joseph Rempe, P.E., 3628 South 35th Street, Tacoma, WA 98409
   Web Site: http://www.mytpu.org/tacomapower/

1.06 EQUIPMENT AND MATERIALS APPROVALS

A. Whenever UL standards exist for electrical equipment and materials, provide UL listed equipment and materials. Otherwise provide equipment and materials labeled by a Nationally Recognized Testing Laboratory (NRTL) in accordance with the provisions of the Revised Code of Washington and the Washington Administrative Code. NRTL shall be one that is acceptable to the Authority Having Jurisdiction (AHJ).

   1. Submit UL listing with Product Data submittals for UL listed equipment and materials.

   2. Submit proof of AHJ's approval of the NRTL's qualifications to the Engineer not less than 14 calendar days prior to NRTL field evaluation.

   3. Submit NRTL test and evaluation reports not less than 14 calendar days prior to requesting electrical inspection.

1.07 INTENT OF DRAWINGS

A. Drawings are diagrammatic and show only approximate locations of ducts, conduits, cable trays, pathways, raceways, devices, and equipment. Take measurements from site and verify with Drawings. Because of the small scale of the Drawings, it is not possible to indicate all offsets, fittings, and accessories that may be required. Carefully investigate the site conditions that would affect the Work to be performed and arrange such work accordingly, providing required ducts, conduits, pathways, raceways, equipment, fittings, conduit bodies, and accessories to meet such conditions.

B. It is the responsibility of the Contractor to provide equipment that fits into the space allotted and allows adequate acceptable clearances for installation, replacement, entry, servicing, and maintenance.

C. Plans and sections generally do not show all conduits, conductors, conductor sizes, junction boxes, conduit bodies, grounding conductors, or other components. Refer to manufacture diagrams or schematics to obtain a more complete description of systems.

1.08 DETAIL DRAWINGS BY CONTRACTOR

A. Wherever the Work is of sufficient complexity to warrant additional detailing, prepare additional detail drawings to scale 1/4 inch = 1 foot, prepared on tracing paper the same size as Contract Drawings; with these layouts, coordinate work with the work of other trades. All such detailing work shall be clearly identified on the drawings as to the area to which it applies.

B. Do not submit these drawings to the Engineer for approval. At completion, however, include a set of such drawings with each set of as-built drawings for Engineer's record purposes.

1.09 SUBMITTALS

A. Bill of Materials: Submit a Bill of Materials containing items to be used on this project, listing manufacturer's name and catalog numbers and referenced to the applicable Specification paragraph.

B. Product Data: Submit manufacturer's descriptive product information including catalog cuts, performance curves, ratings, accessories, features, time-current curves, standards (i.e. ANSI, IEEE, UL, MIL, NEMA) and other information required to confirm compliance with the Drawings and Specifications. Include complete ordering numbers showing prefixes and suffixes

identified for the specified product. Submittals showing generic model numbers, part numbers, product line, or other generalized information will be returned without review or rejected.

C. Shop Drawings: Submit manufacturer's shop drawings including plans, elevations, sections, schedules, wiring diagrams, schematics, seismic installation instructions, and other information required to confirm compliance with the Drawings and Specifications. Shop drawings shall accurately represent the specified product, including specified options and accessories. Show the specified included options and accessories as included. Show connections to specified options and accessories.

D. Detail and Coordination Drawings: Submit Contractor prepared drawings to show how multiple systems and interdisciplinary work will be coordinated.

E. Calculations: Submit calculations where specified. Include input variables, constants, formulas, assumptions, temperatures, resistances, capacitances, inductances, and other information to confirm compliance with the Drawings and Specifications.

F. Test Reports: Submit factory test reports and field quality control acceptance test reports.

1. Test reports shall include a cover sheet having the following information.

a. Project title as shown on the Drawings.

b. Signature of person reviewing the test report.

c. Printed name and title of person reviewing the test report.

d. Date reviewed.

e. Company name and contact information for the company performing the test.

f. Contractor name and contact information.

2. Test report data sheets shall show the following information.

a. Project title, location, testing company name, date the test is performed, name of person performing the test.

b. Test equipment model, serial number, and actual date the test equipment was last calibrated. Do not show the date that calibration is due.

c. Test conditions including ambient temperature, humidity, and short description of weather during the test (example: raining). Show date of last rainfall for ground and earth resistance measurements.

d. Show test parameters in numeric form including but not limited to voltages, currents, times, resistance, distances, and temperatures.

e. Show test results in numeric form for electrical tests and mechanical measurements.

G. Certificates: Submit statements printed on the manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements. Shall be dated after award of project contract and clearly name the project.

1.10 TESTING

A. Test wiring and electrical equipment installed in this Contract to verify wiring insulation integrity, absence of grounds and short circuits and verify proper operation, rotation, and phase relationship.

B. Perform tests in the presence of the Engineer, or their representatives unless the witnessing requirement is waived in writing by the Engineer.

C. Provide instruments, controls and protection settings, and personnel required to conduct the tests.

D. Provide test reports, waivers, calibration certificates, and drawings. The documents shall become the property of the Engineer upon completion of construction.

E. Provide acceptance testing of each adjustable breaker, in accordance with NETA ATS and applicable ANSI standards.

F. Replace equipment not meeting the test result evaluation criteria. Perform tests on the replacement equipment.

G. Place a sticker on each piece of tested equipment indicating the date of the test and the name of the testing agency.

H. Record the results of the tests and submit the record as part of the closeout submittals.

1.11 INSPECTIONS

A. Obtain a Certificate of Final Electrical Inspection from the local Authority Having Jurisdiction stating that work had been inspected, accepted, and approved as complying with existing governing ordinances and codes.

1. Tacoma Power, 3628 South 35th Street, Tacoma, WA 98409 Web Site: http://www.mytpu.org/tacomapower/electrical-permitting/electrical-inspection-permits/

B. Submit Certificate of Final Electrical Inspection to the Engineer upon completion of the project as part of project closeout.

1.12 ABBREVIATIONS, DEFINITIONS, AND REFERENCE STANDARDS

A. Additional reference standards, definitions, and abbreviations are as follows.

A	Amperes
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASHRAE Engineers	American Society of Heating, Refrigerating and Air-Conditioning
ASTM	American Society for Testing and Materials
as shown	as shown on the Drawings
C	Degrees Celsius
CPDT	Double Pole, Double Throw
F	Degrees Fahrenheit
FRP	Fiberglass reinforced plastic
Hz	Hertz (frequency)
IBC	International Building Code
kVA	Kilovolt-Ampere

kVAR	Kilovolt-Ampere Reactive
kW	Kilowatt
kWH	Kilowatt-Hour
mA	Milliamperes
mV	Millivolts
MVA	Megavolt Amperes
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NETA	InterNational Electrical Testing Association
NFPA	National Fire Protection Association
provide	furnish and install
psig	pounds per square inch gage pressure
SPDT	Single Pole, Double Throw
UL	Underwriters Laboratories, Inc.
V	Volts
VAC	Volts Alternating Current
VDC	Volts Direct Current

1.13 AS-BUILT DRAWINGS

A. Furnish As-Built Drawings. Show location of equipment and size of conduits, raceways, pathways, and ducts. Locate luminaires, lighting contactors, equipment disconnect switches, and other equipment and devices. Keep record drawings continuously updated during progress of project and ready for reference. Make available to Engineer at site for review prior to each pay request.

B. Duct banks and conduits installed below grade shall be shown with both horizontal and vertical dimensions at an accuracy of plus or minus 6 inches.

C. Show the actual dimensions of equipment installed. Dimensions on plans, elevations, and sections shall match exactly as installed.

D. Approved modifications to equipment in the field shall be shown on the record drawings to reflect the “as-built” conditions.

E. Record drawings shall be consistent. Changes made to plans, elevations, sections, wiring diagrams, schematics, or functional diagrams shall be made to related or otherwise affected plans, elevations, sections, wiring diagrams, schematics, or functional diagrams.

1.14 SITE CONDITIONS AND METHODS

A. Manufacturer's Installation Instructions: Follow manufacturer's written instructions where furnished. If the details are in conflict with the Drawings, notify Engineer for resolution.

B. Delivery, Storage, and Handling:

1. Conduits shall be maintained clean, free of debris, and dry from fabrication through field installation. Open ends shall be sealed with conduit manufacturer's end caps at the end of each workday. Maintain sealing procedure until installation is completed. Damaged, wet, and dirty conduits shall be removed from site.
2. All components and equipment shall be maintained clean, free of debris, and dry from fabrication through field installation. Openings shall be sealed with plastic at all times except when the equipment is in the process of being connected to conduits and connected equipment. Maintain sealing procedure from fabrication until installation is completed with conduits connected to the equipment.

PART 2 - PRODUCTS

2.01 NOT USED.

PART 3 - EXECUTION

3.01 DEMOLITION EXAMINATION

A. Verify measurements are as shown on the Drawings.

B. Demolition Drawings are based on field observation and existing record documents. Report discrepancies to Engineer before disturbing existing installation.

C. Contractor accepts existing conditions upon beginning the Work.

D. Provide temporary connections to maintain existing systems in service during construction. When work must be performed on energized equipment, use personnel experienced in such operations and perform the work in accordance with laws, rules, and regulations.

E. Where conduit is indicated on Drawings to be abandoned, remove conductors, remove debris from inside the conduit, and seal the conduit openings with conduit manufacturer endcaps.

F. Repair adjacent construction and finishes damaged during demolition and extension work.

G. Maintain access to existing installations which remain active. Maintain NEC required working space around and above electrical equipment.

3.02 EQUIPMENT CONNECTIONS

A. Coordinate and provide raceway, wiring, junction boxes, overcurrent protection, anchors, supports, and connections required by equipment manufacturers to make the equipment and systems completely functional. This includes, but is not limited to, items between equipment or components of same or different manufacturers, whether or not the items are shown on Drawings, Specifications, shop drawings, or product data. It is the Contractor's responsibility to ensure that the shop drawings show the required connections and associated devices.

B. Test continuity and insulation resistance of conductors in accordance with Section 26 05 20.

C. Test overcurrent protective devices.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes supports, anchors, fasteners, nameplates, labels, wire markers, raceway markers, vibration isolators, equipment housekeeping pads, sealing, firestopping, seismic restraints, wind restraints, and earthwork.

1.02 DEFINITIONS

A. Equipment: General term including fittings, devices, appliances, apparatus, machinery, generators, transformers, and other items used as parts of or in connection with an electrical installation.

B. Raceway: An enclosed channel of metal or nonmetallic materials designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this Code. Raceways include, but are not limited to, rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible conduit, flexible metallic tubing, flexible metal conduit, electrical metallic tubing.

1.03 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. ASTM A153/A153M (ASTM International) – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

D. ASTM A193/A193M-12b (ASTM International) – Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.

E. ASTM A276-13 (ASTM International) – Standard Specification for Stainless Steel Bars and Shapes.

F. ASTM B633 (ASTM International) – Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel.

G. ASTM F593 – 13 (ASTM International) – Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.

H. ASTM F594 – 09e1 (ASTM International) – Standard Specification for Stainless Steel Nuts.

I. NECA (National Electrical Contractors Association) – Standard of Installation.

1.04 DESIGN REQUIREMENTS

A. Select materials, sizes, and types of anchors, fasteners, and supports to carry loads of equipment and raceway, including weight of wire and cable in raceway.

1.05 SUBMITTALS

A. Product Data:

1. Submit product data and tabulated lists of nameplate, label, and marker types for equipment, devices, and wiring. Group the list by type of equipment, device, and wiring. Include material type and thickness, font type, size, vertical and horizontal spacing (tracking), number of rows, colors, and other specified features.

2. Submit product data for sealants. Identify the specific application for which the sealant is being submitted. Include manufacturer's instructions showing approved and prohibited installation methods.

3. Submit product data for anchors and fasteners. Include rated load and pull-out strengths.

B. Seismic Design: See Paragraph 3.07.A.1 SEISMIC AND WIND.

C. Wind Restraints: Submit calculations, details, Shop Drawings, and Product Data for the wind restraint design for electrical equipment located outside. After Engineer's review, Engineer will submit the Engineer's notification with the calculations, details, Shop Drawings, and Product Data to the Building Official per 2012 IBC section 107.3.4.1. No Work shall be started until the calculations, details, Shop Drawings, and Product Data have been approved by the Building Official.

PART 2 - PRODUCTS

2.01 ANCHORS AND FASTENERS

A. Anchor Bolts:

1. Anchor Bolts (Cast–In–Place): Galvanized steel bolts conforming to requirements of ASTM A307 and galvanized steel nuts conforming to requirements of ASTM A194. Number and size per manufacturer's recommendations or as shown. In concrete construction, provide bolts set in the formwork before pouring concrete. In building floors where equipment bases are cast iron over 18 inches maximum dimension, provide a pipe sleeve around each bolt to allow for positioning.

2. Anchor Bolts (Expansion Type): Molly "Parabolt" or Hilti "Kwik-Bolt III"; Type 304 stainless steel construction; with impact section on the end of the bolt.

2.02 FORMED STEEL CHANNEL

A. Manufacturers:

1. B-Line.

2. Globestrut.

3. Unistrut.

B. Description: Strut-type support and fittings.

1. Provide ASTM A153/A153M hot-dip galvanized steel. Minimum thickness of galvanizing shall be 2.6 mils.

2.03 SPRING STEEL CLAMPS

A. Manufacturer: Erico Caddy.

2.04 NAMEPLATES

A. Provide three-layer laminated melamine plastic nameplates for each item specified in the technical Sections and for those shown on the drawings. Items requiring nameplates include, but are not limited to the following.

1. Panelboards.

2. Enclosed circuit breakers.

3. Equipment enclosures.

4. Contactors.
5. Switches.
6. Devices.

B. Colors:

1. Matt black background with white letters for normal power.

C. Letter Size: Provide letters sized minimum 1 inch.

D. Legend: Provide nameplates with identification and other information as follows.

1. Source of power
2. Equipment designation/name.
3. Equipment voltage and phase.

2.05 LABELS

A. Description: Embossed adhesive tape, with 3/8 inch letters on white background.

B. Colors: Black letters for normal power circuits. Red letters for emergency power circuits.

2.06 ARC FLASH LABELS

A. Comply with NFPA 70E.

2.07 WIRE MARKERS

A. Description: Cloth tape, split sleeve or tubing type wire markers.

B. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number.
2. Control Circuits: Control wire number as indicated on shop drawings.

2.08 CIRCUIT DIRECTORIES

A. Provide typewritten circuit directories for all switchboards and panelboards, including breaker/fuse identification and size, equipment or system served and location(s).

B. Place directories inside doors under transparent plastic covers.

2.09 SLEEVES

A. Round: Rigid galvanized steel conduit (RGS).

B. Rectangular: Galvanized sheet steel.

1. Perimeter less than 50 inches with no side greater than 16 inches: 18 gage.
2. Perimeter equal to or greater than 50 inches or with a side greater than 16 inches: 10 gage.

2.10 GROUT

A. ASTM C1107.

B. Mix with water for 30 minutes of working time.

2.11 PULL STRINGS

A. 200 Pound Pull String: Nylon pull string having minimum tensile strength of 200 pounds.

B. 500 Pound Pull String: Nylon pull string having minimum tensile strength of 500 pounds.

C. 1500 Pound Pull String: Polypropylene pull rope having minimum tensile strength of 1500 pounds.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

B. Verify wiring and equipment that are about to be demolished are no longer required for the facility.

3.02 EXISTING WORK

A. Demolition drawings may not show all existing conditions. Report discrepancies to Engineer before disturbing existing installation. Protect existing systems not designated for removal or demolition from damage. Repair or replace with new any systems inadvertently damaged.

B. Install temporary wiring and connections to maintain existing systems in service during construction.

3.03 ANCHOR BOLTS

A. New Concrete Construction:

1. Anchor Bolts (Cast–In–Place): Set anchor bolts in the formwork before pouring concrete. Number and size of anchor bolts shall be per manufacturer's recommendations or as shown on Drawings. Install anchor bolts through concrete equipment pads to structural concrete slab. In building floors where equipment bases are cast iron over 18 inches maximum dimension, provide a pipe sleeve around each bolt to allow for positioning.

3.04 INSTALLATION

A. Supports:

1. Install electrical systems and equipment attached directly to structure and to dedicated supports attached directly to structure. Attach supports to structure, independent of all other equipment and systems. Do not fasten electrical equipment to other equipment or the supports for such equipment or systems.

2. Fabricate supports from structural steel or formed steel members. Rigidly weld members or install hex-head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts unless indicated otherwise on the drawings.

3. Locate and install anchors, fasteners, and supports in accordance with seismic requirements.

4. Install surface mounted equipment and panelboards with minimum of 4 anchors.

5. Install channel supports in wet and damp locations to anchor panelboards.

6. Do not use clips.

B. Identification Components:

1. Degrease and clean surfaces to receive nameplates and labels.

2. Install nameplate and label parallel to equipment lines.
3. Secure nameplate to equipment front using screws or rivets.
4. Identify underground conduits in accordance with Section 26 05 45.

3.05 EQUIPMENT HOUSEKEEPING PADS

A. Provide housekeeping pads for equipment.

B. Verify surfaces of housekeeping pads are level within 0.3 percent (1/8 inch in 42 inches).

C. Locate equipment a minimum of 4 inches from edge of pad.

3.06 PULL STRINGS

A. 1500 Pound Pull String: Provide 1500 pound pull string in empty ducts underground.

3.07 SEISMIC AND WIND

A. Seismic Restraints: Seismically restrain electrical nonstructural components in Divisions 26 in accordance with the requirements of the 2012 International Building Code. Electrical nonstructural components in Divisions 26 shall be as defined by ASCE 7.

1. Obtain the services of a professional engineer licensed in the State of Washington to prepare the seismic restraint design for electrical nonstructural components in Divisions 26. The professional engineer licensed in the State of Washington shall also prepare a statement of special inspections per requirements of the 2012 International Building Code. Submit calculations, details, Shop Drawings, Product Data, and statement of special inspections for the seismic restraint design of electrical nonstructural components in Divisions 26. If the professional engineer determines that the 2012 International Building Code does not require some of the electrical nonstructural components in Divisions 26 to be seismically restrained, then submit a stamped and signed statement from the professional engineer to that effect.
2. Seismic Certification of Electrical Nonstructural Components: Submit manufacture's certification by analysis, testing, or experience for electrical nonstructural components and designated seismic systems in accordance with Section 13.2 of ACSE 7, where such certification is required by Section 1705.12 of the 2012 International Building Code.

B. Wind Restraints: Restrain electrical equipment located outside in accordance with the wind requirements of the 2012 International Building Code.

1. Obtain the services of a professional engineer licensed in the State of Washington to prepare the wind restraint design for electrical equipment. Submit calculations, details, Shop Drawings, and Product Data for the wind restraints for electrical equipment.

C. The professional engineer obtained by the Contractor shall prepare both seismic and wind designs.

3.08 EARTHWORK

A. Provide earthwork for the installation of electrical work in the ground in accordance with Section 31 23 33 and as specified herein.

B. Trench Excavation: Provide for the installation of the work, with trenches of the necessary width for proper laying of conduit and duct bank. Accurately grade and compact trench bottoms to provide uniform undisturbed bedding for each section of conduit and duct bank along its entire length; form holes and depressions for joints after trench bottom has been graded. For trenches running from buildings to manholes or hand holes, slope trenches away from buildings toward manholes or hand holes. For trenches between manholes or hand holes, slope trenches from a high point at the center of the trench toward each manhole or hand hole. Sloping for trenches shall be not less than 4 inches in 100 feet. Keep excavation free from water. Provide conduit and duct bank bedding in rock excavation consisting of not less than 6 inches of sand or equivalent material.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes wiring, splices, connectors, and testing for electrical generation and distribution wiring rated 600 volts and less.

1.02 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. NECA (National Electrical Contractors Association) – Standard of Installation.

D. NEMA WC 70 (National Electrical Manufacturers Association) – Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

E. NFPA 70 (National Fire Protection Association) – National Electrical Code.

F. UL 4 (Underwriters Laboratories) – Armored Cable.

G. UL 44 (Underwriters Laboratories) – Thermoset-Insulated Wires and Cables.

H. UL 83 (Underwriters Laboratories) – Thermoplastic-Insulated Wires and Cables.

I. UL 489A-489B (Underwriters Laboratories) – Wire Connectors.

J. UL 489C (Underwriters Laboratories) – Splicing Wire Connectors.

K. UL 2196 (Underwriters Laboratories) – Tests for Fire Resistive Cables.

1.03 SYSTEM DESCRIPTION

A. Conductors for wiring electrical power, lighting, and control circuits. Provide conductors, conduits, boxes, conduit bodies, fittings, wiring devices, terminations, splices, connections, identification, and testing.

1.04 SUBMITTALS

A. Product Data: Submit for building wire and each cable assembly type.

1. Insulation type, conductor material, conductor strands, voltage, ampacity, and UL listing.

1.05 CLOSEOUT SUBMITTALS

A. Field Quality Control Test Reports: Submit test reports in accordance with Section 26 00 10.

B. Project Record Documents: Record actual locations of components and circuits.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years documented experience.

1.07 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Apply shrink-to-fit sealing caps on wire and cable reels for conductors 250 kcmil and larger.

B. Deliver conductors 250 kcmil and larger on recyclable or returnable reels.

1.09 COORDINATION

A. Determine routes and lengths where not indicated on the Drawings. Coordinate route with structural members, architectural requirements, and with work by other trades. Pay for costs of routing and rerouting circuits.

PART 2 - PRODUCTS

2.01 GENERAL

A. Conductors shall be copper.

B. Conductor for Feeders and Branch Circuits 10 AWG and Smaller shall be solid or stranded conductor. Wiring devices connected to stranded conductors shall provide containment for all strands in the termination.

C. Conductors for Control Circuits: Stranded conductors.

D. Power and lighting circuits shall not be smaller than 12 AWG.

E. Exterior underground wiring shall be XHHW-2. Outdoor above grade wiring shall be XHHW-2 or TWHN.

F. Provide minimum 12 AWG conductors for 20 A, 120 V branch circuits not exceeding 50 feet in conductor length.

G. Provide minimum 10 AWG conductors for 20 A, 120 V branch circuits longer than 50 feet but not exceeding 100 feet in conductor length.

H. Provide minimum sizes indicated on drawings for all 277/480V feeders and branch circuits.

I. Wire coloring shall be integral to the jacket or insulation for wires 6 AWG and smaller. For wires 4 AWG and larger, furnish colored tape or colored shrink-to-fit sleeves.

J. Wire Colors, 120/240 V Single-Phase Systems:

1. L1 shall be black.
2. L2 shall be red.
3. Neutral shall be white.

K. Wire Colors, 120/208 V Three-Phase Systems:

1. A-Phase shall be black.
2. B-Phase shall be red.
3. C-Phase shall be blue.
4. Neutral shall be white.

L. Wire Colors, 277/480 V Three-Phase Systems:

1. A-Phase shall be brown.
2. B-Phase shall be orange.
3. C-Phase shall be yellow.
4. Neutral shall be grey.

M. Neutral Conductors: When two or more neutrals are located in one conduit, individually identify each with proper circuit number using shrink-to-fit wire sleeve.

N. Branch Circuit Conductors: Install three-wire and four-wire home runs with each phase uniquely color coded.

O. Feeder Circuit Conductors: Uniquely color code each phase.

P. Equipment Ground Conductors:

1. For 6 AWG and smaller: Green.

2. For 4 AWG and larger: Identify with green tape or shrink-to-fit sleeves at both ends and at visible points including junction boxes.

2.02 WIRE CONNECTORS, COMPRESSION TYPE

A. Product Description: UL 486A-486B wire connectors, mechanical set-screw, split-bolt, and high-pressure type.

B. Manufacturers:

1. 3M.

2. Thomas & Betts (T&B).

C. Construction: Plated copper connector without insulation. With or without set-screws.

D. Operating Temperature: Rated not less than the higher of the wire or equipment terminal temperature.

E. Color: Manufacturer’s standard colors, coded by wire size and quantity application.

F. Use Restrictions:

1. Use same manufacturer for each type and size installed.

2. Use on conductors at equipment terminal pads. Used for in-line splices when included in a UL listed splice kit.

3. Crimp type connectors shall be installed using manufacturer-approved ratcheting, hydraulic, or air-powered crimping tool and die.

2.03 SPLICING WIRE CONNECTORS, SOLDERLESS CRIMP TYPE

A. Product Description: UL 489A-B and 486C splicing wire connectors; insulated, crimp-type connectors, splices, and terminals.

B. Manufacturers:

1. 3M.

2. Stakon.

C. Construction: Vinyl or nylon insulation covering tin or silver-plated annealed copper connector.

D. Operating Temperature: Rated for use up to 105 degrees C.

E. Voltage Rating: 600 V.

F. Color: Manufacturer’s standard colors, coded by wire size.

G. Use Restrictions:

1. Crimp type connectors shall be installed using manufacturer-approved ratcheting crimping tool and die.
2. Use same manufacturer for each type and size installed.
3. In-line splices shall only be used for extending existing circuits where specifically called out on drawings.
4. End-cap solderless crimp type shall be used only for permanent, non-maintenance applications.
5. Insulation-displacing splices and connectors shall not be used.
6. Terminal connectors for current transformer secondary circuits, relays, meters, test blocks, and shorting blocks shall be ring type. Spade terminals shall be rejected.

2.04 EXTRA HARD USAGE CORD

A. Product Description: UL and RoHS Compliant.

B. Construction: Type SEOOW, rubber, NEC rated Extra Hard Usage, #10AWG.

C. Operating Temperature: Rated for use up to 105 degrees C.

D. Voltage Rating: 600 V.

2.05 SPLICING WIRE CONNECTORS, SPRING TYPE

A. Product Description: UL 486C splicing wire connectors.

B. Manufacturers:

1. 3M Performance Plus.
2. Substitutions: Approved equal.

C. Construction: Spring steel, corrosion resistant coating with flame retardant, polypropylene and thermoplastic elastomeric insulator.

D. Operating Temperature: Rated for use up to 105 degrees C.

E. Voltage Rating: 600 V when used as building wire splices. 1000 V when used for signs and luminaires.

F. Flammability: UL 94 V-2.

G. Color: Manufacturer’s standard colors, coded by wire size and quantity application.

H. Use Restriction: Conductors 16 AWG to 8 AWG, in receptacle, switch, and rotating equipment termination boxes only.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify raceway installation is complete and supported.

3.02 PREPARATION

A. Completely and thoroughly swab and madrel raceway before installing wire.

B. Protect exposed cable from damage and moisture. Apply shrink-to-fit sealing caps on wire and cable reels when stored outdoors.

3.03 EXISTING WORK

A. Remove exposed abandoned wire and cable. Patch surfaces where removed cables pass through building finishes.

B. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.

C. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.

D. Extend existing circuits using materials and methods as specified.

3.04 INSTALLATION

A. Metal Clad (MC) Cable: Type MC cable shall not be permitted. Requests to substitute type MC cable will not be considered.

B. Service Entrance:

1. Provide service entrance conductors in conduit.

2. Provide service entrance conductors in continuous lengths, without splices, unless otherwise shown on the Drawings.

C. Feeder Circuits:

1. Provide feeder circuits in conduit unless otherwise shown on Drawings.

2. Provide feeder conductors in continuous lengths, without splices, unless otherwise shown on the Drawings.

D. Branch Circuits:

1. Provide branch circuits in conduit unless otherwise shown on Drawings.

E. Dedicated Neutral: Provide dedicated neutral conductors for 120V and 277V circuits.

F. Replace damaged conductors at no additional cost to the Owner.

G. Neatly train and lace wiring inside boxes, equipment, and panelboards.

H. Identify circuits under provisions of Section 26 05 00. Identify each conductor with its circuit number or other designation indicated.

I. Pull all conductors into raceway at same time.

J. Use wire-pulling equipment including fish-tape, rope, or cable appropriate for the size of wire, conduit, and circuit length. Use basket-weave wire/cable grips for multiple conductors over 2 AWG.

K. Use manufacturer-approved pulling compound or lubricant where necessary. Compound used shall not deteriorate conductors or insulation.

L. Pull wire in accordance with the wire manufacturer’s recommended pulling tensions and side wall pressure values.

M. Wiring Connections:

1. Clean conductor surfaces before installing lugs and connectors.

2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
3. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
4. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
5. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
    a. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger except where in-line splices are specified.
    b. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
    c. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
6. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
7. Install solid conductors for feeders and branch circuits 10 AWG and smaller. If, however, special conditions require stranded conductors in lieu of solid, then install crimp on locking (barbed) fork terminals for device terminations. Do not place bare stranded conductors directly under screws.

3.05 FIELD QUALITY CONTROL

A. Performance of Acceptance Checks and Tests: Perform in accordance with the manufacturer's recommendations and perform the visual and mechanical inspections and electrical tests in accordance with ANSI/NETA ATS.

B. Perform insulation resistance (Megger) test on conductors 2 AWG and larger. Measure resistance phase to phase and phase to ground for one minute. Test voltage shall be 1000 VDC. Record results. Minimum acceptable insulation resistance shall be 100 megohms in accordance with ANSI/NETA ATS, Table 100.1.

C. Remove and replace defective conductors, splices, and terminations until test results meet the specified requirements.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes electrodes, conductors, connections, and testing for bonding and grounding of electrical equipment and systems.

1.02 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. ASTM F2281 – 2004 (ASTM International) – Standard Specification for Stainless Steel and Nickel Alloy Bolts, Hex Cap Screws, and Studs, for Heat Resistance and High Temperature Applications.

D. IEEE Std. 81-1983 (Institute of Electrical and Electronics Engineers) – IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements.

E. IEEE Std. 81.2-1991 (Institute of Electrical and Electronics Engineers) – IEEE Guide for Measurement of Impedance and Safety Characteristics of Large, Extended or Interconnected Grounding Systems.

F. IEEE Std. 142-2007 (Institute of Electrical and Electronics Engineers) – IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems.

G. IEEE Std. 837-2002 (Institute of Electrical and Electronics Engineers) – IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

H. NECA (National Electrical Contractors Association) – Standard of Installation.

I. UL 467 (Underwriters Laboratories) – Grounding and Bonding Equipment.

1.03 SYSTEM DESCRIPTION

A. Grounding System Elements: Use the following elements as grounding electrodes in accordance with NFPA 70 National Electrical Code.

1. Rod electrodes.

1.04 PERFORMANCE REQUIREMENTS

A. The resistance between the main grounding electrode and ground shall be no greater than five ohms for commercial and industrial systems and 1.0 ohm or less for generating or transmission station grounds unless otherwise specified. (Reference ANSI/IEEE Standard 142-2007).

1.05 SUBMITTALS

A. Product Data:

1. Grounding electrodes.

2. Grounding electrode connectors.

3. Bonding connectors.

B. Manufacturer's Installation Instructions: Submit for active electrodes.

1.06 CLOSEOUT SUBMITTALS

A. Field Quality Control Test Reports: Submit test reports in accordance with Section 26 00 10.

1. Site plan showing each installed electrode and each test electrode. Uniquely identify electrodes and include on test data sheet.

2. Test data sheet showing electrode identifications, distances, test lead resistance, measured resistance as displayed on the test instrument, and calculated resistance. Include test equipment manufacturer, model number, serial number, and date last calibrated. Include test technician name, company, and company contact information. Include the IEEE 81 test method used to perform the test and evaluate the test results.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

1.07 FIELD MEASUREMENTS

A. Verify field measurements prior to installing grounding system.

PART 2 - PRODUCTS

2.01 ROD ELECTRODES

A. Product Description: UL 467; Copper-clad steel rod electrodes.

B. Diameter: 3/4 inch.

C. Length: 10 feet.

2.02 COMPRESSION CONNECTORS

A. Manufacturers:

1. DMC Power SWAGE.

2. Burndy HYGROUND.

3. Thomas and Betts.

B. Product Description: IEEE 837 Compression connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.03 MECHANICAL CONNECTORS

A. Manufacturers:

1. DMC Power.

2. Burndy.

3. Thomas and Betts.

B. Product Description: Bronze mechanical connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

2.04 WIRE

A. Material: Stranded copper unless otherwise indicated. Outdoor above ground shall be THWN insulation. Underground shall be XHHW-2.

2.05 GROUND ELECTRODE CONDUCTORS INSTALLED OUTDOORS BELOW GRADE

A. Product Description: Bare, stranded copper conductors listed for use as ground electrode conductors.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify final backfill and compaction has been completed before driving rod electrodes.

B. Verify wiring and equipment that are about to be demolished are no longer required for the facility.

3.02 EXISTING WORK

A. Disconnect power sources and test for ground current prior to disconnecting and removing bonding, equipment grounding, and ground electrode conductors.

3.03 INSTALLATION – GENERAL

A. Provide bonding in accordance with the National Electrical Code as adopted by the Authority Having Jurisdiction.

B. Install grounding connections in accordance with their UL listing.

C. Where the grounding materials and methods specified and shown exceed that of the National Electrical Code and the Authority Having Jurisdiction, the materials and methods specified and shown shall be used.

D. Mechanical connections shall be accessible.

E. Stranded grounding or bonding conductors larger than 8 AWG shall be connected using exothermal or die-crimped compression terminals.

F. Tighten accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer’s published data or ANSI/NETA ATS. Bolt torque levels shall be in accordance with manufacturer’s published data. In the absence of manufacturer’s published data, use ANSI/NETA ATS.

3.04 INSTALLATION – ROD ELECTRODES

A. Install rod electrodes at locations shown. Where a resistance to ground is specified, but not achieved with rods as shown, Install additional rod electrodes to achieve specified resistance to ground.

3.05 INSTALLATION - EQUIPMENT GROUNDING CONDUCTORS

A. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

B. Identify each ground conductor by circuit number in panelboards and switchboards.

3.06 INSTALLATION – FENCE GROUNDING

A. Provide connection and bond to fence a minimum of 50’ on center. Refer to specification 32 31 13 for additional bonding requirements.

3.07 FIELD QUALITY CONTROL

A. Engage the services of an independent Electrical Testing Organization in accordance with Section 26 00 10 to perform the following inspections and tests.

B. Performance of Acceptance Checks and Tests. Perform in accordance with the manufacturer's recommendations and include the following visual and mechanical inspections and electrical tests, performed in accordance with ANSI/NETA ATS.

1. Visual and Mechanical Inspection:
    a. Verify ground system is in compliance with Drawings, Specifications, and NFPA 70 National Electrical Code Article 250.
    b. Inspect physical and mechanical condition. Grounding system electrical and mechanical connections shall be free of corrosion.
    c. Inspect anchorage.
2. Electrical Tests:
    a. Perform resistance measurements through bolted connections with a digital, low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values which deviate from those of similar bolted connections by more than 50 percent of the lowest value.
    b. Perform fall of potential or alternative test in accordance with IEEE 81 and IEEE 81.2 on the main grounding electrode or system.
    c. Perform point-to-point tests to determine the resistance between the main grounding system and all electrical equipment frames, ground busses, system neutral, and derived neutral points. Notify Engineer of point-to-point resistance values that exceed 0.5 ohm.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes the following items.

1. Conduit.
2. Pull and junction boxes.

1.02 REFERENCES

A. ANSI C80.1 (American National Standards Institute) – Rigid Steel Conduit, Zinc Coated.

B. ANSI/SCTE 77 (Society of Cable Telecommunications Engineers) – Underground Enclosure Integrity.

C. NEMA FB 1 (National Electrical Manufacturers Association) – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

D. NEMA WD 1 (National Electrical Protection Association) – General Purpose Wiring Devices.

E. NEMA WD 6 (National Electrical Protection Association) – Wiring Devices – Dimensional Requirements.

F. NEMA 250 (National Electrical Manufacturers Association) – Enclosures for Electrical Equipment (1000 Volts Maximum).

G. UL 6 (Underwriters Laboratories) – Electrical Rigid Metal Conduit – Steel.

H. UL 6A (Underwriters Laboratories) – Electrical Rigid Metal Conduit – Aluminum and Stainless Steel.

I. UL 360 (Underwriters Laboratories) – Liquid-Tight Flexible Steel Conduit.

J. UL 514A (Underwriters Laboratories) – Metallic Outlet Boxes.

K. UL 514B (Underwriters Laboratories) – Conduit, Tubing and Cable Fittings.

L. UL 886 (Underwriters Laboratories) – Outlet Boxes and Fittings for Use in Hazardous (Classified) Locations.

1.03 SYSTEM DESCRIPTION

A. System description consists of raceway and boxes located as indicated on Drawings, and other locations required for splices, taps, wire pulling, equipment connections, and at locations required to be in compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.

1.04 SUBMITTALS

A. Product Data:

1. Liquidtight flexible metal conduit.
2. Raceway fittings.
3. Conduit bodies.
4. Pull and junction boxes.

B. Manufacturer's Installation Instructions: For adhesives submit instructions for storage, handling, protection, examination, preparation, and installation of the product.

1.05 CLOSEOUT SUBMITTALS

A. Project Record Documents:

1. Record actual routing of all raceways.

2. Record actual locations, sizes, and configurations of equipment connections.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

B. Protect PVC conduit from sunlight.

1.07 COORDINATION

A. Obtain and review shop drawings, product data, manufacturer’s wiring diagrams, and manufacturer's instructions for equipment furnished under other Sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation of equipment.

D. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 - PRODUCTS

2.01 RIGID METAL CONDUIT (RMC)

A. Rigid Steel Conduit: ANSI C80.1 and UL 6.

B. Fittings and Conduit Bodies: NEMA FB 1; threaded, material to match conduit.

2.02 PVC COATED METAL CONDUIT

A. Product Description: NEMA RN 1; galvanized rigid steel conduit with 40 mils thick external PVC coating.

B. Fittings and Conduit Bodies: NEMA FB 1; threaded steel fittings with external PVC coating to match conduit.

C. Provide covers with gaskets and captive screws for conduit bodies.

2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Product Description: UL 360; interlocked steel construction with PVC jacket.

B. Fittings: NEMA FB 1 and UL 514B; cadmium-or zinc-plated.

2.04 METALLIC CONDUIT BODIES

A. Product Description: UL 514B.

2.05 PULL AND JUNCTION BOXES

A. Captive Cover Hardware: Provide captive hardware for boxes which to be installed with the box opening facing downward or where dropping the hardware have the potential to present a safety or equipment hazard.

B. Surface Mounted Cast Metal Box: NEMA 250, Type 4X; flat-flanged, surface mounted junction box.

1. Material: 316 Stainless steel.

2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
3. Provide continuous steel hinges on boxes on light poles
4. Provide continuous steel hinges on boxes larger than 4 inches tall by 4 inches wide.
5. Provide locking clasp and locking bolt.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify equipment is ready for electrical connection, for wiring, and to be energized.

B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.02 EXISTING WORK

A. Disconnect and remove abandoned system components.

B. Remove buried abandoned raceway to its source.

C. Remove exposed abandoned equipment wiring connections.

D. Disconnect abandoned utilization equipment and remove wiring connections. Remove abandoned components when connected raceway is abandoned and removed. Install blank cover for empty boxes and enclosures to remain for future use.

E. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel. Mark and protect all raceway not designated for modification or demolition. Replace any raceway not designated for modification or demolition that becomes damaged during the project.

F. Extend existing raceway and box installations using materials and methods as specified.

G. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.03 INSTALLATION

A. Equipment Connections:

1. Make conduit connections to transformers and equipment using liquid tight flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations. Install flexible conduit with enough length to provide at least a ninety degree bend in the flexible conduit.
2. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

B. Fasten raceway and box supports to structure and finishes.

C. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.04 INSTALLATION – RACEWAY

A. Minimum Size: Install raceway with the following minimum sizes unless otherwise shown on the Drawings.

1. Homeruns: 3/4 inch trade size diameter.

B. Raceway Selection and Location Criteria:

1. Outdoor Locations, Above Grade: Provide PVC coated rigid steel conduit. Provide cast metal outlet, pull, and junction boxes.
2. Exposed Locations with Vehicular Traffic or Equipment Movement: Provide rigid steel conduit.

C. Arrange raceway supports to prevent misalignment during raceway and wiring installation.

D. Provide seismic supports in accordance with Section 26 05 00.

E. Support raceway using coated steel.

F. Do not support raceway with wire or perforated pipe straps for permanent installations. Remove wire and perforated pipe straps prior to inspection when they are used for temporary supports.

G. Group related raceway; support using conduit rack attached to structure. Construct rack using steel channel; provide space on each for 25 percent additional raceways.

H. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

I. Cut conduit square using saw or pipecutter; de-burr cut ends.

J. Bring conduit to shoulder of fittings; fasten securely.

K. Install conduit hubs to fasten conduit to cast boxes.

L. Install no more than equivalent of three 90 degree bends between conduit bodies and boxes. Install conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or install factory elbows for bends in metal conduit 2 inch trade size and larger.

M. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

N. Provide pull string sized in accordance with Section 26 05 00 in each empty conduit except sleeves and nipples. Furnish informational submittals showing pull calculations used to size pull strings. Install caps to protect installed conduit against entrance of dirt and moisture.

O. Provide insulated throat box connectors where raceway terminates at sheet steel in boxes, panels, and equipment. Connector material shall match raceway.

3.05 INSTALLATION – BOXES

A. Install boxes used for equipment and luminaire attachment directly to structure or to supports provided under Section 26 05 00. Do not use supports for non-electrical equipment or systems for electrical system attachment.

B. Adjust box location up to 10 feet prior to rough-in to accommodate intended purpose.

C. Orient boxes to accommodate wiring device orientation.

D. Do not fasten boxes to ceiling support wires or other piping systems.

E. Support boxes independently of conduit.

F. Install gang box where more than one device is mounted together. Do not use sectional box.

3.06 ADJUSTING

A. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide

personnel to operate electrical system and checkout wiring connection components and configurations.

3.07 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes the following items.

1. Conduit.
2. Duct.
3. Warning Tape.
4. Manholes.
5. Handholes.
6. Accessories.

1.02 REFERENCES

A. ANSI C80.1 (American Society for Testing and Materials) – Rigid Steel Conduit, Zinc-Coated.

B. ASTM A48 (American Society for Testing and Materials) – Gray Iron Castings.

C. ASTM C857 (American Society for Testing and Materials) – Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

D. ASTM C858 (American Society for Testing and Materials) – Underground Precast Concrete Utility Structures.

E. ASTM C891 (American Society for Testing and Materials) – Installation of Underground Precast Utility Structures.

F. ASTM C1037 (American Society for Testing and Materials) – Inspection of Underground Precast Utility Structures.

G. ASTM F512 (American Society for Testing and Materials) – Smooth-Wall Poly(Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.

H. IEEE C2 (Institute of Electrical and Electronic Engineers) – National Electrical Safety Code.

I. NEMA FB 1 (National Electrical Manufactures Association) – Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing (EMT) and Cable.

J. NEMA TC 2 (National Electrical Manufactures Association) – Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.

K. NEMA TC 3 (National Electrical Manufactures Association) – Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.

L. NEMA TC 14 (National Electrical Manufactures Association) – Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.

M. UL 514B (Underwriters Laboratories, Inc.) – Conduit, Tubing and Cable Fittings.

N. UL 651 (Underwriters Laboratories, Inc.) – Schedule 40 and 80 Rigid PVC Conduit and Fittings.

O. UL 651A (Underwriters Laboratories, Inc.) – Type EB and A PVC Conduit and HDPE Conduit.

1.03 SUBMITTALS

A. Product Data:

1. Warning tape data including width, legend, traceability features, colors, and strength.

2. Conduit and duct data including listing, sizes, wall thickness, and material for each type used.
3. Innerduct data including material, size, color, and listing for each material type.

B. Shop Drawings:

1. Manhole shop drawings including plan, elevation, sections. Show the following details on the shop drawings.
    a. Loading calculations.
    b. Concrete mix strengths and calculations.
    c. Weights.
    d. Duct entry provision locations and sizes.
    e. Reinforcement details.
    f. Frame and cover design.
    g. Manhole frame support rings.
    h. Ladder or step details.
    i. Grounding details.
    j. Dimensioned locations of cable rack inserts, pulling-in irons, lifting irons, and sumps.
    k. Joint details.
2. Attachments to other work.
3. Accessories.

C. Manufacturer's Installation Instructions: Furnish lifting, moving, site preparation, excavation, and bedding instructions and requirements.

D. Manufacturer’s Qualifications: Furnish manufacturer’s qualifications including the years of experience, name and contact information, certifications, and quality assurance program description.

E. Manufacturer’s Quality Control Reports: For precast structures, submit production quality control reports.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of manholes and hand-holes.

1.05 QUALIFICATIONS

A. Manufacturer: Manhole manufacturer shall have specializing in manufacturing manholes specified in this Section with minimum 20 years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept manholes and hand-holes on site. Inspect for damage.

B. Move and store in accordance with manufacturer's instructions.

C. Store nonmetallic ducts with supports to prevent bending, warping, and deforming.

D. Arrange so identification markings are visible.

PART 2 - PRODUCTS

2.01 RIGID STEEL CONDUIT

A. Rigid Steel Conduit: ANSI C80.1.

B. Fittings: NEMA FB 1, steel.

2.02 ELECTRICAL POLYVINYL CHLORIDE (PVC) TUBING AND CONDUIT

A. Rigid Plastic Conduit: NEMA TC 2 and UL 651, Schedule 80 PVC, with fittings and conduit bodies to NEMA TC 3 and UL 514B.

B. Marking: UL 651 mark, manufacturer's name, and descriptive marking shall appear not less than every 10 feet.

2.03 DUCT ACCESSORIES

A. Duct Separators: Rigid PVC interlocking spacers, sized for type and sizes of ducts, providing duct spacing indicated, while supporting ducts during concrete pouring or backfilling.

B. Underground Warning Tape: Three-inch wide detectable type extra strength (not less than 300 pounds in tension) plastic tape, colored red for power, yellow for telephone and data, with suitable warning legend describing buried electrical or communications lines.

C. Innerduct:

1. Construction: HDPE, Smooth wall, 1 1/4 inch diameter.

2. Color: orange.

2.04 PRECAST CONCRETE MANHOLES

A. Manufacturers:

1. Christy Concrete Products.

2. Oldcastle.

3. Utility Vault Co.

4. Utility Concrete Products.

B. Product Description: Precast manhole designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.

C. Loading: ASTM C857 Class as follows.

1. Class A-16 for roadways and for delivery service areas and other areas subject to combination truck and trailers.

2. Class A-12 for delivery service areas subject only to non-combination delivery vehicles such as box vans.

D. Shape: Rectangular.

E. Base Section: Include 3 inch deep by 14 inch round sump with cast sleeve, and two 1 inch ground rod openings.

F. Top Section: Include 39 inch diameter grooved opening for frame and cover.

G. Riser Casting: 6 inch, with manhole step cast into frame.

H. Frames and Covers: ASTM A48; Class 30B gray cast iron, 30 inch size, machine finished with flat bearing surfaces. Furnish cover marked ELECTRIC or COMMUNICATIONS to indicate utility.

I. Duct Entry Provisions: Single duct knockouts or Window knockouts.

J. Duct Entry Locations: As indicated on Drawings.

K. Duct Entry Size: Sized to accommodate the ducts shown.

L. Cable Pulling Irons: Use ASTM 167 type 316 stainless steel rod and hardware. Locate opposite each duct entry. Furnish watertight seal.

M. Metal Cable Racking System:

1. Cable Rack Inserts: ASTM A167 Type 316 stainless steel channel cast into vault walls. Minimum load rating of 800 pounds. Locate 4 feet on center around the inside perimeter of the vault and provide rack inserts within 2 feet of each vault corner.

2. Cable Rack Mounting Channel: ASTM A167 Type 316 stainless steel channel anchored onto vault walls using ASTM A167 Type 316 stainless steel anchors. Minimum load rating of 800 pounds. Locate 4 feet on center around the inside perimeter of the vault and provide rack inserts within 2 feet of each vault corner.

3. Cable Rack Arms: ASTM A167 type 316 stainless steel1-1/2 by 3/4 by 14 inches, with fastener to match mounting channel.

4. Cable Supports: Porcelain clamps and saddles.

2.05 HANDHOLES

A. Manufacturers:

1. Christy Concrete Products.

2. Oldcastle.

3. Utility Concrete Products.

4. Utility Vault Co.

5. Substitutions: Not Permitted.

B. Description: Molded concrete handhole comprising modular, interlocking sections complete with accessories.

C. Loading: ASTM C857 Class as follows.

1. Class A-16 for roadways and for delivery service areas and other areas subject to combination truck and trailers.

2. Class A-12 for delivery service areas subject only to non-combination delivery vehicles such as box vans.

D. Shape: Rectangular.

E. Cover: Metallic with tamperproof fasteners.

F. Frame and Lid or Door:

1. Weatherproof steel frame, mounted in cover, with steel lid with recessed hook eyes and tamper-resistant, captive, lid-securing stainless-steel bolts.

2. Furnish lid or door marked ELECTRIC or TELEPHONE to indicate utility.

G. Duct Entry Provisions: Singe duct knockouts.

H. Duct Entry Size: 4 inches.

I. Utility: Sheet C14 (N1171367.53, E703836.54) Tacoma Power Secondary Service Box/Handhole & Conduit Riser on new power pole (N1171372.53, E703824.57) per Standard C-SV-3200, See Web Site: http://www.mytpu.org/tacomapower/electrical-permitting/electrical-construction-standards.htm

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify routing and termination locations of duct bank prior to excavation for rough-in.

B. Verify locations of manholes prior to excavating for installation.

3.02 EXISTING WORK

A. Remove abandoned duct bank.

B. Maintain access to existing duct bank and other installations remaining active and requiring access.

C. Extend existing duct bank installations using specified materials and methods.

D. Clean existing duct bank.

3.03 INSTALLATION

A. Install Work in accordance with State and Port standards.

3.04 INSTALLATION – DUCT BANK

A. Conduit Selection Criteria: Unless otherwise shown on drawings, use the following selection criteria.

1. Low Voltage (Below 600VAC) Power: Provide schedule 80 PVC encased in reinforced concrete for conduit located between 1 inch and 59 inches under tracks. Provide schedule 80 PVC encased in reinforced concrete for conduit located between 1 inch and 35 inches under pavement. Provide schedule 80 PVC direct buried with sand encasement for conduit 60 inches below finish grade under tracks. Provide schedule 80 PVC direct buried with sand encasement for conduit 36 inches below finish grade under pavement. Provide rigid galvanized steel conduit for sweeps.

2. Communications: Provide schedule 80 PVC encased in reinforced concrete for conduit located between 1 inch and 59 inches under tracks. Provide schedule 80 PVC encased in reinforced concrete for conduit located between 1 inch and 36 inches under pavement. Provide schedule 80 PVC direct buried with sand encasement for conduit 60 inches below finish grade under tracks. Provide schedule 80 PVC direct buried with sand encasement

for conduit 36 inches below finish grade under pavement. Provide rigid galvanized steel conduit for sweeps.

B. Excavate for duct bank installation in accordance with Section 31 23 33.

C. Install conduit with listing and manufacturer's information clearly visible from above.

D. Install duct to locate top of ductbank at depths as indicated on Drawings.

E. Install power and communications conduit and duct to locate top of duct bank minimum 36 inches below finished grade and 60 inches below finish grade under tracks.

F. Install conduit and duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope conduit and duct toward manholes and away from building entrances.

G. Cut conduit and duct square using saw or pipe cutter; de-burr cut ends.

H. Insert conduit and duct to shoulder of fittings; fasten securely.

I. Join nonmetallic conduit and duct using adhesive as recommended by manufacturer.

J. Wipe nonmetallic conduit and duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

K. Install no more than equivalent of three 90-degree bends between pull points.

L. Install fittings to accommodate expansion and deflection.

M. Terminate conduit and duct at manhole entries using end bell.

N. Stagger conduit and duct joints vertically in concrete encasement 6 inches minimum.

O. Use suitable separators and chairs installed not greater than 4 feet on centers. Secure separators and chairs to trench bottom prior to concrete pour.

P. Band conduits and ducts together before backfilling or placing concrete.

Q. Securely anchor conduit and duct to prevent movement during concrete placement.

R. Direct concrete down sides of bank assembly to trench bottom.

S. Do not allow a heavy mass of concrete to fall directly onto ducts.

T. Use mineral pigment to color concrete red for power ductbanks.

U. Install ductbank with minimum 3 inch concrete cover at bottom, top, and sides.

V. Install No. 4 steel reinforcing bars cage for bank under paved areas where conduits are less than 36 inch below finish grade.

W. Provide pull string sized in accordance with Section 26 05 00 in each empty conduit and innerduct except sleeves and nipples. Swab duct. Use caps to protect installed duct against entrance of dirt and moisture.

X. Backfill trenches in accordance with Section 31 23 33.

Y. Interface installation of underground warning tape with backfilling specified in Section 31 23 33. Install tape 12 inches below finished surface.

Z. Provide HPDE innerduct in ducts shown on the drawings.

3.05 INSTALLATION-PRE-CAST MANHOLE AND HANDHOLE

A. Excavate for manhole and handhole installation in accordance with Section 31 23 33.

B. Install and seal precast sections in accordance with ASTM C891.

C. Install manholes and handholes plumb, square and level.

D. Use precast neck and shaft sections to bring manhole cover to finished elevation.

E. Attach cable racks to inserts after manhole installation is complete.

3.06 FIELD QUALITY CONTROL

A. Make arrangements for inspections with the Jurisdiction having authority and by the Engineer.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes the following.

1. Fuses.

1.02 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. NEMA FU 1 (National Electrical Manufacturers Association) – Low Voltage Cartridge Fuses.

1.03 FUSE PERFORMANCE REQUIREMENTS

A. Main Service Switches: Class RK1 (dual-element, time-delay).

B. Power Load Feeder Switches: Class RK1 (dual-element, time-delay).

C. Lighting Load Feeder Switches: Class RK1 (non-time-delay).

D. Other Feeder Switches: Class RK1 (time-delay).

E. General Purpose Branch Circuits: Class RK1 (non-time-delay).

F. Lighting Branch Circuits: Class G.

1.04 SUBMITTALS

A. Product Data:

1. Fuse classification.
2. Voltage rating.
3. Current rating.
4. Interrupting rating.
5. Current limiting and let-through characteristics for fuse classes and sizes used.
6. Time-current curves for fuse classes and sizes used.
7. Dimensions.

1.05 CLOSEOUT SUBMITTALS

A. As-Built Drawings: Record actual sizes, ratings, and locations of fuses.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years documented experience.

1.07 MAINTENANCE MATERIALS

A. Furnish two fuse pullers.

1.08 EXTRA MATERIALS

A. Furnish ten percent of the quantity of each type, size and rating of fuse installed, but not less than three spare fuses.

PART 2 - PRODUCTS

2.01 FUSES

A. Manufacturers:

1. Bussmann.
2. Mersen (formerly Ferraz Shawmut).
3. Littlefuse.
4. Substitutions: Approved equal.

B. Dimensions and Performance: NEMA FU 1, Class as specified or as indicated on Drawings.

C. Voltage: Rating suitable for circuit phase-to-phase voltage.

D. Class Rk1 (Time Delay) Fuses:

1. Voltage: Rating suitable for circuit phase-to-phase voltage.

E. Class Rk1 (Non-Time-Delay) Fuses:

1. Voltage: Rating suitable for circuit phase-to-phase voltage.

F. Class G Fuses:

1. Voltage: Rating suitable for circuit phase-to-phase voltage.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Remove fuses from abandoned circuits.

B. Maintain access to existing fuses and other installations remaining active and requiring access. Modify installation.

3.02 INSTALLATION

A. Install fuse with label oriented so manufacturer, type, and size are easily read.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes: Fused and non-fused safety switches.

1.02 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. NECA (National Electrical Contractors Association) – Standard of Installation.

D. NEMA FU1 (National Electrical Contractors Association) – Low Voltage Cartridge Fuses.

E. NEMA KS 1 (National Electrical Contractors Association) – Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).

F. NEMA 250 (National Electrical Contractors Association) – Enclosures for Electrical Equipment (1000 Volts Maximum).

G. UL 98 (Underwriters Laboratory) – Enclosed and Dead-Front Switches.

1.03 SUBMITTALS

A. Product Data:

1. Short circuit rating.
2. Voltage.
3. Continuous current.
4. Horsepower rating.
5. Cable terminal sizes.

B. Shop Drawings:

1. Dimensioned outline drawing.
2. Conduit entry/exit locations.

1.04 CLOSEOUT SUBMITTALS

A. Field Quality Control Test Reports: Submit test reports in accordance with Section 26 00 10.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

B. Operation and Maintenance Data:

1. Product Data and Shop Drawings per above.
2. Spare parts listing.
3. Source and current prices of replacement parts and supplies.
4. Recommended maintenance procedures and intervals.

5. Per Section 017823.

C. As-Builts: Record actual locations of safety switches and ratings of installed fuses.

PART 2 - PRODUCTS

2.01 SWITCHES

A. Manufacturers:

1. Square D.
2. General Electric.
3. Siemens.
4. Eaton.
5. Substitutions: Not Permitted.

B. Product Description: NEMA KS 1, Type HD, enclosed load interrupter knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Provide defeat for interlock. Handle lockable in OFF position.

C. Enclosure:

1. Interior Dry Locations: NEMA 250 Type 1, fabricated from steel finished with manufacturer's standard gray enamel.
2. Interior Wet or Damp Locations: NEMA 250, Type 4X fabricated from stainless steel.
3. Exterior Locations: NEMA 250, Type 4X fabricated from stainless steel.

D. Furnish switches with entirely copper current carrying parts.

E. Fuses: Provide fuse holders and fuses where switches are shown as fused.

F. Switch Rating: Horsepower rated for AC or DC as shown on Drawings.

G. Short Circuit Current Rating: UL listed for 200,000 rms symmetrical amperes when used with or protected by Class R fuses (30-600 ampere switches employing appropriate fuse rejection schemes). 200,000 rms symmetrical amperes when used with or protected by Class L fuses (800-1200 ampere).

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Disconnect and remove abandoned safety switches.

B. Maintain access to existing safety switches and other installations remaining active and requiring access. Modify installation or provide access panel.

C. Clean and repair existing safety switches to remain or to be reinstalled.

3.02 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install safety switches plumb, square and level. Provide supports in accordance with Section 26 05 00.

C. Height: 78 inches, maximum, to operating handle.

D. Install fuses for fusible disconnect switches. Refer to Section 26 28 13 for product requirements.

E. Install engraved plastic nameplates in accordance with Section 26 05 00.

F. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

3.03 FIELD QUALITY CONTROL

A. Engage the services of an independent Electrical Testing Organization in accordance with Section 26 00 10 to perform the following inspections and tests.

B. Perform the following inspections and tests in accordance with Section 26 00 10.

1. Visually inspect switch for physical damage.

2. Inspect paint condition on painted switches. Apply touch-up paint matching switch manufacturer's specification.

3. Perform insulation resistance tests phase to phase and phase to ground with switch in the closed position and power conductors disconnected. Perform insulation resistance tests on each pole from line terminals to load terminals with the switch in the open position and power conductors disconnected. Test voltage shall be 1000 VDC. Test durations shall be 1 minute.

4. Perform continuity tests across each pole with the switch in the closed position. Perform test using digital low-resistance ohmmeter capable of reading resistances as low as 1 micro-ohm.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes molded-case circuit breakers in individual enclosures.

1.02 REFERENCES

A. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

B. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

C. NECA (National Electrical Contractors Association) – Standard of Installation.

D. NEMA 250 (National Electrical Manufacturers Association) – Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NEMA AB 1 (National Electrical Manufacturers Association) – Molded Case Circuit Breakers.

1.03 SUBMITTALS

A. Product Data:

1. Dimensions.
2. Features.
3. Performance.
4. Electrical characteristics.
5. Ratings.

1.04 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations and continuous current ratings of enclosed circuit breakers.

B. Operation and Maintenance Data:

1. Product Data per above.
2. Parts Identification.

C. Field Quality Control Test Reports: Submit test reports in accordance with Section 26 00 10.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 - PRODUCTS

2.01 MOLDED CASE CIRCUIT BREAKER

A. Manufacturers:

1. Cutler-Hammer.
2. GE.
3. Siemens.
4. Square D.

5. Substitutions: Not Permitted.

B. Product Description: Enclosed, bolt-on molded-case circuit breaker conforming to NEMA AB 1 suitable for use as service entrance equipment.

C. Enclosure: NEMA AB 1, to meet conditions. Fabricate enclosure from stainless steel finished. Provide with lockable external operating handle.

1. Exterior Locations: NEMA Type 4X.

D. Service Entrance: Switches identified for use as service equipment are to be labeled for this application. Furnish solid neutral assembly and equipment ground bar.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Disconnect and remove abandoned enclosed circuit breakers.

B. Maintain access to existing enclosed circuit breakers and other installations remaining active and requiring access. Modify installation or provide access panel.

C. Clean and repair existing enclosed circuit breakers to remain or to be reinstalled.

3.02 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."

B. Install enclosed circuit breakers plumb. Provide supports in accordance with Section 26 05 00.

C. Height: Not more than 60 inches to operating handle.

D. Locate and install engraved plastic nameplates in accordance with Section 26 05 00.

3.03 FIELD QUALITY CONTROL

A. Engage the services of an independent Electrical Testing Organization in accordance with Section 26 00 10 to perform the following inspections and tests.

B. Performance of Acceptance Checks and Tests. Perform in accordance with the manufacturer's recommendations and include the following visual and mechanical inspections and electrical tests, performed in accordance with ANSI/NETA ATS.

C. Molded Case Circuit Breakers:

1. Compare nameplate data with Contract Documents.

2. Inspect physical and mechanical condition.

3. Reports: Submit test report.

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. The Work of this Section includes the following.

1. Luminaires and accessories.
2. Ballasts.
3. Lamps.
4. Poles and accessories.

1.02 REFERENCES

A. AASHTO LTS-5 (American Association of State and Highway Transportation Officials) – Structural Supports for Highway Signs, Luminaires and Traffic Signals.

B. ANSI C135.13 (American National Standards Institute) – Roadway and Area Lighting Equipment – Metal Brackets for Wood Poles.

C. ANSI/IESNA LM-50 (Illuminating Engineering Society of North America) – Photometric Measurements of Roadway Lighting Installations.

D. ANSI/IESNA RP-8 (Illuminating Engineering Society of North America) – Roadway Lighting.

E. ANSI/NEMA C78.42 (National Electrical Manufacturers Association) – Electric Lamps-High-Pressure Sodium (HPS) Lamps.

F. ANSI/NEMA C82.4 (National Electrical Manufacturers Association) – Ballasts for High-Intensity Discharge and Low-Pressure Sodium (LPS) Lamps (Multiple-Supply Type).

G. ANSI/NETA ATS (InterNational Electrical Testing Association) – Standard for Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

H. ANSI/NETA ETT (InterNational Electrical Testing Association) – Standard for Certification of Electrical Testing Technicians.

I. RUS Bulletin 1724E-150 (USDA Rural Utility Services) – Unguyed Distribution Poles – Strength Requirements.

J. RUS Bulletin 1728F-700 (USDA Rural Utility Services) – Wood Poles, Stubs and Anchor Logs.

K. UL 1029 (Underwriters Laboratories, Inc.) – High Intensity Discharge Lamp Ballasts.

L. UL 1598 (Underwriters Laboratories, Inc.) – Luminaires.

1.03 SUBMITTALS

A. Product Data:

1. Physical Descriptions:

a. Features.
b. Accessories.
c. Materials.
d. Finishes.
e. Dimensions.
f. Projected area.

g. Ratings.

2. Performance data.
3. Ballasts, including energy-efficiency data.
4. Lamps, including the following.
    a. Expected life.
    b. Wattage.
    c. Lumen output.
    d. Color temperature.
    e. Color rendering index.

B. Shop Drawings:

1. Detail equipment assemblies, indicating the following.
    a. Dimensions.
    b. Weights.
    c. Loads.
    d. Required clearances.
    e. Method of field assembly.
    f. Components.
2. Installation and attachment details.
3. Pole base mounting details.
4. Schematic drawings.
5. Wiring diagrams.
6. Photometric data.
7. For pole LP17 photometric aiming diagrams and foot candle calculations..

1.04 CLOSEOUT SUBMITTALS

A. As-Built Drawings: Provide site drawings showing actual locations and types of luminaires.

B. Field Quality Control Test Reports: Submit test reports in accordance with Section 26 00 10.

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

C. Operation and Maintenance Data:

1. Product Data and Shop Drawings per above.
2. Spare Parts Data Listing:
    a. Source.

b. Current prices of replacement parts and supplies.

3. Recommended maintenance procedures and intervals.

4. Manufacturer's written instructions for testing and adjusting.

5. Per Section 017823.

1.05 QUALITY ASSURANCE

A. Luminaire Photometric Data Testing Laboratory Qualifications: Provided by manufacturers' laboratories that are accredited under the National Volunteer Laboratory Accreditation Program for Energy Efficient Lighting Products.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Store poles on decay-resistant-treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

B. Handle wood poles so they will not be damaged. Do not use pointed tools that can indent pole surface more than 1/4 inch deep. Do not apply tools to section of pole to be installed below ground line.

C. Handle poles with web fabric straps.

1.08 MAINTENANCE MATERIALS

A. Furnish one of each type of lens type.

B. Furnish, minimum five case, for each lamp type installed.

C. Furnish two of each ballast type.

PART 2 - PRODUCTS

2.01 LUMINAIRES

A. Product Description: UL 1598, complete luminaire assemblies, with features, options, and accessories as scheduled.

B. Lateral Light Distribution Patterns: IESNA RP-8 for parameters of lateral light distribution patterns indicated.

C. Metal Parts: Free of burrs, sharp corners and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning and replacing lenses.

G. Light Shields: Metal baffles, factory installed and field adjustable, arranged to block light distribution to indicated portion of normally illuminated area or field.

H. Exposed Hardware Material: Stainless steel.

I. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

J. Reflecting surfaces shall have minimum reflectance as follows unless otherwise indicated.

1. White Surfaces: 85 percent.
2. Specular Surfaces: 83 percent.
3. Diffusing Specular Surfaces: 75 percent.

K. Lenses and Refractors Gaskets: Provide heat- and aging-resistant resilient gaskets to seal and cushion lenses and refractors in luminaire doors.

L. Provide disconnecting means with each luminaire.

2.02 HIGH PRESSURE SODIUM BALLASTS

A. Manufacturers:

1. Advance.
2. G.E.
3. Triad.

B. Product Description: ANSI/NEMA C82.4 and UL 1029, electromagnetic high pressure sodium lamp ballast, suitable for lamp specified, with voltage to match luminaire voltage.

1. Provide instant restart igniter.
2. Power Factor: Greater than or equal to 0.90.
3. Provide igniter disabling for burned-out lamps.
4. Provide in-line fuse rated for the load.
5. Provide in-line disconnecting means.

2.03 HPS LAMPS

A. Manufacturers:

1. G.E.
2. Osram/Sylvania.

B. Product Description: ANSI/NEMA C78.42 High Pressure Sodium Lamps.

1. CRI: Greater than or equal to 21.
2. Color: 1900 degrees K.
3. Rated Life: 24,000 hours, minimum.

C. Low-Pressure Sodium Lamps: ANSI/NEMAC78.41

2.04 WOOD POLES

A. Poles: RUS Bulletin 1728-700, Douglas fir and bored, roofed, and gained before treatment.

B. Mounting Provisions: Unless otherwise noted on the drawings embedded to a distance of 10 percent of the total pole length plus 2 feet, rounded upward to the next 6 inches. For instance, a 45 foot pole would be embedded 4 feet, 6 inches plus 2 feet for a total of 6 feet, 6 inches. A 46 foot pole would be imbedded a total of 7 feet, because of the rounding up requirement.

C. Pole Class: 2.

D. Luminaire Brackets: Comply with ANSI C136.13.

2.05 SUPPORT COMPONENTS

A. Luminaire Attachment Provisions: Comply with luminaire manufacturers' mounting requirements. Use stainless-steel fasteners and mounting bolts.

B. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.

1. Materials: Shall not cause galvanic action at contact points.

2. Anchor Bolts, Leveling Nuts, Bolt Caps, and Washers: Hot-dip galvanized after fabrication unless otherwise indicated.

3. Anchor-Bolt Template: Plywood or steel.

C. Steel Mast Arms: Single-arm type, continuously welded to pole attachment plate. Material and finish same as pole.

D. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

2.06 SOURCE QUALITY CONTROL

A. Analyze each unique combination of poles, luminaires, luminaire mounting, and other appurtenances in accordance with AASHTO LTS-5 for the geographic area in which the poles are to be installed. Each analysis shall include consideration of the following factors.

1. Pole:

a. Height.

b. Weight.

c. Projected area.

2. Mounting Bracket:

a. Height.

b. Weight.

c. Projected area.

3. Luminaire:

a. Height.

b. Weight.

c. Projected area.

4. Ice loading.

5. Wind velocity and effective pressure in pounds per square foot.

6. Pole base characteristics.
7. Soil conditions.

B. Calculate the resultant forces and moments on structural components.

C. Certify the adequacy of the structural strengths of the poles, brackets and bases to resist the wind forces in accordance with AASHTO LTS-5. Certification shall be by a Professional Engineer, registered in the jurisdiction where the poles are to be installed.

PART 3 - EXECUTION

3.01 EXISTING WORK

A. Disconnect and remove abandoned luminaires, poles, foundations, lamps, and accessories.

3.02 POLE INSTALLATION

A. Embedded Poles with Concrete Backfill: Set poles in augered holes to depth below finished grade indicated on Drawings, but not less than 10 percent of the total pole length plus 2 feet, rounded upward to the next 6 inches.

1. Make holes 6 inches in diameter larger than pole diameter.
2. Fill augered hole around pole with air-entrained concrete having a minimum compressive strength of 3000 psi at 28 days, and finish in a dome above finished grade.
3. Use a short piece of 1/2 inch (13-mm) diameter pipe to make a drain hole through concrete dome. Arrange to drain condensation from interior of pole.
4. Cure concrete a minimum of 72 hours before performing work on pole.

B. Raise and set poles using web fabric slings (not chain or cable).

3.03 LUMINAIRE INSTALLATION

A. Install lamps in each luminaire.

B. Install accessories furnished with each luminaire.

C. Install fuses in the in-line fuse holders for all luminaires.

D. Fasten luminaire structural supports.

E. Adjust luminaires that require field adjustment or aiming.

F. Bond and ground luminaries metal accessories in accordance with Section 26 05 26. Install supplementary grounding electrodes at each pole.

3.04 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.

B. Steel Conduits: In concrete foundations, wrap conduit with pipe-wrapping bitumastic tape applied with a 50 percent overlap.

3.05 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged luminaires and components.

B. Illumination Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source.

1. Verify operation of photoelectric controls.

C. Illumination Tests:

1. Measure light intensities at night. Use photometers with calibration referenced to NIST standards. For the types of installations listed, comply with the associated IESNA testing guide(s).

a. Roadway Lighting: IESNA LM-50.

D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

3.06 MANUFACTURER'S FIELD SERVICES

A. Program controls, adjust sensors, and set timers.

B. Measure lighting system energy consumption levels.

3.07 ADJUSTING

A. Aim and adjust luminaries to provide illumination levels and distribution.

B. For pole LP17 aim luminaire per the aim luminaire calculations.

3.08 CLEANING

A. Remove dirt and debris from enclosures.

B. Clean photometric control surfaces recommended by manufacturer.

C. Clean finishes and touch up damage.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The work includes excavation, subgrade preparation, backfilling, grading, and compaction.

B. Excess soil and aggregate generated as a result of the work may be re-used on-site if the material meets the requirements for Fill, Backfill or Recycled Aggregate Base Courses. If the material does not meet the aggregate gradation for Fill, Backfill or Recycled Aggregate Base Courses, the material may be exported off-site and disposed of, or may be blended with additional aggregates to meet the grading requirements for Fill, Backfill or Recycled Aggregate Base Courses. Use of on-site material as Fill, Backfill or Recycled Aggregate Base Courses is subject to approval by the Engineer as described in these specifications. Physical and/or chemical characterization of excess materials may be required and will be provided by the Port as determined by the Engineer.

1.02 QUALITY ASSURANCE

A. The Port will provide testing and inspection services to the satisfaction of the Engineer unless otherwise specified. Sampling and testing for compliance with the Contract provisions shall be in accordance with Section 01 45 00 of these specifications. The Contractor may obtain copies of results of tests performed by the Port at no cost. Tests conducted for the sole benefit of the Contractor shall be at the Contractor's expense.

1.03 SUBMITTALS

A. The Contractor shall perform and pay for and submit test reports for all imported materials as specified in Paragraphs 2.08, 2.09, and 2.10. Submit test reports for all field tests to determine in-place density as specified in Paragraph 3.05 B.

1.04 SITE CONDITIONS

A. The Port has subsurface investigations made throughout the project site and immediate vicinity of the project as part of a long term phased development of the entire area. The information is available for review as described in Section 00 31 00 Available Project Information.

B. The Contractor should anticipate encountering groundwater throughout the project site. The Port has subsurface investigations made throughout the project site, the information is available for review as described in Section 00 31 00 Available Project Information

C. Existing Utilities: The Contractor shall verify the location of existing utilities at the site as described in Section 02 41 13 Selective Site Demolition. Those utilities which are to remain shall be protected from damage. Damage to utilities which are to remain shall be repaired by the Contractor at no cost to the Port.

PART 2 – PRODUCTS

2.01 FILL AND BACKFILL

A. Material used for fill and backfill shall be clean, free-draining, sandy gravel or gravelly sand obtained from natural deposits or from excess soils generated during site construction activities. Individual particles shall be free from all objectionable coating. The material shall contain no organic matter or soft friable particles considered objectionable by the Engineer.

Material used for backfill shall be one of the following:

1. Material from trench excavation or other on-site borrow soils generated during construction at the site, as approved by the Engineer in accordance with paragraph 2.08, free from organic matter, demolition debris, or other deleterious substances, and containing no

rocks or lumps over 6 inches in greatest dimension, except where otherwise approved by the Engineer. "Nesting" of rock pieces that will create voids will not be permitted. Characterization of on-site common borrow materials shall be completed by the Port as directed by the Engineer.

2. Imported fill material consisting of bank run gravel for trenches meeting the requirements of Washington State Department of Transportation Standard Specifications Section 9-03.19. The amount of fines shall not exceed 5 percent based on the minus ¾-inch fraction. Off-site borrow materials shall be characterized as specified in sections 2.07 and 2.09 at the Contractor's expense.

   Material shall be graded between the limits specified below:

Sieve Size	Percent Passing (by weight)
8-inch	100
4-inch	95-100
3/4-inch	60-90
U.S. No. 10	25-65
U.S. No. 40	10-40
U.S. No. 200	0-4

   The moisture content of fill material shall be within minus 2 percent to plus 1 percent of the optimum moisture content at the time of compaction.

2.02 GRAVEL BORROW

A. Gravel Borrow shall meet the requirements of Specification 32 11 23 – Aggregate Base Courses". Imported gravel base shall be characterized as specified in paragraphs 2.07 and 2.09 at the Contractor's expense.

2.03 GRAVEL BACKFILL FOR PIPE ZONE BEDDING

A. Gravel backfill for pipe zone bedding shall consist of crushed, processed or naturally occurring granular material. It shall be free from various types of wood waste or other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will compact and shall meet the following specifications for grading and quality:

Sieve Size	Percent Passing
1-1/2" square	100
1" square	75-100
5/8" square	50-100
U.S. No. 4	20-80
U.S. No. 40	3-24
U.S. No. 200	10.0 Max.
Sand Equivalent	35 min.

   Imported bedding material shall be characterized as specified in sections 2.07 and 2.09 at the Contractor's expense.

2.04 GRAVEL BACKFILL FOR DRAINS

A. Gravel Backfill for Drains shall conform to the following gradation:

Sieve Size	Percent Passing
1” square	100
3/4” square	80-100
3/8” square	0-40
U.S. No. 4	0-4
U.S. No. 200	0-2

Imported bedding material shall be characterized as specified in sections 2.07 and 2.09 at the Contractor’s expense.

2.05 PEA GRAVEL

A. Pea gravel material must be non-plastic, rounded to sub-rounded aggregate material. A minimum of 70 percent by weight of the pea gravel must have at least one fractured face. Pea gravel shall conform to the following gradation:

Sieve Size	Percent Passing
3/8” square	95-100
U.S. No. 4	0-30
U.S. No. 8	0-15
U.S. No. 200	0-2

Imported pea gravel material shall be characterized as specified in sections 2.07 and 2.09 at the Contractor’s expense.

2.06 QUARRY SPALLS

A. Quarry spalls shall meet the requirements of the Washington State Department of Transportation Standard Specifications Sections 9-13.

Quarry spalls shall be characterized as specified in sections 2.07 and 2.09 at the Contractor’s expense.

2.07 OFF-SITE BORROW SOURCE CHARACTERIZATION

A. Off-site borrow source characterization shall be performed by the Contractor as specified in Section 2.09 to assure that imported materials are natural, native, virgin materials, free of contaminants, including debris or recycled materials, and meet the requirements of the contract documents.

Each source of off-site borrow material shall be tested once per year for physical properties.

Each source of off-site borrow for sands and gravels shall be tested once per calendar year for metals.

Each source of off-site borrow for soils, including materials to be used for fill and backfill, shall be tested for metals, chemical compounds and hydrocarbons once for every 500 cubic yards of material to be imported.

The Engineer maintains the right to reject any materials that have been determined to be substandard for any reason. In the event of rejection, it shall be the responsibility of the contractor to remove all stockpiles of rejected material from the site.

1. General

    a. Materials shall be of the quality, size, shape, gradation, or equal to that manufacture as specified herein. The Contractor shall submit a characterization of any and all imported material prior to any on-site placement. The characterization will include source identification, analyses of a material source sample, and a source inspection report. The material shall not be imported to the site until approved by the Engineer. Once approved and imported to the site, the Contractor shall perform an on-site inspection of the material to verify that it is the material sampled for characterization and approval.

2. Source Identification

    a. The Contractor shall provide documentation of the origin of imported materials and maps identifying specific location(s) of material source(s). Physical and chemical characterization reports available from the material supplier shall be provided to the Engineer.

3. Inspection of Source

    a. The Contractor shall inspect all material sources. During such inspection, the Contractor shall assure that materials to be delivered to the jobsite are likely to meet the appropriate specifications. The Contractor shall provide the Engineer two weeks notice of such inspections. The Engineer or a designated representative may accompany the Contractor to witness such inspections. This witnessing shall in no way release the Contractor from complying with the specifications and in no way shall be construed as approval of any particular source of material.

4. Testing, Reporting, and Certification

    a. Off-site borrow materials shall be in accordance with the requirements of Section 2.09 unless waived by the Engineer.

5. Inspection of Materials at the Jobsite

    a. The Contractor shall visually inspect import material upon delivery. Materials shall be inspected for presence of foreign, recycled, or reprocessed material. The Engineer may at any and all times perform an independent inspection. Material may be tested according to Section 2.09 at the Engineer's discretion. Material may be rejected due to the presence of deleterious substances or as a result of substandard test results.

2.08 ON-SITE BORROW SOURCE CHARACTERIZATION

A. Excess soils generated during site activities may be used as on-site common borrow for backfill and other fills associated with the work, as approved by the Engineer. Characterization of excess materials generated during site activities and proposed for reuse as on-site common borrow material will be performed by the Port of Tacoma as determined by the Engineer to assure that on-site borrow materials are free of contaminants, including debris and meet the requirements of the Contract Documents. The Engineer maintains the right to reject any materials that have been determined to be substandard for any reason. One or more of the physical properties tests listed in paragraph 2.09 of these specifications will be required by the Engineer for characterization prior to acceptance. The Contractor shall provide representative sample(s) of the material if requested.

1. General

    a. Materials shall be of the quality, size, shape, gradation, or equal to that manufacture as specified herein or as approved by the Engineer. The Contractor shall submit a written request for approval for use of on-site common borrow materials at least 1 week prior to any on-site placement. The request shall identify the source of the material, proposed onsite use and quantity of material to be used. The Engineer may request that the Contractor provide samples of the material for physical and/or chemical characterization. The material shall not be reused at the site until approved by the Engineer. Once approved for site use, the Contractor shall perform an on-site inspection of the material to verify that it is the material sampled for characterization and approval.

2. Inspection of Source

    a. The Contractor shall visually inspect excess materials generated from on-site construction proposed to be reused. Materials shall be inspected for presence of foreign, recycled, or reprocessed material. The Engineer may at any and all times perform an independent inspection. Material may be tested according to paragraph 2.09 at the Engineer's discretion. Material may be rejected due to the presence of deleterious substances or as a result of substandard test results.

2.09 CHARACTERIZATION TESTING, REPORTING, AND CERTIFICATION OF OFF-SITE MATERIAL

A. The Contractor shall provide characterization and testing as described below for off-site borrow materials. Testing results shall meet the Port of Tacoma Import Material Screening Criteria to be considered acceptable.

B. The Contractor is responsible for all testing costs associated with characterization of off-site borrow materials. The Port is responsible for testing costs associated with on-site borrow materials and excess materials to be exported.

C. The Contractor shall provide the following information with each sample submitted:

    1. Material Source

    2. Proposed On-site Use

    3. Sampling dates

    4. Chain of custody

    5. Sampling locations

    6. Contractor's certification that the samples submitted are representative of the materials that shall be used at the site.

D. Characterization Testing shall include:

    1. Physical Properties:

        a. Grain Size Distribution (ASTM D 422-63)

        b. Maximum Dry Density (ASTM D1557)

    2. Metals and Chemicals:

        a. Import Material Screening Criteria as indicated in Table 31 00 00 - 1 – Import Material Screening Criteria

b. Petroleum Hydrocarbons (NWTPH-Gx (Gasoline) and –Dx (Diesel/Oil))

Table 31 00 00 - 1 – Import Material Screening Criteria

Chemical / Metal Name	Gravel/Rock Criteria (mg/kg)	Soil Criteria (mg/kg)
Volatile Organic Compounds (EPA Method 8260)		
Benzene	-	0.03
Ethylbenzene	-	6.0
Toluene	-	7.0
Xylenes	-	9.0
Tetrachloroethylene (PCE)	-	0.05
Semi-Volatile Organic Compounds (EPA Method 8270)		
acenaphthene		99.8
anthracene		2,284
benzo[a]anthracene		0.9
benzo[a]pyrene		0.1
benzo[b]fluoranthene		1.4
benzo[k]fluoranthene		13.7
benzoic acid	-	385
benzyl alcohol	-	8,000
bis(2-ethylhexyl)	-	13.9
phthalate	-	12.9
butyl benzyl phthalate	-	95.5
cresol;o-	-	3.1
cresol;p-	-	8,000
dibenzo[a,h]anthracene	-	0.1
dibenzofuran	-	80
di-butyl phthalate	-	59.7
dichlorobenzene;1,2-	-	9.9
dichlorobenzene;1,4-	-	0.2
diethyl phthalate	-	97.8
dimethylphenol;2,4-	-	1.6
di-n-octyl phthalate	-	800
fluoranthene	-	632
fluorene	-	102
hexachlorobenzene	-	0.09
hexachlorobutadiene	-	0.6
indeno[1,2,3-cd]pyrene	-	1.4
methyl naphthalene;2-	-	320
naphthalene	-	5.0
nitrosodiphenylamine;N-	-	0.6
pentachlorophenol	-	0.004
phenol	-	15.8
pyrene	-	656
trichlorobenzene;1,2,4-	-	0.06

Pesticides / PCBs (EPA Method 8081/8082)		
ddd	-	0.3
dde	-	0.4
ddt	-	3.0
Polychlorinated biphenyls (PCBs)	-	1.0
Metals (EPA Method 6010/6020/7041)		
Arsenic	13.8	13.8
Cadmium	2.0	2.0
Chromium (total)	2,000	2,000
Chromium (VI)	-	19
Copper	143	143
Lead	250	250
Mercury	2.0	2.0
Nickel	418	418
Zinc	5,981	5,981

PART 3 – EXECUTION

EXCAVATING AND GRADING WHICH IS PART OF THIS CONTRACT, SHALL BE COMPLETED WITHIN THE TOLERANCES ESTABLISHED OR WITHIN REASONABLY CLOSE CONFORMITY WITH THE ALIGNMENT GRADE AND CROSS SECTIONS INDICATED ON THE DRAWINGS OR AS ESTABLISHED WITHIN THESE SPECIFICATIONS.

3.01 EXCAVATION AND GRADING

A. Excavation: Shall be the naturally occurring earth, sand, gravel, clays, or mixtures of the above, required to be moved for the construction of roadways, slopes, approaches, parking areas, service yard and associated work. Excavation material shall be moved with the use of mechanical equipment, such as shovels, loaders, bulldozers, graders, rippers, etc., but shall not require drilling and blasting or drilling and line breaking. Excavation by sluicing method will not be permitted unless specifically approved by the Engineer. In general, excavation shall be removed in horizontal layers in such a way that the resulting material will be a reasonable blend of the naturally occurring materials.

Embankment Compaction (Filling): Place material used for the construction of embankment in horizontal layers upon earth which has been stabilized or otherwise approved by the Engineer for embankment construction.

Irrespective of the method of compaction specified, at the time of compaction the moisture content of that portion of the embankment material passing a U.S. No. 4 sieve shall be not more than three (3) percentage points above or below the optimum moisture content at 100% density as determined by Compaction Control Density Tests, described in Article "Compaction Control Tests" these specifications.

Construct earth embankment in compacted layers of uniform thickness. Carry the layers up full width from the bottom of the embankment. Compact the slopes of all embankments to the required density as part of the embankment compaction work. The embankment shall be compacted with modern, efficient compacting units satisfactory to the Engineer. The compacting units may be of any type, provided they are capable of compacting each lift of the

material to the specified density. The right is reserved for the Engineer to order the use of any particular compacting unit discontinued if it is not capable of compacting the material to the required density within a reasonable time, or if the equipment may damage underlying or adjacent soils or structures.

Construct earth embankments in successive horizontal layers not exceeding 4 inches in loose thickness except that the layers in the top 2-feet shall not exceed 2-inches in loose thickness. Compact each layer of the top 2-feet of embankment to 95% and each layer of embankment below the top 2-feet to 90% of the maximum density as determined by compaction control tests. Use small mechanical or vibratory compactor units to compact the layers adjacent to structures that are inaccessible to the loaded haul equipment or other compaction rollers.

3.02 EXCAVATION FOR TRACK AND STRUCTURES, AND TRENCHING FOR UTILITIES

A. Excavate as necessary for track and structures to lines and grades indicated on the drawings.

B. Excavation below the designed depth, except as directed by the Port, shall be backfilled with quarry spalls, or other suitable backfill material as approved by the Engineer and compacted as specified, at no extra cost to the Port.

C. Brace and shore sides of excavations. Comply with all federal, state, and local regulations regarding shoring, bracing, and other protection requirements.

D. Keep water out of excavated pits and trenches by pumping or other means of dewatering. Water level shall be kept below the bottom of concrete pours before, during, and for a minimum of three days thereafter.

E. Protect excavated material, stockpiled for use as backfill, from contamination by other materials and from damage by weather by covering with waterproof sheeting or other suitable means.

F. Unsuitable Structural and Trench Excavation: Shall consist of unstable materials, such as peat, muck, water-impregnated clays, swampy or other undesirable materials, including buried logs, stumps, or trash. Unsuitable excavation materials shall be removed to the depth designated by the Engineer.

Unsuitable material excavated shall be replaced with Gravel Backfill for Drains per paragraph 2.04 as directed by the Engineer.

Unsuitable materials, excess material and excavated material not approved by the Engineer for use as fill or backfill shall be transported off-site by the Contractor in accordance with Section 01 35 43.19, Export Soil Management.

3.03 FILL AND BACKFILL FOR STRUCTURES AND UTILITIES

A. All underground structures including manholes, catch basins, oil/water separators, flow splitters, vaults, and/or other structures, shall be over excavated by one foot. The subgrade shall be prepared, and a minimum of 12 inches of Aggregate Base Course shall be placed and compacted.

B. Place backfill and structural backfill to lines and grades indicated on the Drawings.

C. Remove water from excavated areas, by pumping or other means, before placing any fill material.

D. Compact subgrade, as specified in paragraph 3.04, before placing any fill or backfill material.

E. Do not place any fill against concrete walls/structures until the concrete has attained its specified design strength and/or certain other construction sequence criteria, if noted on the drawings, are met, or as specifically approved by the Port.

F. Place fill in layers not exceeding 12 inches (loose thickness) and compact to at least 95% of dry density (ASTM D 1557).

3.04 COMPACTION

A. Compaction shall be performed with approved compaction equipment suited to the soil and the area being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Each lift of material placed shall be uniformly compacted to the density indicated for the specific material and use set forth in these Specifications. The percent of density required is in relation to the maximum density obtainable at optimum moisture content (Compaction Control Density) as determined in paragraph 3.05 “Compaction Control Tests.”

3.05 COMPACTION CONTROL TESTS

A. Laboratory and field tests shall be performed in accordance with the applicable provisions of these Specifications.

1. Compaction control density shall be the maximum density at optimum moisture content as determined by ASTM D-1557, Standard Methods for Moisture-Density Relationships of Soil and Soil Aggregates, Methods B, C or D as applicable but shall be no less than 95% of dry density for Select Fill and Backfill and no less than 98% of dry density for Base Course Material.

2. Field tests to determine in-place compliance with required densities as specified, shall be performed in accordance with ASTM D1556, D2167, or D2922.

3.06 EXISTING TRACKBED BACKFILL

A. Backfill depressed areas of existing trackbed where track removal has occurred as indicated on the Drawings. Backfill existing trackbed with aggregate base course conforming to Section 32 11 23, Aggregate Base Courses. Place backfill within depressed areas to a depth of 2 inches above the surrounding surface grade.

3.07 PREPARATION FOR BASE COURSE OR GRAVEL SURFACING:

A. Preparation of Subgrade: Immediately prior to placement of surfacing materials, clean the entire width of the area of all debris and dispose of as directed by the Engineer. All depressions or ruts which contain storm water shall be drained.

Shape the entire subgrade to a smooth uniform surface, true to line, grade, and cross section as staked by the Engineer. Compact the roadbed material for a depth of six-inches below the subgrade to 95% of the maximum density as determined by compaction tests ASTM Designation D1557. If soft or spongy material underlying the upper six inches of the area being prepared precludes satisfactory compaction of the upper six inches, loosen, aerate, or excavate, replace and compact to the required density as directed by the Engineer.

Remove and dispose of excess material which cannot be disposed of by normal drifting to low spots during blading and shaping operations or by placing in subgrade areas deficient in materials or by wasting, all as directed by the Engineer. Subgrade areas deficient in materials shall be brought to grade by importing suitable materials from other subgrade areas or other sources as directed by the Engineer. Materials added to subgrade areas deficient in materials shall be watered and compacted as necessary to yield a true finished subgrade as described above.

Once it is prepared, maintain the subgrade for surfacing in the finished condition until the first course of surfacing has been placed.

B. Finishing Subgrades: Before any paving or base material is placed, the subgrade shall be brought to the proper line, grade and cross section and shall be so maintained until the base course and paving is placed.

   Compact the subgrade for pavement to 95% of maximum density as defined for Compaction Control Density, Article "Compaction Control Tests" these Specifications, to a minimum depth of six inches.

C. Subgrade Protection: Take all precautions necessary to protect the subgrade from damage; hauling over the finished subgrade shall be limited to that which is essential for construction purposes. Equipment used for hauling over the prepared subgrade which, in the opinion of the Engineer, is causing undue damage to the prepared subgrade or to the underlying materials, shall be removed from the work at the request of the Engineer. Repair at the Contractor's expense all cuts, ruts and breaks in the surface of the subgrade prior to placing surfacing, treated base, or paving materials. Protect the prepared subgrade from both the Contractor's traffic and public traffic and maintain the subgrade by blading and rolling as frequently as may be necessary to preserve the subgrade in a completely satisfactory condition.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This work includes all necessary measures to keep excavations and pipe trenches dry during construction. The work covered by this specification consists of providing all supervision, labor, materials, and equipment required to dewater excavations and trenches.

1.02 SITE CONDITIONS

A. The Contractor should anticipate encountering groundwater in excavations. The Port has subsurface investigations made at and near the project site, the information is available for review as described in Section 00 31 00.

1.03 QUALITY CONTROL

A. It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering operations in such a manner as to avoid all objectionable settlement and subsidence.

B. All dewatering operations shall be adequate to ensure the integrity of the finished project and shall be the responsibility of the Contractor.

1.04 SUBMITTALS

A. The Contractor shall submit a dewatering plan which addresses the methods proposed in dewatering trenches and handling the dewatering discharge.

B. The Contractor shall submit a dewatering plan for dewatering of the Erdahl Ditch to allow installation of the new culvert pipe. For the past two years, 2014 and 2015, the average flow rate in Erdahl Ditch during the months of June and July has been 7,560 gallons per minute. Flow in Erdahl Ditch is significantly affected by precipitation, Contractor shall schedule work within the Ditch to during extended periods of dry weather to the maximum extent possible.

C. Erdahl Ditch dewatering plan shall include:

1. Pumping and conveyance equipment.
2. Anticipated pumping rates and durations.
3. Water treatment best management practices.
4. Water discharge.
5. Schedule for completion of work within the trench.
6. Sequence of installation and removal for dewatering measures.

D. The Contractor shall be required to obtain all necessary permits for disposing of the dewatering discharge. Permits required shall be addressed in the Contractor's dewatering plan.

PART 2 - PRODUCTS

2.01 GENERAL

A. Products that are required to accomplish, or to be incorporated into, the work of this Section shall be as selected by the Contractor, subject to review by the Engineer.

2.02 EQUIPMENT

A. The Contractor shall have available on this site of work sufficient pumping equipment and/or other machinery to ensure that the operation of the dewatering system can be maintained.

PART 3 - EXECUTION

3.01 GENERAL

A. Site work for excavations and pipe trenches shall be kept free from water to facilitate fine grading, construction of structures, the proper laying and joining of pipe and appurtenances, and placement of backfill material. Adequate pumping equipment shall be provided to handle and dispose of the water without damage to adjacent property. Trenches shall be dewatered if, at the decision of the Engineer, the quantity of water present prevents the proper installation of pipes and ductbanks. Water in pipe trenches shall not be allowed to flow through the pipe.

B. The Contractor shall provide and maintain at all times during construction, ample means and devices with which to promptly remove and properly dispose of all water entering trenches and excavations and other parts of the work, whether the water be surface water or underground water. No piping shall be laid in water, nor shall water be allowed to rise over them until the concrete or mortar has set at least 24 hours or until the pipeline has been adequately backfilled to prevent buoyancy. No embankment material shall be placed in standing water. The Contractor shall be responsible for obtaining all water discharge permits as required. No water shall be discharged to areas or work built or under construction.

C. Water shall be disposed of in such a manner as not to be a nuisance or menace to the public health.

D. Written permission shall be secured from the Engineer before locating any wells, well points, or drain lines for purposes of dewatering within the limits of an excavation. The Engineer shall have the right to require that any dewatering well, line, or trench drains left in place within the excavation limits be filled with concrete or grout as herein specified, and shown on the Record Drawings.

E. Dewatering of excavations must be controlled to prevent damage from settlement due to possible lowering of the adjacent groundwater table.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. Work herein generally covers trenching, bedding, backfilling and compaction required for installation of site utilities and site storm drainage. Trench excavation and backfill shall include all excavation, backfilling, disposal of surplus and unsuitable material and all other work incidental to the construction of trenches.

1.02 SITE CONDITIONS

A. The Port has subsurface investigations made at and near the proposed project site. The information is available for review by the Contractor.as described in Section 00 31 00, Available Project Information.

B. The Contractor should anticipate the presence of groundwater at or near the existing ground surface at much of the project site. The groundwater elevation varies depending upon proximity to the shoreline, tidal conditions and weather.

1.03 SUBMITTALS

A. For each off-site source of material, submit test reports for the following:

1. Grain Size Distribution, ASTM D 422-63.
2. Weight per unit volume of uncompacted material, ASTM C-29.
3. Specific gravity of material as determined from absolute volume, in accordance with ASTM No. D854.

PART 2 - PRODUCTS

2.01 BEDDING MATERIAL

A. Refer for Section 31 00 00 - Earthwork

2.02 BACKFILL MATERIAL

A. Refer to Section 31 00 00 – Earthwork

2.03 UNDERGROUND MARKING TAPE

A. Underground marking tape shall consist of inert polyethylene plastic, 4-mil thickness that is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil, with a metallic foil core to provide the most positive detection and pipeline locators.

B. The tape shall be color coded and shall be imprinted continuously over its entire length in permanent black ink. The message shall convey the type of line buried below and shall also have the word "Caution" prominently shown. Color coding of the tape shall be as follows:

Utility	Tape Color
Stormwater	Green
Electrical	Red
Communications/Fiber Optic	Orange

C. The width of the tape shall be as recommended by the manufacturer for the depth of installation and detection.

PART 3 - EXECUTION

3.01 STOCKPILING AND DISPOSAL

A. All excavated material shall be stock piled beside the trench as it is removed and shall be backfilled from this position or wasted offsite. The disposal of excess material shall be performed in accordance with Section 01 35 43.19 – Export Soil Management.

3.02 TRENCH EXCAVATION

A. The Contractor shall maintain, at all times during the execution of this work, safe and stable excavations. All trench excavation and preparation shall comply with Section 7-08.3(1) of the Washington State Department of Transportation Standard Specifications, 2014 edition.

B. Unsuitable materials encountered during trench excavation shall be handled as specified in Section 01 35 43.19 – Export Soil Management.

3.03 BEDDING AND BACKFILLING

A. Backfill trenches with bedding material as specified and as called for on the Drawings. Fine-grade the bedding material to the required slope and excavate to accommodate bell and spigot joints so the entire length of each pipe will be uniformly supported. Trench backfill shall be common material placed in horizontal layers not to exceed eight inches in loose thickness and carefully compacted by the use of small vibratory or mechanical compactors until the cover is one (1) foot above the top of the pipe. Subsequent layers of trench backfill shall not exceed eight inches in loose thickness but may be compacted by any method, which will not exceed the allowable stresses for the pipe. Compaction testing will be performed in conformance with Section 31 00 00 - Earthwork.

B. Backfill utility structures with structural backfill as specified in Section 31 00 00 Earthwork and as called for on the Drawings.

3.04 COMPACTION

A. Compaction shall be performed with approved compaction equipment suited to the soil and the area being compacted. Moisten or aerate material as necessary to provide the moisture content that will readily facilitate obtaining the specified compaction with the equipment used. Each lift of material placed shall be uniformly compacted to the density indicated for the specific material and use set forth in these Specifications.

B. The Contractor shall properly place and compact all bedding and backfill materials to at least 90% of dry density (ASTM D 1557) in the bedding zone and 95% of dry density in trench backfill zone, and shall correct any deficiencies resulting from insufficient or improper compaction of such materials throughout the contract period.

3.05 COMPACTION CONTROL TESTS

A. Laboratory and field tests shall be performed in accordance with the applicable provisions of these Specifications.

B. Compaction control density shall be the maximum density at optimum moisture content as determined by ASTM D-1557, Standard Methods for Moisture-Density Relationships of Soil and Soil Aggregates, Methods B, C or D as applicable.

C. Field tests to determine in-place compliance with required densities as specified, shall be performed in accordance with ASTM D1556, D2167, or D2922.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section describes the work necessary to furnish, place, maintain and remove shoring required for all structure and trench excavations greater than four (4) feet deep. Shoring shall be provided in accordance with Section 2-09.3(3) D Shoring and Cofferdams of the Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction, 2014 Edition and applicable local, State and Federal safety codes.

B. Design, approvals, and construction of all shoring are the exclusive responsibility of the Contractor. A Professional Engineer, licensed in the State of Washington, shall be used to design all aspects of the shoring.

1.02 SITE CONDITIONS

A. The Contractor should anticipate to encounter groundwater at or near the existing ground surface at much of the project site. The groundwater elevation varies depending upon proximity to the shoreline, tidal conditions and weather.

B. The Contractor shall ascertain to his own satisfaction the extent and method in which shoring will be required to meet all required safety codes based on the nature of the material in which it will appear, and the extent to which such occurrence of water shall affect his bid.

1.03 SUBMITTALS

A. Submit plans in accordance with Section 01 33 00, Submittal Procedures, 10 working days prior to beginning excavation, showing proposed shoring methods and construction details.

PART 2 - PRODUCTS

2.01 GENERAL

A. Products that are required to accomplish, or to be incorporated into, the work of this Section shall be as selected by the Contractor, subject to review by the Engineer.

PART 3 - EXECUTION

3.01 GENERAL

A. The method of shoring shall be according to the Contractor's design. The design, planning, installation and removal, if required, of sheeting and bracing shall be accomplished in such a manner as to maintain the required excavation or trench section and to maintain the undisturbed state of soils below and adjacent to the excavation.

B. Damages resulting from improper support or from failure to support excavations shall be the sole responsibility of the Contractor.

C. In trenching operations, the use of horizontal strutting below the barrel of pipe or the use of pipe as support for trench bracing will not be permitted.

D. Sheet piling and timbers in trench excavations shall be withdrawn in a manner so as to prevent subsequent settlement of the pipe or additional backfill loading which might overload the pipe.

E. That portion of cribbing or sheeting extending below the springline of pipe shall be left in place unless satisfactory means of reconsolidating bedding or side support disturbed by cribbing or sheeting removal can be demonstrated.

F. If a movable box is used in lieu of cribbing or sheeting, and the bottom cannot be kept above the spring line of the pipe, the bedding or side support shall be carefully reconsolidated behind the movable box prior to placing initial backfill.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of "Aggregate Base Courses" work is indicated on the Drawings. The work includes the requirements for 1) furnishing and installing imported aggregate base, and 2) installing Contractor generated aggregate recycled base. Work includes transporting, placing, shaping and compacting base courses in conformance with these Specifications and the dimensions and sections indicated on the Drawings or within the lines and grades established by the Engineer.

1.02 SUBMITTALS

A. The Contractor shall submit test reports in accordance with Section 01 33 00 for Contractor furnished import aggregate base as follows:

1. Sieve analyses for all materials specified in accordance with ASTM C 136.
2. Maximum Dry Density (ASTM D1557)

PART 2 – PRODUCTS

2.01 AGGREGATE BASE COURSE

A. Material used for base course shall be one or a mixture of the following:

1. Contractor furnished imported aggregate base course complying with Section 9-03.9(3) of the Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction, 2014 edition.
2. Contractor generated recycled aggregate base in conformance with Section of 32 11 24 – “Aggregate Recycled Base Courses” of these Specifications.

PART 3 – EXECUTION

3.01 EQUIPMENT

A. All equipment necessary for the satisfactory installation of base courses shall meet the requirements of Section 4-04.3(1) of the Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction, 2014 edition, as amended to provide for the following:

Equip grading machines or trimmers with a spirit level or other type slope indicator which will continuously indicate the average, transverse slope of the screed. Bubble or indicator movement should be no less than 1/8 inch for each 0.1 percent change in transverse slope.

3.02 PREPARATION OF SUBGRADE

A. Prepare subgrade as specified in Section 31 00 00 and obtain approval of the Engineer before placing base course materials.

3.03 PLACEMENT OF BASE COURSE AGGREGATES

A. Prior to placement Contractor shall blend the various source materials to create a homogenous, well graded, mixture.

B. Equipment necessary for the satisfactory performance of this construction shall be on the project and approved by the Engineer prior to beginning work. If central-mix-plant methods are used, the central mixing plant shall comply with the applicable portions Section 4-04.3(3) of the Standard Specifications, 2006 edition.

C. Prepare subgrades as specified above and obtain approval of the Engineer before placing base course, ballast or surfacing materials.

D. Mixing: After each layer of material is placed, mix the material by motor graders or other approved equipment until the mixture is uniform throughout. Add water as directed by the Engineer to facilitate mixing and compacting.

E. Placing and Spreading: Spread each layer of material by means of approved spreading equipment. Such equipment may be bottom-dump hauling equipment with transverse spreading facilities; self-propelled spreading and leveling machines; or spreader boxes equipped with wheels or so constructed as to preclude damage to the subgrade or underlying courses. Spreading in small areas of less than 2,000 square yards or in areas irregular in shape may be accomplished by other means as directed by the Engineer. Material shall be placed in layers not exceeding 6 inches.

F. Shaping and Compacting: Immediately following spreading and shaping, compact each layer to at least ninety five percent (95%) of the maximum dry density determined in accordance with ASTM D-1557 before the next succeeding layer is placed thereon. When the thickness of the base course is less than 0.15 feet, density testing may not be required and the Engineer will determine the number of coverage's required for the particular compaction equipment available.

   Vibratory compactors or rollers shall be adequate in design and number to provide compaction and obtain the specified density for each layer while still moist. Apply a mist spray of water as needed to replace moisture lost by evaporation. The completed layer shall have a smooth, tight, uniform surface true to the line, grade and cross section indicated on the Drawings.

   Variations in the surface of the top course shall be a maximum of 1/4 inch in 10 feet. Shave off or fill in variations greater than the allowable and recompact that area.

G. Surface Maintenance: Maintain the surface of each layer of material true to line, grade and cross section by blading, watering and rolling until placing the succeeding course. Place the first course of material on all available subgrade before placing the succeeding course unless otherwise authorized by the Engineer. Should irregularities develop in any surface during or after compaction, remedy by loosening the surface and correcting the defects, then thoroughly recompact the entire area, including the surrounding surface. In the event that additional materials are necessary to make the repairs, they shall be provided at no additional cost to the Port.

H. Route hauling equipment over the roadway in such a manner as to be most effective in the compacting of the material. Hauling over the surfacing in the process of construction will not be permitted when, in the opinion of the Engineer, the effect will be detrimental.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The work of this section consists of furnishing all transportation, labor, materials, equipment and incidentals for recycling aggregate materials including, but not limited to, the following:

1. Excavating existing on-site aggregate base materials.
2. Stockpiling, transporting, screening, sorting, processing and blending material to the required gradation.
3. Testing and providing documentation to the Port that the processed stockpiles are in conformance with the required gradation.

1.02 QUALITY ASSURANCE

A. The aggregate recycled base course material shall conform to the gradation requirements shown in Part 2 of this section, and shall be free of any detrimental or organic materials.

B. Characterization tests shall be performed by the Engineer after Contractor has completed processing of material but prior to placing the material. Each test shall represent no more than 100 cubic yards of material. The 100 cubic yard lots may be consolidated or placed as soon as the material has been approved by the Engineer.

C. The Engineer will approve or disapprove of the processed material within 7 days of receipt of test reports or according to an agreed upon schedule.

D. After a lot has been approved, no additional material shall be added to the lot stockpile until that stockpile is exhausted and any new stockpile formed shall be subject to testing and acceptance as described above.

E. The Contractor may obtain copies of results of tests performed by the Engineer at no cost. Tests conducted for the sole benefit of the Contractor shall be at the Contractor's expense.

F. Stockpile lots that are rejected based on testing results will be retested by the Port at the request of the Contractor and at the Contractor’s expense.

G. Reference Standard: ASTM C136 Method for Sieve Analysis for Fine and Coarse Aggregates.

H. Materials with unexpected regualated material, as identified by visual and olfactory methods, shall be segregated from other exvcavated material and shall not be placed in stockpile for reuse.

I. Characterization Testing shall include:

1. Grain Size Distribution (ASTM D 422-63)
2. Maximum Dry Density (ASTM D1557)

1.03 SUBMITTALS

A. Submit test reports in accordance with Section 01 33 00 – Submittal Procedures, for the following:

1. Work plan including
    a. Diagrams showing layouts of equipment, stockpiles of raw and processed materials, weighing equipment, security fencing and methods for segregating and controlling access to various stockpiles.

b. Procedures for crushing, blending and testing materials, quality control, inventory control, dust control and cleanup.

PART 2 – PRODUCTS

2.01 AGGREGATE RECYCLED BASE COURSE

A. The final blended material shall be uniformly graded and shall conform to the following gradation:

Sieve Size	Percent Passing
1 1/4" sq. sieve	100
1” sq. sieve	80 to 100
5/8" sq. sieve	50 to 80
U.S. No. 4 sieve	25 to 45
U.S. No. 40 sieve	3 to 18
U.S. No. 200 sieve	7.5 max.
Sand Equivalent	40 min.

PART 3 – EXECUTION

3.01 PROCESSING OPERATIONS

A. The Contractor shall provide all necessary equipment such as crushers, screens and blenders and labor to efficiently process the material.

3.02 DISPOSAL

A. General: All processed material not recycled for use as aggregate base or select fill on site shall be removed, transported and disposed of by the Contractor in accordance with all applicable local, state and Federal requirements and Section 01 35 43.19 – Export Soil Management.

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The extent of Hot Mix Asphalt (HMA) Pavement Class ½" PG 64-22 "Asphalt Paving" work is indicated on the Drawings. The work includes the requirements for producing, transporting, placing, shaping and compacting of one or more courses of materials in conformance with these specifications and the dimensions and sections indicated on the Drawings.

1.02 QUALITY ASSURANCE

A. The Port will provide necessary inspection services. Sampling and testing for compliance with the Contract provisions shall be in accordance with Section 01 33 00 of these Specifications. The Contractor may obtain copies of results of tests performed by the Port from the office of the Port, at no cost. Tests conducted for the sole benefit of the Contractor, shall be at the Contractor's expense.

Unless otherwise referenced or modified herein, quality control and quality standards for this section shall be as specified in the Washington State Department of Transportation Standard Specifications for Road, Bridge and Municipal Construction 2012 edition.

1.03 SUBMITTALS

A. The Contractor shall also submit certificates of Specification compliance for materials to be used.

1. Hot mix asphalt mix design taking into account the specific plan and equipment to be used.
2. Material data sheets for asphalt materials, certificates of compliance for asphalt materials and aggregates.
3. Gradation and material test results for aggregates used for HMA, including Los Angeles Wear, Degradation Factor, and fracture requirements.
4. Name, contact information and current accreditation documentation for AASHTO accredited independent testing agency.
5. Acceptance testing results.

1.04 ACCEPTANCE TESTING REQUIREMENTS

A. Acceptance sampling and testing of Hot Mix Asphalt shall be performed at the Contractor's expense by an independent AASHTO accredited testing and inspection agency. Testing agency shall be accredited by AASHTO for the specific testing methods to be performed. Acceptance testing shall be provided under nonstatistical evaluation on up to three samples when ordered by the Engineer.

B. Sampling shall be performed in accordance with Washington State Department of Transportation Test Method T 716.

C. The Contractor shall perform sampling in the presence of the Engineer and in accordance with WSDOT FOP for WAQTC/AASHTO T 168.

D. Testing Methods:

1. Testing of HMA for compliance of asphalt binder content shall be by WSDOT FOP for AASHTO T308.

2. Testing of HMA for compliance of gradation shall be by WAQTC FOP for AASHTO T27/T11.

E. The results of all acceptance testing shall be provided to the Engineer.

PART 2 – PRODUCTS

2.01 ASPHALT CONCRETE PAVEMENT

A. Asphalt concrete pavement shall be Hot Mix Asphalt Class 1/2" PG 64-22 as defined in the WSDOT Standard Specifications. Materials shall be proportioned according to Section 9-03.8(6) of WSDOT Standard Specifications.

2.02 ASPHALT MATERIALS

A. Aggregate for asphalt concrete shall conform to the grading requirement of Section 9-03.8, and shall be tested according to Section 9-03.20 of WSDOT Standard Specifications.

B. Asphalt shall be PG 64-22 conforming to AASHTO Specification M 320.

C. Joint sealer shall be paving asphalt 64-22 conforming to AASHTO Specification M 320

D. Tack coat shall be emulsified asphalt, CSS-1, conforming to Section 9-02.1(6) of the Standard Specifications.

2.03 ASPHALT MIXING

A. Mixing plant for preparing asphalt concrete shall conform to the specific requirements of Section 5-04.3 of Washington State Department of Transportation Standard Specifications 2012 and related Sections.

PART 3 — EXECUTION

3.01 PLACING ASPHALT CONCRETE

A. The asphalt concrete shall be prepared from materials as previously described and by plants and methods conforming to the Standard Specifications. Delivery of materials to the site shall meet said Standard Specifications.

B. Bituminous courses shall be placed when the crushed surfacing is dry and weather is not rainy. No mix shall be placed at atmospheric temperature below 40°F unless otherwise approved by the Engineer. Paving shall be placed using an approved type of paving machine. Workers shall not be allowed to walk or stand on the finished mixture before it has been rolled.

C. Asphalt concrete shall be placed in two lifts of equal thickness over the crushed surfacing course as shown in the plans. Lifts shall not exceed 2 inches and a tack coat shall be applied as needed in between. Specific construction requirements of Section 5-04.3 of WSDOT shall be followed.

D. Paved slopes and paved ditch sections shall be shaped and thoroughly compacted to avoid spalling at the edges.

3.02 TACK COAT

A. Tack coat of emulsified asphalt shall be applied to all surfaces on which any course of HMA is to be placed or abutted, including pavement, catch basins, manholes and other structures. Rate of application shall be 0.10 gal/sq. yd. Tack coat requirement between lifts may be waived by the Engineer if the base course surface is kept thoroughly clean and the time lag between placement of base and wearing course is small.

3.03 COMPACTION

A. Compaction of the asphalt concrete pavement shall conform to the requirements of WSDOT Section 5-04.3(10). Density of the pavement in place shall be a minimum of 91% or the reference maximum density as determined by WSDOT Test Method 716. The reference maximum density shall be determined as the moving average of the most recent five determinations for the lot of asphalt concrete being placed.

3.04 JOINT SEAL

A. Apply joint sealer to the edges of new paving joints, catch basins, manholes, at the meet lines to concrete structures and as directed by the Engineer..

3.05 SURFACE SMOOTHNESS

A. Surface smoothness of completed pavement shall conform to the specific requirements of WSDOT Section 5-04.3(13).

END OF SECTION

PART 1 – GENERAL

1.01 DESCRIPTION OF WORK

A. The extent and location of "fence" work is indicated on the drawings. The work includes the requirements for furnishing and installing all items and components of a completed fence system in conformance with these specifications and the dimensions and sections indicated on the drawings or as established by the Engineer.

1.02 SUBMITTALS

A. Submit supplier's certificate certifying that products meet or exceed specified requirements.

B. The Contractor shall submit shop drawings of fencing, gates and appurtenances. Shop drawings must be approved by the Engineer prior to fabrication or installation.

1.03 SITE CONDITIONS

A. Clearing of the fence line will be required. Clearing shall consist of the removal and disposal of all vegetation measuring more than one inch in diameter or higher than 15 inches above the ground. The clearing width shall be approximately ten feet for chain-link-type fences and approximately three feet for wire-type fences.

B. Grading of the fence line shall be accomplished to eliminate abrupt changes in ground contours. Grubbing incidental to grading shall be accomplished as required. Vegetation resulting from grubbing activities shall be disposed of as cleared material. Boulders, rocks, or excess excavation shall be graded along the fence line or placed adjacent to the clearing on Port property as directed by the Engineer.

PART 2 – PRODUCTS

2.01 CHAIN LINK FENCE

A. The fence shall be chain link fabric supported on a steel frame, the posts of which are embedded in concrete foundations. Barbed wire supported on brackets above the fabric portion shall be installed as indicated on the drawings. Materials shall be polymer coated heavy industrial chain link fencing in accordance with ASTM F1043, with the additional requirements as follows:

1. General: All steel fabric, framework and fittings shall be hot-dipped galvanized and black polymer coated in accordance with the applicable ASTM specification.

2. Fabric: Fence fabric height shall match existing and shall be black PVC or polyolefin elastomer coated, 7 mil to 15 mil thickness, thermally fused to zinc-coated steel core wire per ASTM F668 Class 2b, and the wire shall be No. 9 gage and the fabric shall be twisted and barbed on both selvages.

3. Framework:

a. Posts, rails and braces shall be in accordance with ASTM F1043, hot dip galvanized with minimum average 1.8 oz zinc coverage per square foot of coated surface area, with black PVC-coated finish of 10 to 15 mils, thermally fused.

1) Line posts shall be 2.375-inch O.D., Schedule 40 pipe @ 3.65 pounds per foot, or "C" section @ 2.10 pounds per foot.

2) End, corner, or pull posts shall be 2.875-inch 0.D., Schedule 40 pipe @ 5.79 pounds per foot.

3) Swing gate posts shall be sized according to the following tabulation. Pipe sizes are nominal 0.D. for Schedule 40 pipe.

Swing Gate Opening (2-in.Frames)	Gate Post	Weight, Pounds per Linear Ft
Single Pedestrian (6 ft max)	2-7/8 in. 0.D.	5.79
Single 20 ft. and over	8-5/8 in. 0.D.	24.70

4) Top rails and post braces shall be 1.66-inch O.D., schedule 40 pipe @ 2.27 pounds per foot, or Type II "C" section as detailed on the drawings @ 1.35 pounds per foot.

b. Tension Wire shall be No. 7 gage, coil spring, high tensile strength wire, Marcelled, and coated with not less than 0.80 oz. of zinc per square foot of uncoated wire surface and coated with thermally-fused black PVC or polyolefin elastomer in accordance with ASTM F1665.

c. Ties shall be No. 9 guage thermally fused black polymer coated galvanized steel meeting the requirements of ASTM F626.

4. Fittings: All fittings, accessories and hardware for Class 2b thermally fused black polymer coated galvanized chain link fence shall conform to the requirements of ASTM Designation F626 and other ASTM Designations listed therein.

5. Gates

a. Chain link gates shall be constructed with chain link fabric fastened to the end bars of the gate frame by tension bars and fabric bands, and to the top and bottom bars of the gate frames by tie wires in the same manner as specified for the chain link fence fabric.

b. Gate frames shall be constructed in accordance with ASTM F-900. The corners of the gate frame shall be welded and coated with two coats of GALVACON or approved equal and two coats of manufacturer approved black polymer coating.

Cross-trussing shall be 3/8-inch galvanized steel adjustable rods, galvanize and having class 2b thermally fused black PVC or polyolefin elastomer coating.

Each gate shall be provided complete with necessary hinges, gate keeper for each swing leaf, latch and drop bar locking device designed for the type of gate, posts and lock used.

Gates shall have positive-type latching devices with provisions for padlocking. Padlocks will be furnished by the Port of Tacoma.

6. Other Materials

a. Barbed Wire: Perimeter (Coast Guard) Fences: Each barbed wire shall conform to the requirements of ASTM F1665 and shall consist of two strands of 12-1/2-gauge having 0.007-inch minimum of class 2b thermally fused black polymer coating over 0.3-oz. of zinc coating per square foot of wire, twisted with 4-point, 14-gage barbs with the barbs spaced no more than five inches apart.

b. Concrete used in anchorage of posts shall be shall be Class B as specified in Section 03 30 00 – Cast-in-Place Concrete.

c. Barbed wire supporting arms (Coast Guard Perimeter Fences): Shall be black PVC-coated, minimum thickness of 0.006 inch, maximum thickness of 0.015 inch of the single, 45 degree outward angle 4-strand arm type and of the design required for the post furnished. Secure arms by top rail.

PART 3 – EXECUTION

3.01 GENERAL

A. The location and alignment of the fence corners and gates is indicated on the Drawings. The Contractor shall locate all intermediate line posts.

3.02 INSTALLATION

A. Fencing, gates and appurtenances shall be erected and installed by an organization regularly engaged in this business, employing labor skilled in this type of work to provide a complete security fencing system.

B. Swing gates shall be fabricated to withstand wind and swing loads. They shall have locking bars to seat into keepers that are set in concrete in ground locations which will hold the gate rigidly in position when closed. Stops which will hold the gate open shall be provided and set in concrete at the location designated by the Engineer. Hinges shall be provided which will allow the gate to swing the entire arc indicated on the drawings. Install gates on gate posts only, do not install on buildings.

C. Fabric shall be fastened to posts, the top rail and the bottom wire, with wire ties spaced as indicated on the drawings.

D. Top rails shall be continuous. The Contractor shall provide for expansion or contraction of the continuous rail. Expansion and contraction spring couplings shall be installed at intervals of 100 feet maximum.

E. Posts shall be installed vertically in the concrete with a minimum depth of embedment indicated on the drawings and at the spacing specified for the type of posts approved for the Project. In unpaved areas, the concrete shall be struck off two inches above the surrounding grade. In paved areas it shall be struck off flush with the paving. The top of the concrete shall be trowelled smooth, with a slight slope away from the posts.

F. Minor damage to galvanizing of fabric and fence appurtenances shall be repaired by thorough cleaning of the damaged surfaces and the application of "GALVACON," or approved equal, in strict accordance with the manufacturer's recommendations.

G. Upon completion of the fence, the Contractor shall clean the fence of all soiled places and repair marred or abraided areas.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The location and extent of the "Storm Drainage Utilities" work is indicated on the Drawings. The work includes the requirements for furnishing and installing storm drain pipes, and storm drain structures.

1.02 QUALITY ASSURANCE

A. Except as specified in section 3.06, the Port will provide testing and inspection service to the satisfaction of the Engineer. The Contractor may obtain test results from the Engineer at no cost. Tests conducted for the sole benefit of the Contractor, or before a product is approved, shall be at the Contractor's expense.

B. Qualification of Workmen: Employ at least one person who shall be present at all times during execution of this portion of the work, shall have all portions of the Drawings and Specifications applicable to that portion of the contract, shall be thoroughly familiar with the type of materials being installed and the best methods for their installation, and shall direct all work performed under this Section.

C. Qualifications of Land Surveyor responsible for layout of alignment and grade of site drainage piping.

D. Codes and Standards: The Contractor shall comply with the applicable provisions of all pertinent codes and regulations. References made herein for manufactured materials such as pipes, fittings, and specialties refer to designations for the latest edition of materials published by the American Association of State Highway and Transportation Officials (AASHTO), the American Society for Testing Materials (ASTM), the American Public Works Association (APWA) Standard Specification for Municipal Public Works Construction, and the WSDOT/APWA 2004 Standard Specifications for Road, Bridge and Municipal Construction.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00 – “Submittal Procedures” for the following products:

1. Manufacturer's literature on pipe and fitting materials.
2. Manufacturer’s certificates of compliance for pipe and fitting materials.
3. Manufacturer’s literature on the metal castings for manholes, catch basins and cleanouts.
4. Certificates of compliance with AASHTO HS-25 load rating requirements for precast structures and metal castings.
5. Shop drawings for precast catch basins and manholes.

PART 2 - PRODUCTS

2.01 STORM DRAINAGE PIPE

A. Polyvinyl chloride (PVC) storm drainage pipe, couplings and fittings shall comply with ASTM D 3034. PVC pipe shall have integral bell joints complying with ASTM D 3212 and gaskets conforming to ASTM F477.

B. Subdrain pipe shall be perforated polyvinyl chloride (PVC) pipe conforming to the requirements of ASTM D 3034, and AASHTO M278.

C. Ductile iron shall be used at points noted on the Drawings. Ductile Iron pipe shall be push on joint pipe by US Pipe or American Pipe.

2.02 MANHOLES AND CATCH BASINS

A. Catch Basins shall be of precast concrete and shall be made up from the components indicated on the Drawings and shall be per Washington State Department of Transportation Standard Plans for Road, Bridge and Municipal Construction, 2006 edition for dimensions and functionality. Loading criteria shall be as listed in Paragraph 1.04.

B. Metal frame and grate or cover for catch basins and manholes shall be ductile iron of the size and style indicated on the Drawings and capable of supporting the maximum loading criteria listed in Paragraph 1.04.

C. Ladders and other steel components and hardware shall be coated with HDPE.

D. Mortar shall be mixed 1:1; Type I cement and sand.

2.03 CULVERT PIPE

A. Culvert pipe shall be 128”x83” 10 gauge aluminized 5x1 corrugated metal pipe. Pipe will be furnished with connecting bands and gaskets and two 48-inch diameter access risers factory welded to the pipe.

2.04 PVC SADDLE

A. Polyvinyl chloride (PVC) clamp on pipe saddles shall be clamp-on type with O-ring seal constructed from PVC Type I cell classification 12454 or CPVC Type IV cell classification 23447. All O-rings shall be Buna-N, or EPDM. All saddles shall be piloted at O-ring area for positive positioning in pipe. All bolt clamping hardware shall be stainless steel. Saddles shall be pressure rated at 235 psi for use on pipe sizes through 4" nominal IPS diameters, 200 psi for use on 6" pipe, and 150 psi for use on 8" - 12" pipe, maximum internal pressure for water at 73° F.

2.05 PIPE COUPLING

A. Pipe couplings for joining new pipe to existing pipe shall conform to the performance requirements of ASTM C 1173 and shall include a PVC gasket, stainless steel clamps and stainless steel shear ring. Gasket shall conform to ASTM D 5926 with a minimum tensile strength of 1000 psi and minimum elongation at rupture of 250 percent. Shear ring shall be designed to resist heavy earth loads and shear forces, and retain pipe alignment. Shear ring shall be stainless steel, 0.012 inch or greater thickness.

PART 3 - EXECUTION

3.01 GENERAL

A. It shall be the Contractor’s responsibility to verify the actual locations (horizontal and vertical) of all utilities prior to beginning trench excavation. If utilities are to remain in place, provide protection from damage during construction operations.

3.02 EARTHWORK

A. Excavation, bedding, and backfilling shall be as specified in Section 31 00 00, Earthwork, of these Specifications.

3.03 SURVEYS

A. Layout of alignment and grade of site drainage piping shall be established by a Land Surveyor State licensed in Washington. Check the line and grade during installation to ensure that the Work is within the following allowable tolerances:

1. Fine-grade and prepare bedding so the pipe can be initially placed with a variation from true line or grade, measured at each joint, of not more than 1/32 inch per inch diameter or 1/2 inch maximum, provided that:

a. A resulting level or backsloping length of pipe does not occur; and

b. No more than one-half of the permissible variation shall be accumulated between successive joints.

c. Pipe laid within these tolerances shall not be subjected to any further adjustment. Measurement for grade shall be taken at the pipe invert, NOT TOP OF PIPE. Eccentricity of pipe barrels, with respect to jointing surfaces, shall not produce grade interruption adverse to flow of more than 1/4 inch maximum.

3.04 INSTALLATION OF UNDERGROUND PIPE

A. Contractor shall hold a pre-construction conference onsite with culvert manufacturer and Engineer a minimum of 2 weeks prior to beginning culvert installation.

B. Furnish all necessary machinery for the work and pump, bail, or otherwise remove any water which accumulates in the trench. Perform all work necessary to keep the trench clear of water while the foundation and the masonry are being constructed or the pipe is being laid.

C. Placing: Place the pipe from downstream to upstream with the bells pointing upstream in appropriate bedding graded to conform with the grades and alignment indicated on the Drawings and prepared as specified. Ensure that the pipe has a full, solid bearing along its entire length. Provide small depressions for pipe bells when utilized. Make minor adjustments to line and grade by scraping away, or filling in with, bedding material. Do not support pipes on blocks or mounds of any nature.

D. Jointing: Take care to properly align the pipe and clean the bell and spigot or tongue of the pipe. Gaskets must be straight, properly lubricated and without twist. The pipe shall be partially supported by hand, sling, or crane, as required, to minimize lateral pressure on the gasket and to maintain concentricity until the pipe has been forced into final longitudinal position in accordance with the manufacturer's recommendations. Pipe handling, after the gasket has been affixed, shall be carefully controlled to avoid bumping the gasket and, thus, knocking it out of position or loading it with dirt or other foreign material. Gaskets so disturbed shall be removed, cleaned, relubricated and replaced before the joint is attempted.

E. Apply sufficient restraint to the line to ensure that the joints, once home, are held so by tamping fill material under and alongside the pipe. At the end of the day's work, block the last pipe in such a manner as may be required to prevent creep during down time.

3.05 INSTALLATION OF MANHOLES AND CATCH BASINS

A. Furnish all necessary labor, materials, or equipment to pump, bail, or otherwise dewater the trench or pit for the duration of the construction and backfill period.

B. Manholes/Catch Basins

1. Place manholes/catch basins at the elevation and location indicated on the Drawings upon the appropriate bedding prepared in accordance with Section 31 00 00 – “Earthwork”.

2. Carefully place precast manholes/catch basins on the quarry spall and structural fill bedding so as to be fully and uniformly supported in true alignment, making sure that all entering pipes can be inserted on proper grade.

3. All lift holes and all joints between precast elements shall be thoroughly wetted and then completely filled with mortar, smoothed and point both inside and out, to ensure watertightness.

4. Place precast sections and align to provide vertical sides and vertical alignment of the ladder rungs. The completed catch basin shall be rigid, true to dimensions and watertight.

5. In precast manhole/catch basin sections where steel loops have been provided in lieu of lift holes, remove the loops flush with the inside wall surface after the catch basin has been completed. No sharp cutoff protrusions will be permitted. If concrete spalling occurs as a result of the loop removal, restore the spalled area with mortar to a uniformly smooth surface.

C. Grade Adjustment: The manhole/catch basin casting frame or casting ring may be either cast into a concrete collar or set flange down on pre-cast concrete adjustment rings and mortared, as directed by the Engineer. It shall not, in any case, be grouted to final grade until the final elevation of the pavement in which it is to be placed has been established and permission has been given by the Engineer to grout the casting in place. Provide not less than eight inches or more than 16 inches between the top of the cone or slab and the underside of the manhole casting ring for adjustment of the casting ring to grade. Bricks for grade adjustment shall not be used. Location of manholes/catch basins will be staked by the Contractor.

D. Pipe Connections: Place all pipes entering or leaving the structure on firmly compacted bedding, particularly within the area of the structure excavation, which normally is deeper that that of the sewer trench. All openings in the walls of catch basins constructed with precast sections for the insertion of pipe connections and outlet trap castings shall, after pipe or castings have been placed to their final position, be grouted tight in place to present a smooth uniform surface inside and outside. Pipe placed through walls to which connections will be made shall be so placed that the socket end of the pipe is backed against the outside surface of the catch basin as closely as practicable for the angle of entrance. The spigot end of the pipe shall be cut square with the last point of contact with the inside wall surface. Provide flexible joints within 12 inches of the catch basin structure.

E. Backfill: Hand-place backfill around the manhole, extending at least one pipe length into each trench and tamp with selected material up to an elevation of six inches above the crown of all entering pipes. Conform to the applicable provisions of Section 31 00 00 – “Earthwork”.

3.06 ACCEPTANCE TESTING

A. After completion of the following, authorization from the Engineer shall be required before the Contractor can perform acceptance testing:

1. Acceptable placement of applicable pipe, bedding, and backfill material.

2. Acceptable completion of all applicable manhole channels and grout work.

3. Acceptable debris removal, cleaning, and flushing of all applicable pipes and structures.

B. Contractor shall perform testing as required by Section 7-17.3 (2) Cleaning and Testing of the WSDOT Standard Specifications for Road Bridge and Municipal Construction, 2014 Edition. Infiltration Testing shall be required where the pipe is installed below the ground water table.

C. Before final acceptance, the Contractor shall inspect all drainage lines by the use of a television camera, utilizing a Port approved independent inspection service company. The television inspection requirements shall include the provisions of:

1. A color analog/digital camera with pan and tilt capacity in order to view all main lines, lateral lines, and structures including channels.

2. A dye solution to be introduced in sufficient quantity to travel from the structure that is the highest point of inspection to the downstream terminus of the inspection limits. Red or purple dye shall be used for PVC pipe and green dye for ductile iron and concrete pipe.

3. A one-inch reference ball to be mounted to the camera in order to drag along the bottom of the pipe during the entire inspection procedure.

4. Linear measure references to be measured from the center of the beginning structure to the center of the next inline structure and include the direction of flow. The locations of lateral pipes and all distinctive pipe conditions shall be referenced to the centerline of the beginning structure. All structure references shall utilize the designated structure reference numbers shown on the plans.

D. The following television inspection information shall be provided to the Engineer:

1. A clear movie format on DVD which encompasses the limits of the inspection area and including all reference data as described herein. A tape reference time and date for the start of each run shall also be indicated.

2. A written report shall be provided corresponding to the taped inspection and including all reference data as described herein. The report shall consist of a written narrative of all distinctive pipe conditions including ponding areas in excess of ¼ inch.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. The location and extent of the "Storm Water Treatment" work is indicated on the Drawings. The work includes the requirements for furnishing and installing all items and components of a completed Storm Water Treatment System as follows:

B. Description

1. The Contractor shall furnish and install modular stormwater biofiltration systems, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.

   Modular stormwater biofiltration systems shall consist of a pretreatment chamber containing filtration cartridges, a horizontal flow biofiltration chamber with a peripheral void area and a centralized and vertically extending underdrain, the biofiltration chamber containing a sorptive media mix which does not contain any organic material and a layer of plant establishment media, and a discharge chamber containing an orifice control structure.

   Modular stormwater biofiltration systems shall approved by Washington State Department of Ecology with a General Use Level Designation for basic, enhanced and total phosphorous treatment requirements.

2. The Contractor shall furnish and install catch basin storm filter stormwater treatment systems, complete and operable as shown and as specified herein, in accordance with the requirements of the plans and contract documents.

   Catch basin storm filter stormwater treatment systems shall consist of an underground structure that houses passive siphon-actuated, radial-flow media-filled filter cartridges. The siphon actuated radial flow filter cartridges shall be rechargeable and shall incorporate a self actuated surface cleaning mechanism to increase the effective life of the filter media and to reduce the accumulation of material on the cartridge surface. Each radial flow filter cartridge shall operate at a predetermined flow rate through the use of an integrated flow control orifice located within each filter cartridge outlet manifold.

   Catch basin storm filter stormwater treatment systems shall approved by Washington State Department of Ecology with a General Use Level Designation for basic treatment requirements.

1.02 QUALITY ASSURANCE

A. Qualification of Workmen: Employ at least one person who shall be present at all times during execution of this portion of the work, shall have all portions of the Drawings and Specifications applicable to that portion of the contract, shall be thoroughly familiar with the type of materials being installed and the best methods for their installation, and shall direct all work performed under this Section.

B. Codes and Standards: The Contractor shall comply with the applicable provisions of all pertinent codes and regulations. References made herein for manufactured materials such as pipes, fittings, and specialties refer to designations for the latest edition of materials published by the American Association of State Highway and Transportation Officials (AASHTO), the American Society for Testing Materials (ASTM), the American Public Works Association (APWA) Standard Specification for Municipal Public Works Construction, and the WSDOT/APWA 2004 Standard Specifications for Road, Bridge and Municipal Construction.

C. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection by the Engineer. Such inspection may be made at the place of manufacture, or on the work site after delivery, or at both places, and the sections shall be subject to rejection at any time if material conditions fail to meet any of the specification requirements, even though sample sections may have been accepted as satisfactory at the place of manufacture. Sections rejected after delivery to the site shall be marked for identification and shall be removed from the site at once. All sections that have been damaged beyond repair during delivery will be rejected and, if already installed, shall be repaired to the Engineer's acceptance level, if permitted, or removed and replaced, entirely at the manufacturer's expense.

1.03 SUBMITTALS

A. The Contractor shall design and provide vaults including grade rings, frames, and covers for the following criteria:

1. Rail Load: E-80 rail loading, load factor 2.33 for ultimate strength design
2. Truck Load: HS25 – 44 Load, load factor 2.17 for ultimate strength design

Allowable soil bearing capacity of 2,500 PSF.

Submit design calculations, shop drawings, and product information for each wheel loading condition and all items related to the concrete vault and manhole structure fabrications and installations. Calculations and construction shall include compensation to prevent buoyancy assuming groundwater at 2 feet below grade.

Shop Drawings and calculations shall be stamped by a structural engineer registered in the State of Washington shall be submitted and approved by the Engineer prior to fabrication.

B. Shop and installation drawings shall include all dimensions, filter placement, location of piping and vault foundation.

C. Manufacturer's literature on the catch basin storm filter storm water treatment system that includes information on the performance and operation of the units, materials of construction, dimensions, hydraulic capacity calculations including flow and head-loss data.

D. Submit (4) copies of the Operation and Maintenance Manuals for catch basin storm filter and modular stormwater biofiltration units upon completion of installation

PART 2 - PRODUCTS

2.01 MODULAR STORMWATER BIOFILTRATION INTERNAL COMPONENTS

A. All water transfer system components shall conform with the following;

1. Filter netting shall be 100% polyester with a number 16 sieve size, and strength tested per ASTM D 3787.
2. Drainage cells shall be manufactured of lightweight injection-molded plastic and have a minimum compressive strength test of 6,000 psi and a void area along the surface making contact with the filter media of 75% or greater. The cells shall be at least 2" in thickness and allow water to freely flow in all four directions.

B. Filter cartridges shall operate at a loading rate not to exceed 3 gallons per minute per square foot surface area.

C. Drain down system shall include a pervious floor that allows water to drain into the underdrain pipe that is connected to the discharge chamber.

D. Media shall consist of ceramic material produced by expanding and vitrifying select material in a rotary kiln. Media must be produced to meet the requirements of ASTM C330, ASTM C331, and AASHTO M195. Aggregates must have a minimum 24-hour water absorption of 10.5% mass. Media shall not contain any organic material. Flow through media shall be horizontal from the outer perimeter of the chamber toward the centralized and vertically extending underdrain. The retention time in the media shall be at least 3 minutes. Downward flow filters are not acceptable alternatives. The thickness of the media shall be at least 19" from influent end to effluent end. The loading rate on the media shall not exceed 1.1 gallons per minute per square foot surface area. Media must be contained within structure that spaces the surface of the media at least 2" from all vertically extending walls of the concrete structure.

2.02 CATCH BASIN STORM FILTER COMPONENTS

A. ABS manifold pipe shall meet ASTM specification F628. PVC manifold pipe shall meet ASTM specification D1785 and PVC fittings shall meet ASTM specification D2466.

B. Filter cartridge bottom pan, inner ring, and hood shall be constructed from linear low density polyethylene (LLDPE) or ABS. Filter cartridge screen shall consist of 1" x ½" welded wire fabric (16 gauge minimum) with a bonded PVC coating. Internal parts shall consist of ABS or PVC material. Siphon-priming float shall be constructed from high-density polyethylene (HDPE). All miscellaneous nuts, bolts, screws, and other

C. Fasteners shall be stainless steel or aluminum.

D. An orifice plate shall be supplied with each cartridge to restrict flow rate to a maximum of 22.5 gpm at system design head or as specified on drawings.

E. Filter media shall be provided by same manufacturer as filtration system. Filter media shall be zeolite-perlite-granular activated carbon (ZPG) mixture. ZPG is a mixed media that shall be composed of a 1.3 ft3 outer layer of 100% perlite and a 1.3 ft3 inner layer consisting of a mixture of 90% zeolite and 10% granular activated carbon.

1. Perlite media shall be made of natural siliceous volcanic rock free of any debris or foreign matter. The perlite media shall have a bulk density ranging from 6.5 to 8.5 lb/ft3 and particle sizes ranging from that passing through a 0.50 inch screen and retained on a u.s. standard #8 sieve

2. Zeolite media shall be made of naturally occurring clinoptilolite, which has a geological structure of potassium-calcium-sodium aluminosilicate. The zeolite media shall have a bulk density ranging from 44 to 48 lb/ft3, particle sizes ranging from that passing through a u.s. standard #4 sieve to that retained on a u.s. standard #6 sieve, and a cation exchange capacity ranging from 1.0 to 2.2 meq/g.

3. Granular activated carbon (gac) shall be made of lignite coal that has been steam activated. The gac media shall have a bulk density ranging from 28 to 31 lb/ft3 and particle sizes ranging from that passing through a u.s. standard #4 sieve to that retained on a u.s. standard #8 sieve.

F. Catch basins for catch basin storm filter treatment systems shall be all welded steel construction, fabricated from ASTM A36 steel or shall be concrete conforming to Paragraph 2.03. Catch basin shall be designed to withstand loading criteria as listed in Paragraph 1.04.

2.03 PRECAST CONCRETE VAULT

A. Pre-cast concrete vaults shall be provided according to ASTM C857 and C858. Loading criteria shall be as listed in Paragraph 1.04.

B. Vault joint sealant shall be Conseal CS-101 or approved equal.

C. If interior concrete baffle walls are provided, baffle walls shall be sealed to the interior vault walls and floor with a polyurethane construction sealant rated for use below the waterline, SikaFlex 1a or equal. Contractor to provide sealant material and installation unless completed prior to shipment.

D. Metal frame and grate or cover for catch basins and manholes shall be ductile iron of the size and style indicated on the Drawings and capable of supporting the maximum loading criteria listed in Paragraph 1.04.

E. Steps shall be constructed of copolymer polypropylene conforming to ASTM D-4101. Steps shall be driven into preformed or drilled holes once concrete is cured. Steps shall meet the requirements of ASTM C-478 and AASHTO M199. The ½ -inch Grade 60 deformed reinforcing bar shall meet ASTM A-615.

F. Ladders shall be constructed of aluminum and steel reinforced copolymer polypropylene conforming to ASTM D-4101. Ladder shall bolt in place. Ladder shall meet all ASTM C-497 load requirements. Ladders provided upon request or where required.

2.04 OTHER COMPONENTS

A. All contractor-provided components shall meet the requirements of this section, the plans specifications and contract documents. In the case of conflict, the more stringent specification shall apply.

1. Silicone Sealant shall be pure RTV silicone conforming to Federal Specification Number TT S001543A or TT S00230C or Engineer approved.

2. Grout shall be non-shrink grout meeting the requirements of Corps of Engineers CRD-C588. Specimens molded, cured and tested in accordance with ASTM C-109 shall have minimum compressive strength of 6,200 psi. Grout shall not exhibit visible bleeding.

PART 3 - EXECUTION

3.01 GENERAL

A. It shall be the Contractor's responsibility to verify the actual locations (horizontal and vertical) of all utilities prior to beginning excavation. If utilities are to remain in place, provide protection from damage during construction operations.

3.02 EARTHWORK

A. Excavation, bedding, and backfilling shall be as specified in Section 31 00 00 – "Earthwork" of these Specifications.

3.03 PRECAST CONCRETE VAULTS AND CATCH BASINS

A. Set pre-cast vaults and catch basins on aggregate base material that has been placed in maximum 12-inch lifts, loose thickness, and compacted to at least 95-percent of the maximum dry density as determined by the standard Proctor compaction test, ASTM D698, at moisture content of +/-2% of optimum water content.

B. Inlet and outlet pipes shall be stubbed in and connected to pre-cast concrete vault shown on the drawings. If grout is used, Contractor to grout all inlet and outlet pipes flush with or protruding up to 2 inches into interior of vault.

C. Catch basins shall be connected with no-hub stainless steel connectors an adapter fittings as necessary.

3.04 CLEAN UP

A. Remove all excess materials, rocks, roots, or foreign material, leaving the site in a clean, complete condition approved by the engineer. All filter components shall be free of any foreign materials including concrete and excess sealant.

3.05 FILTER CARTRIDGES

A. Filter cartridges shall be delivered with the vault and catch basins. Contractor shall take appropriate action to protect the cartridges from sediment and other debris during construction. Methods for protecting the cartridges include but are not limited to:

1. Remove cartridges from vaults and catch basins and store appropriately. Cartridges shall be reinstalled to operate according to 3.05 B.
2. If vault is equipped with underdrain bypass piping, Contractor may leave cartridges in the vault and allow stormwater entering collection system to bypass filter bay through underdrain bypass piping.
3. Leave cartridges in the vaults and catch basins and plug inlet and outlet pipe to prevent storm water from entering the vault.

The method ultimately selected shall be at Contractor’s discretion and Contractor’s risk.

B. Filter cartridges shall not be placed in operation until the vault is clean and the project site is clean and stabilized. The project site includes any surface that contributes storm drainage to the filter. All impermeable surfaces shall be clean and free of dirt and debris. All catch basins, manholes and pipes shall be free of dirt and sediments. Contact Manufacturer to assist with system activation and/or inspect the system for proper installation once site is clean and stabilized.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section specifies the material requirements and performance criteria for complete trackwork and special trackwork to be furnished and installed by the Contractor in accordance with the Contract Drawings.

B. Except as modified herein, special trackwork shall be designed, manufactured, tested, assembled, inspected, handled and shipped in accordance with the current edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Portfolio of Trackwork Plans, and the AREMA Manual of Railway Engineering.

C. The extent and location of railroad work is indicated on the drawings. The work includes the requirements for providing railroad track and special trackwork complete with rail, ties and all appurtenances necessary for a complete, operable railway system.

1.02 REFERENCED STANDARDS:

A. American Railway Engineering and Maintenance-of-Way Association - Manual for Railway Engineering (AREMA) 2014.

B. American Railway Enginering and Maintenance-of-Way Association – Portfolio of Trackwork Plans (AREMA PORTFOLIO) 2014.

C. Code of Federal Regulations Title 49 – Transportation, Chapter II – Federal Railroad Administration, Department of Transportation, Part 213 – Track Safety Standards.

D. Code of Federal Regulations Title 49 – Transportation, Chapter II – Federal Railroad Administration, Department of Transportation, Part 214 – Railroad Workplace Safety.

E. American Wood Preservers Association (AWPA) – M4-98 Standard for the Care of Preservative Treated Wood Products.

1.03 CONTRACTOR FURNISHED MATERIAL:

A. Contractor shall provide all materials required for completion of the Work, except those materials identified on the Drawings as Port Furnished Material.

1.04 PORT FURNISHED MATERIAL:

A. The Port will provide the materials identified on the Drawings as Port Furnished Material. Quantity of Port Furnished Material items shall be as indicated on the Drawings.

B. Port furnished materials shall comply with product specifications of this Section and Section 34 11 23 – Special Trackwork.

C. Port Furnished Materials shall be delivered by material suppliers to Contractor Laydown Area identified on the Drawings. Contractor shall be responsible for unloading materials from trucks.

D. The Contractor shall receive products at the site and give written receipt for materials at the time of delivery, noting visible defects and omissions. If such declaration is not given, the Contractor shall assume responsibility for such defects and omissions.

E. The Contractor shall store materials until ready for installation and protect from loss and damage.

1.05 SUBMITTALS:

A. Rail Construction Sequencing Plans as described in Section 01 14 100, Work Restrictions

B. Certification of Rail

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Rail delivered to the site is in conformance with AREMA Specifications Chapter 4, Part 1 Design of Rail and Part 2 Manufacture of Rail.

2. The chemical analysis of the rails listed by heat number, and the specified chemical analysis elements.

3. The Brinell hardness of the rails shipped by heat numbers.

C. Certification of Other Track Material

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Joint Bars, Compromise Joints, Track Bolts, Nuts and Washers delivered to the site are in conformance with AREMA Specifications Chapter 4, Part 3 Joining of Rail.

D. Certification of Tie Plates

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Tie Plates delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 1 Tie Plates and these specifications.

2. Contractor to provide shop drawing detailing all tie plates using elastic fasteners.

E. Certification of Elastic Fasteners on Timber Ties

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Elastic Fasteners delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 9, Design Qualification Specifications for Elastic Fasteners of Timber Cross Ties.

2. Contractor to provide shop drawing detailing elastic fasteners and clamping force.

F. Certification of Screw Spikes

1. Contractor to provide Certifications of compliance from suppliers or manufacturers that Screw Spikes delivered to the site are in conformance with AREMA Specifications Chapter 5, Part 10, Section 10.1 Steel Screw Spikes.

G. Gage Rods: Provide catalog cut.

H. Ballast

1. The Contractor shall provide laboratory certification that the railroad ballast meets the Specifications of this Section.

2. Offsite borrow source characterization in accordance with Section 31 00 00, Earthwork.

I. Top of rail profile. Vertical control survey of finished top of rail. Submittal to consist of a table comparing proposed top of rail elevations to as constructed top of rail elevations at 50 foot intervals along the centerline of alignment. Submittal to be reviewed and approved by Engineer.

J. Flangeway detail. Shop drawing detailing method of providing flange way block out in asphalt placed around the rail. Plan to be approved by the Engineer before paving around rail begins.

K. Manufacturers literature on air pits and track lubricators.

1.06 QUALITY ASSURANCE:

A. The Contractor performing railroad work shall be regularly engaged in the furnishing and installation of railroad trackwork, and shall employ at least one (1) supervisory person who is thoroughly trained and experienced in trackwork construction. The supervisor shall be completely familiar with the design and application of the work described in this Section and shall direct all work performed under this Section.

B. The Contractor shall own a copy of the American Railway Engineering and Maintenance-of-Way Association - Manual for Railway Engineering (AREMA) 2014, Chapters 1, 4, 5, and 30.

PART 2 - PRODUCTS

2.01 GENERAL:

A. Furnish and install all track materials and products to complete the railroad track and special trackwork, as shown on the Drawings. Completed railroad track shall conform in all regards to the AREMA Manual of Railway Engineering.

B. All materials shall be new, except those materials salvaged from demolition for relay or reinstallation as specified in Section 02 41 13, Selective Site Demolition. Use of relay materials shall only be permitted within the limits shown on the Drawings.

C. Trackwork will use a resilient fastening system, Pandrol type E, or approved equal.

2.02 RAIL:

A. All rail shall be 115 RE meeting the requirements of AREMA Manual, Chapter 4, Part 2, Specification Section “Specifications for Steel Rails”. The Contractor shall provide high strength head hardened rail. High strength head hardened rail shall have a minimum surface Brinell Hardness number of 370.

B. Rail shall be supplied in 80-foot lengths with not more than 10% short rail segments between 33 feet and 39 feet.

C. Bolt holes within the rail are not acceptable, except at the ends of the rail at locations where joint bars are used.

D. The rail section shall conform to the dimensions shown in AREMA Manual, Chapter 4, Part 1 for 115 RE.

2.03 RAILWAY SUBBALLAST:

A. Subballast shall be clean, open graded material removed from the excavation of existing ballast as approved by the Engineer.

2.04 RAILWAY BALLAST AND WALKWAY ROCK:

A. Railway ballast shall conform to the material requirements and be manufactured in accordance with AREMA Chapter 1, Part 2 Ballast. Ballast shall be manufactured by mechanical crushing from ledge rock, talus, or quarry rock and 100% of the material shall have at least one fractured face and 95% of the material retained on a 3/4-inch screen shall have three (3) fractured faces.

B. Railway Ballast material shall not contain more than a total of 1% by weight of wood wastes, clay lumps, dust, or other extraneous material. Carbonate rock and slag is prohibited for use as ballast.

C. The material from which railway ballast is manufactured shall meet the following test requirements:

1. Los Angeles, Wear, 500 Rev. 35% max.
2. Railway Ballast shall conform to AREMA No. 4 gradation requirements when sampled from stock pile to be loaded for shipment:

Table 34 05 17–A, AREMA No. 4 Gradation	
Sieve Size	Passing % by Weight
2 inch	100
1 1/2 inch	90-100
1 inch	20-55
¾ inch	0-15
½ inch	-
3/8 inch	0-5

3. Walkway rock shall be railway ballast conforming to AREMA No. 5 gradation requirements when sampled from stock pile to be loaded for shipment:

Table 34 05 17–B, AREMA No. 5 Gradation	
Sieve Size	Passing % by Weight
1 1/2 inch	100
1 inch	90-100
¾ inch	40-75
½ inch	15-35
3/8 inch	0-15
No. 4	0-5

4. Gradation test shall be determined in accordance to ASTM C-136, utilizing square opening sieves conforming to ASTM Specifications E-11.
5. Material qualities shall be as follows:

Table 34 05 17–C, Ballast Material Qualities			
Property	Minimum	Maximum	Test Method
Percent Passing No. 200 Sieve	-	1%	ASTM C117
Bulk Specific Gravity - Rock	2.6	-	ASTM C127
Absorption – Rock	-	1.3%	ASTM C127
Clay Lumps and Friable Particles	-	0.5%	ASTM C142
Degradation	-	35%	ASTM C535 ASTM C131

Flat and Elongated Particles	-	5%	ASTM D 4791 Test C, Length > 3 times avg thickness

2.05 JOINT BARS AND COMPROMISE JOINTS:

A. Joint bars shall conform with the AREMA Manual, Chapter 4, Part 3 "Joining of Rail", Section 3.1 and 3.2. Joint Bars shall be 6-hole, 36 inches long, conforming to the AREMA Manual for Railway Engineering, Section 3.2 “Joint Bars and Assemblies.”

B. The bars shall be smoothly rolled, or forged, true to template and shall accurately fit the rails for which they are intended and shall provide a true alignment of the gage and running surfaces of the two rails being connected. A variation of ±1/32 inch from the specified size of holes, or ±1/16 inch from the specified location of holes, and of ±1/8 inch from the specified length of joint bar will be permitted.

C. Where compromise joints are shown, Contractor shall field verify the type of existing rail to select proper compromise joint bars.

D. Each compromise joint bar shall also have the rail sections shown at each end along with the word “Gage” or “Out” to indicate on which side of the rail the bar is to be used. (If the compromise joint bars are interchangeable, the words gage and out will be omitted.)

2.06 TIE PLATES:

A. Tie plates shall conform to AREMA Manual Chapter 5, Part 1, "Specifications for Steel Tie Plates".

B. Either low carbon or high carbon steel tie plates may be furnished.

C. Tie plates shall accommodate two elastic spring clips and at least four screw spikes to secure the plates to the timber ties. Tie plates to have a minimum length of 16” for 136 RE and minimum length of 15" for 115 RE. Tie plates shall have minimum width of 7-3/4" and minimum thickness of 5/8" under the rail in base section.

D. Tie plates to have 1" diameter holes to accommodate 15/16" diameter screw spikes.

E. Tie plate section to be canted 1:40,+/-5, toward the center line of track.

F. Tie plates shall have smooth flat bases with no ridges or indentations.

2.07 TRACK BOLTS, NUTS, AND SPRING WASHERS:

A. Track bolts and square nuts shall be new, conforming to the current AREMA Manual, Chapter 4, Part 3, "Specifications for Heated Treated Carbon Steel Track Bolts and Carbon Steel Nuts". Spring washers shall be new conforming to the current AREMA manual Chapter 4, Part 2, "Specification for Spring Washers". For each track bolt, provide a square nut and spring washer of proper size for each bolt.

2.08 ELASTIC RAIL CLIPS:

A. The elastic rail clips to be used shall be one piece, threadless fasteners of spring steel Pandrol e-2055 Rail or approved equal, which must meet all the following requirements:

B. An easy to install one piece elastic spring steel rail clip without threaded elements which can be easily removed from its housing without any possible damage to or the loss of the lateral support provided by the shoulder. The design and configuration of the clips, their housing and

their area in contact with the rail should be such that a nominal rail seat clamping force of 2500 pounds per clip is provided and frequent rail slippage can be allowed without stressing, bending, twisting or damaging the clips or their housing.

2.09 SCREW SPIKES:

A. Screw spikes shall be new, conforming to the current AREMA Manual, Chapter 5, Part 10, Section 10.1.

B. Screw spikes used to fasten the plates to the timber ties shall be one piece with reinforced throat, 3/4" by 1-1/8” rectangular head, 15/16-inch diameter, 6-1/2-inches long per AREMA Plan 1S-12 AREMA Rectangle Head Screw Spike.

C. The head shall be concentric with and firmly joined to the body of the screw. The material shall be free from injurious defects and shall have a workmanlike finish. Screws shall be provided with plain finish.

D. Finished screws shall conform to the following minimum requirements for tensile properties:

1. High Strength

a. Tensile Strength, psi 120,000 Min

b. Yield Strength, psi 80,000 Min

c. Elongation, % 18 Min

E. Except for heat-treated screws, steel mill cert data may be used for tensile strength with approval of the Port.

F. A letter or brand indicating the manufacturer shall be located on the top of the washer of each screw.

G. High strength screws shall be marked with an “H” of the top of the washer.

2.10 GAGE RODS:

A. Gage rods shall be manufactured to fit the specified rail, shall be manufactured from 1-1/4-inch diameter steel bar with double adjustable clamps at both ends to grip both sides of the rail, and shall be set for standard gage track. Gage rods to be installed on 13’ centers within the curves.

B. All gage rods within the limits of grade crossing signal circuit limits shall be insulated.

2.11 AIR CONNECTION PITS

A. Air connection pits shall be cast-in-place concrete with fiberglass pit liner and cast aluminum double hinge cover assembly. Fiberglass pit liner shall have integral concrete anchors and top flange. Cover shall have an overall diameter of 23.5-inches and hinged concentric access lid of 18-inch diameter. Cover shall have “AIR” cast in two directions. Pits shall be DABICO Model DAB-24DHS-VA or approved equal.

2.12 TRACK LUBRICATORS

A. Track lubricators shall an assembly of lubricant tank, pumping components, hoses, applicators, controls, sensors, protective mats, foundation and all associated hardware designed for the delivery of friction management lubricants to the top of rail and gauge face of rail and designed for freight rail applications. Track lubricators shall be a proven effective design with a minimum of 2,500 units currently in service.

B. Track lubricators shall deliver lubricants at a controllable rate, delivering grease at a rate of 0.75 pounds per 1000 axle passages, and deliver other lubricants at a rate of 0.5 liters per

1000 axle passages. Wheel sensors shall be non-contact and shall activate lubricant delivery upon bi-directional passage of train rolling stock.

C. Lubricator pumps, hoses and applicators shall deliver consistent and balanced amounts of lubricant to each rail. Lubricator pump shall be gear type and shall be suitable for delivering greases and oils. Lubricant applicators shall apply lubricant to the gauge face of each rail and shall be of aluminum construction. Each applicator shall be a minimum of 55 inches in length with a minimum of 48 ports for the distribution of lubricant across the gauge face of the rail. Applicators shall be designed for installation without grinding or cutting of rail. Each track lubricator shall be furnished with six applicators, two applicators for each rail and two spares, and lubricant hoses and fittings conforming to the manufacturers recommendations.

D. Lubricator shall be designed for use DC Solar power at 120 or 240 volts and 60Hz. So DC solar power components for a fully functional power system shall be furnished with each track lubricator. Solar panels shall include vandal resistant shielding and aluminum frame and support. Battery shall be non-spillable, deep cycle battery.

E. Control systems shall be enclosed in a watertight enclosure on the exterior of the lubricant tank and shall provide fuse and surge protection, and manual test function. Controls shall be solid state and shall allow for adjustment of lubricant pump activation interval and duration.

F. Lubricant tank shall provide capacity for 800 pounds of grease and a minimum volume of 100 gallons. Lubricant tank shall be sloped to drain to pump intake and shall have a watertight locking lid.

G. Protective mats shall be puncture and solvent resistant fabric manufactured from recycled materials and resistant to UV deterioration. Mats shall contain dripping lubricants while allowing water to pass through. Protective mats shall cover the full width of the track ties at the lubricator installation site and shall extend a minimum of 30 feet along the track beyond each end of the applicators, a total minimum length of 70 feet.

H. Lubricator tank, pump and controls shall be mounted on timber ties in accordance with manufacturers recommendations.

2.13 LUBRICANT

A. Lubricant shall be high performance grease conforming to the following characteristics:

Operating Temperature Range (°C)	-40 to 120
NLGI Grade	0
Drop Point (°C)	165
Base Oil Viscosity, cSt (°C)	68

PART 3 - EXECUTION

3.01 GENERAL:

A. The track will be constructed using timber ties and bolted rail. In general, the track is to be constructed using 80-foot rail lengths. Burned or sheared rail will not be accepted. Tie spacing will be 21 inches on center for tangent track and 19-1/2 inches on center for curved track.

B. Track construction shall be in conformance with the standards of the American Railway Engineering and Maintenance-of-Way Association and the requirements set forth below.

C. Track construction shall be performed in conformance with CFR 49 Chapter II, Part 214.

D. When power is

3.02 RAILWAY BALLAST:

A. Subballast and ballast sections shall conform to typical cross sections shown in the Drawings.

B. Subballast and ballast shall be unloaded at required locations in a manner to minimize redistribution and handling.

C. Ballast shall be placed before the ties are laid. Raise both rails uniformly to the designed grade.

D. Care shall be taken when distributing materials from trucks and off-track equipment to prevent forming of ruts that would impair proper drainage of subgrade surface.

E. Ballast shall only be installed over subgrade which has been prepared in accordance with this Specification and has been approved by the Engineer.

F. Place ballast in lifts not more than 6 inches in thickness before compaction. Layers shall extend beyond the edge of the ties as shown on the Contract Drawings before compaction . Compact ballast thoroughly to form a stable section able to support the subsequent layers and loads.

G. Compaction of ballast shall be by means of vibratory compaction equipment or specifically manufactured for compaction purposes. Self-propelled, pneumatic-tired roller shall have a gross weight of 10 to 15 tons, and the vibratory compactor shall have a weight of not less than 10 tons and shall be capable of applying a dynamic load of not less than 18,000 pounds at 1300 to 1500 cycles per minute. Proposed compaction equipment shall be approved by Engineer.

H. Engineer will approve the compacted ballast prior to installation of track and appurtenant work over ballast. Each lift of ballast within initial layer shall be uniformly spread and compacted with not less than four passes of either a self propelled, pneumatic-tired roller or vibratory compactor.

I. Track shall be assembled on compacted ballast to permit placement of additional ballast for subsequent raising and tamping and to provide full depth under ties.

J. Final track raise shall not exceed 2 inches, and ballast shall be compacted with a 16 tool vibrating squeeze-type mechanical tamper making one full tamping insertion per tie for each inch of raise. Ballast in crib areas shall be compacted by a means approved by Engineer. Track shall be raised, aligned and tamped to within the specified tolerances.

K. Ballast shall be thoroughly tamped within a space from 15 inches inside each rail to ends of ties. In tamping ties within above described limits, simultaneous tamping shall be performed under each rail. Tamping is not permitted at center of tie except within limits of turnouts and crossings.

L. Pneumatic or electric tamping tools, either hand held or machine mounted, shall be used. Hand tamping with shovels or picks is not permitted.

M. Two tamping tools shall always be used opposite each other on same tie. Tamping tools shall be started from a nearly vertical position and worked downward past bottom of tie, after which tool should be slanted downward to force ballast under tie. Double tamp every joint tie;

N. Ballast shall be mechanically dressed to provide proper section as shown on Drawings.

O. Excess ballast shall be removed, or may, at Contractor 's option, be placed as directed by Engineer. Payment will not be made for ballast in excess of dimensions shown on Drawings.

P. Overworked and excessively tamped ballast shall be removed and replaced at Contractor's expense.

3.03 TRACK CONSTRUCTION:

A. Trackwork: Lay rails on timber tie track with staggered joints such that joints in opposite rails shall be staggered not less than 12 feet apart. Use temporary shims to secure proper spacing between the ends of rails. The rail temperature, at the time of laying, shall determine the number and thickness of shims required. Shim thickness shall be in accordance with table 5.2 in AREMA Section 5.1.4.

B. Space timber ties 21 inches on center for tangent track and 19-1/2 inches on center for curved track, unless otherwise noted. Any deviation from the specified spacing shall be approved by the Engineer prior to installation of spikes or hold down devices.

C. Care shall be taken in handling or spacing ties to not damage them with picks or spiking hammers. Ties shall be lifted and supported during storage, transportation, and placed in such a manner as to prevent damage. Ties shall not be dropped to the roadbed. Tie tongs, lining bars, other suitable tools or tie spacing equipment shall be used.

D. Place wood ties with heartwood face down and square to the rail, except as otherwise shown in the Drawings.

E. Ties shall be placed within 0.5 inches of perpendicular to the opposite rail.

F. Cribs shall be filled to full height unless otherwise directed by the Engineer.

G. Tie Plates: Set tie plates in correct position on the ties, true to gage, and with shoulders in full contact with the rail. Place one tie plate under each rail at each tie.

H. Joint Bars: Secure joint bars in place with the full number of bolts, nuts and lockwashers. Stagger bolts, with heads placed inside and outside alternately, and draw tight before fastening rail to tie.

1. A lubricant shall be applied on the rail within the area of the joint bar at time of installation.

2. Rail joints shall be applied so that bars are not cocked between base and head of rail. Bars are to be properly seated in rail.

3. Rail joints are not to be placed in limits of paving on asphalt crossing.

I. Screw Spikes: Two screw spikes to be provided each side of rail for a total of four screw spikes per plate.

J. Gage Rods: Gage rods shall be provided in all curves and spaced at 13-foot centers along the centerline of track.

3.04 TRACK LAYING:

A. The Contractor shall construct the track in conformance with the alignment and profile data shown on the Drawings. Alignment is based on the center line of track, equidistant between gage sides of the rails.

B. The Contractor shall perform final surfacing and tamping following all other track construction items affecting the track structure. The ballast to conform to the ballast section shown on the Drawings.

C. The Contractor shall place the track in good alignment before the final ballast lift is made. The maximum throw for final lining shall not exceed 1 inch. Contractor shall set hubs for the alignment before the final lift is made and final alignment shall conform to the hubs.

D. Gage of Track:

1. Gage of track is the inside dimension between running rails, measured at right angles to the alignment of the track 5/8" below top of rail. The standard gage of track is 4'-8 1/2".

E. Track Tolerances:

1. The final gage, cross level, and horizontal and vertical alignment of all track shall be within the tolerance shown below:

2. Gage variation:

a. Gage variation shall not exceed 1/8"(+/-) in new track construction.

b. New track will be laid to 4'-8 1/2" gage.

3. Cross Level:

a. Deviation from cross level: No reverse cross level on curves will be allowed. A maximum deviation of minus 1/2 inch cross level on inside rail of curve will be allowed. A maximum of 1/4" cross level deviation will be allowed on tangent track.

4. Horizontal Track Alignment:

a. Maximum allowable deviation of the middle ordinate from a 62-foot chord,

b. On curves: 3/8 inch

c. On tangents: 1/4 inch

F. Vertical Track Profile:

1. The maximum permissible variation from profile elevation detailed on profile drawings shall be + 1/2 inch, -0 inch

G. Maximum permissible runoff per 40 feet in any interim raise shall not exceed: 1 inch

H. The maximum permissible variation from a uniform profile on either rail at the mid-ordinate of a 62-foot chord shall not exceed: 1/4 inch

3.05 ASSEMBLE AND INSTALL SPECIAL TRACKWORK:

A. Install turnouts and crossovers as shown on Drawings.

B. Installation of frog plates, switch plates, and plates under closure rails shall conform with AREMA trackwork standards, and Shop Drawings.

C. Following installation of special trackwork on initial layer of ballast, special trackwork shall be lifted, aligned and supported prior to placement of final ballast.

D. Ballast shall be uniformly placed and spread. Turnout shall then be raised and ballast tamped under both sides of each tie for the full length of tie. Tamp ballast thoroughly throughout length of all ties in turnout. Hand-held power tamping tools shall be used where workheads of tampers cannot reach tie cribs in Special Trackwork. Final top of ballast shall conform to the ballast section as indicated except in cribs between point of switch and heel of switch where it shall be three inches below base of rail to allow clearance for switch rods.

E. When installing various components of Special Trackwork, particular attention shall be given to the following:

1. Check alignment, gage, and surface through turnout .

2. See that bolts, nuts, cotter pins, and other fastenings are m place, in good condition, and properly tightened.

3. See that switch points fit snugly against rail when switch is thrown in either position.
4. See that connecting rod and switch rod bolts are equipped with coner pins properly spread.

F. Test operate switches for lost motion and loose connections and adjust as necessary.

G. Examine rod and fastenings which connect switch point to switch stand to see that they are in place and in good condition.

H. Switch stands shall be so installed as to hold switch point tightly against the stock rail when stand is in normal position. Switch rods shall be adjusted to hold opposite point tightly against rail when stand is in reverse position.

I. Switch stands shall be kept securely spiked to switch ties. Switch ties shall be set square with track and kept firmly tamped.

J. At time of installation, all sliding surfaces of special trackwork assemblies shall be lubricated with a dry film graphite lubricant in accordance with manufacturer's recommendations .

K. Tamping shall be as per Article 3.08.B of this Section.

L. No closed point switch point shall be installed in the main track unless it has the proper point protection in place and tested.

3.06 DRILLING:

A. Rail ends for bolted joints shall be drilled in accordance with AREMA standards. Any additional holes in rail will be sufficient cause for rejection.

B. Hole in rail shall be drilled to proper size and not punched, slotted, or cut with a torch, and holes shall be chamfered to remove sharp edges.

C. A variation of 1/32 inch in size and location of bolt holes shall be allowed.

D. Holes shall be located with proper size rail drilling template and marked with a center punch prior to drilling. Drilling through joint bars is prohibited.

3.07 RAIL ENDS:

A. Rail shall be cut with rail saw to a tolerance of 1/32 inch from square. All burrs shall be removed and ends made smooth. Torch cut rails will be rejected.

B. Battered or mismatched ends shall be built up or ground off

3.08 SURFACE, LINE AND GRADE

A. Contractor shall perform all surfacing as specified to bring line and surface into compliance within track geometry tolerances specified in this section.

B. Contractor shall surface track to zero crosslevel.

C. Ballast shall be spread and track raised in a series of lifts as indicated in Contract Drawings. No single lift shall be higher than 2 inches except in crossings and turnouts. In raising track, jacks or equipment shall be regulated to avoid bending of angle bars or straining of joints. When jacks are used they shall be simultaneously used and properly spaced at not more than quarter points of rail to avoid breaks or bends in rail when track is raised. Both rails shall be raised simultaneously and to proper crosslevel by raising jacks.

D. Each tie shall be tamped from 15 inches inside rail to end of tie. Tamping shall not be permitted at middle of tie. Both ends of a tie shall be tamped simultaneously and tamping inside and

outside rail shall be done at same time. Equipment used for surfacing truck shall be subject to approval by Engineer.

E. Ties that become loose during track raising shall be unfastened realigned, and re-fastened before tamping. During each track raise, track is to be uniformly tamped.

F. After ballasting is completed and track is surfaced and lined, according to tolerances, ballast shall be trimmed neatly and surplus material shall be spread evenly along ballast shoulder.

G. Contractor shall perform necessary operations to assure that all ties are at right angles to track.

H. Contractor shall perform two tamping squeezes per tie up to 1-1/2 inches of raise with one additional insertion and squeeze for each additional 1 inch of raise. Joint ties shall be given one additional squeeze than other ties. The maximum allowable raise per surfacing pass shall be 2 inches.

I. In locations where squeeze tampers cannot fill and compact ballast, such as at frogs, guard rails, switch points of turnouts and headblocks, etc., mechanically tamp with air tools or other hand-held power tamping tools.

J. On curves, high rail shall be used as line rail and low rail shall be used as grade rail.

K. When surfacing turnouts, the straight side of turnout shall be used as the line rail.

L. After ballast regulating in turnouts, Contractor shall immediately clean excess ballast from switch point area, including switch points, switch rods, connecting rods, and guardrail and frog area.

M. After ballast is regulated and dressed, Contractor shall ensure that resilient fasteners, track bolts and rail anchors are tight and in proper alignment.

N. Contractor caused damage to signal equipment, shall be repaired at Contractor's sole expense.

3.09 TESTING:

A. Before final acceptance of trackwork, the Port will provide for a suitable test locomotive to be run over the entire length of new trackage in the presence of the Engineer. There shall be no noticeable settlement or deflection of ties and rail during the test. The Contractor shall re-line, surface, tamp, or otherwise correct any and all deficiencies as directed by the Engineer.

3.10 TRACK LUBRICATORS

A. Install track lubricators in accordance with manufacturers recommendations.

END OF SECTION

PART 1- GENERAL

1.01 DESCRIPTION

A. This section specifies the material requirements and performance criteria for connection of rail segments by aluminothermic (thermite) welding.

1.02 SUBMITTALS

A. Submit under provisions of Section 01 33 00, "SUBMITTALS", the following information:

1. Procedure: Submit proposed materials, methods and procedures to be used for thermite welding of rail. Include procedure, materials and methods and include the following items:

a. Manufacturer's trade name for welding process.

b. Method used for cutting and cleaning of rail ends.

c. Minimum and maximum spacing between rail ends.

d. Method used for maintaining rails in aligrunent during welding.

e. Method used for preheating including time and temperature.

f. Tapping procedure including minimum time required to cool weld under mold insulation.

g. Method used, including a description of special tools and equipment for removing gates and risers and finishing weld to the final contour .

h. Details for compromise welds for different rail sections to be joined.

i. Test Reports.

j. Welding Records.

1.03 QUALIFICATIONS

A. Welding shall be performed under direct supervision of an experienced welding foreman or supervisor with a minimum of three years experience in thermite welding, working on a Class I Railroad.

PART 2 - PRODUCTS

2.01 MATERIALS

A. For thermite welding, materials and equipment shall be as manufactured by "Boutet", "Orgotherm", or other approved equivalent for standard rail.

PART 3 - EXECUTION

3.01 GENERAL

A. For thermite welding, methods and procedures shall comply with AREMA Manual, Chapter 4, specification for "Thermite Welding-Rail Joints-1980," and with welding kit manufacturer's recommendations and as specified herein.

B. Rail ends for thermite welding shall be prepared in accordance with recommendations of welding kit manufacturer.

C. For thermite welding, rail ends shall be preheated prior to welding to a sufficient temperature and for sufficient time to ensure full fusion of weld metal to rail ends without cracking of rail or weld.

D. Completed weld shall be finished by mechanically controlled grinding to conform to same requirements specified for shop welding.

E. Welds shall not be made within six (6) inches of bolt holes, or pin holes, or within 3 feet of plant weld.

F. Follow Manufacturers recommendations for compromise welds.

G. Follow recommendations of rail manufacturer for welding heat-treated or high strength rails.

H. Welds must be in cribs between ties and located no closer than four (4) inches to nearest tie.

3.02 FIELD WELDING RECORD

A. Field welding record shall be continuously maintained and furnished weekly to Engineer. Record shall include the following details:

1. Date and time of weld(s)
2. Location by subdivision, stating track and rail
3. Contractor 's foreman
4. Air and rail temperature
5. Anchorage and rail stress

B. Rail shall be painted in legible characters at least 1-1/2 inches high at each field weld with the following information:

1. Date of Weld (MO/DAY/YR)
2. Initials of welder performing weld
3. Air temperature at time of weld (AT XXX)
4. Rail temperature at time of weld (RT XXX)
5. Example: 5/5/93 ABC AT90 RT120

3.03 TOLERANCES OF FIELD WELDS

A. Maximum dimensional tolerance variations, based upon use of 36-inch straight edge, are as follows:

1. Rail Head:
    a. Vertical Offset
    b. Horizontal Offset
    c. Vertical Crown
    d. Horizontal Kink
    e. 0. 020 inches
    f. 0.040 inches
    g. 0.030 - 0.045 inches
    h. 0. 020 inches
2. Rail Base:

a. Horizontal Offset

b. Offset Bending 0.010 per inch

3.04 FINISHING OF FIELD WELDS

A. Sharp edges and burrs are to be removed, including chimneys from welds. All welds shall be ground smooth.

B. Weld joints shall be smooth on top and sides and straight in line. No overgrinding is permitted.

C. Weld joints shall be smooth on sides and bottom. Offset blending permitted at rate of 0.010 per inch.

D. Weld joints shall be smooth on both sides to within 1/8 inch of original contour. Width of remaining upset will be between 1/2 inch and 5/8 inch.

3.05 FIELD WELD TESTING

A. Rail welds shall be tested by the Contractor through use of a testing agency using Ultrasonic testing method in accordance with ASTM E 164. The results of testing shall be provided to the Engineer.

B. Each completed weld shall have full penetration and complete fusion and be entirely free of cracks. Total area of internal defects such as porosity and slag inclusions shall not exceed 0.060 square inch and largest single porosity or slag defect permitted shall not exceed 1 /8 inch in diameter.

C. Other causes for rejection of welds shall be:

1. Cracks that show in finished weld are cause to reject weld.

2. Pit holes that show in web and base of weld after finish grinding are cause to reject weld. Pit holes in head not exceeding 1/4 inch in depth may, if approved by Engineer, be repaired by gas welding.

3. Welded joints not meeting these specifications and tolerances shall be replaced by Contractor at no additional cost to the Port. Defective weld shall be cut out, and a new section of rail not less than 13 feet long shall be inserted, welded and retested at no additional cost to the Port.

END OF SECTION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

A. This Section specifies the material requirements and performance criteria for complete special trackwork including turnouts, crossovers and crossings to be furnished in accordance with the Contract Drawings.

B. Except as modified herein, special trackwork shall be designed, manufactured, tested, assembled, inspected, handled and shipped in accordance with the current edition of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Portfolio of Trackwork Plans, and the AREMA Manual of Railway Engineering.

1.02 REFERENCE STANDARDS

A. Comply with all applicable local, State and Federal codes provisions of most recent edition, including all addenda, of following codes, specifications, standards, and recommended practices, except as otherwise indicated:

1. AREMA MANUAL – American Railway Engineering and Maintenance-of-Way Association, Manual for Railway Engineering

2. AREMA PORTFOLIO – American Railway Engineering and Maintenance-of-Way Association, Portfolio of Trackwork Plans

3. FRA-DOT – Federal Railroad Administration, Department of Transportation

1.03 QUALITY ASSURANCE

A. All special trackwork specified shall be standardized throughout the project trackage. Mixing and matching of different materials from different suppliers shall not be permitted.

B. Testing and inspection shall conform to the AREMA Manual, AREMA Portfolio and these specifications.

1.04 CONTRACTOR FURNISHED MATERIAL:

A. Contractor shall provide all materials required for completion of the Work, except those materials identified on the Drawings as Port Furnished Material.

1.05 PORT FURNISHED MATERIAL:

A. The Port will provide the materials identified on the Drawings as Port Furnished Material. Quantity of Port Furnished Material items shall be as indicated on the Drawings.

B. Port furnished materials shall comply with product specifications of this Section.

C. Port Furnished Materials shall be delivered to Contractor Laydown Areas identified on the Drawings by material suppliers.

D. The Contractor shall receive products at the site and give written receipt for materials at the time of delivery, noting visible defects and omissions. If such declaration is not given, the Contractor shall assume responsibility for such defects and omissions.

E. The Contractor shall store materials until ready for installation and protect from loss and damage.

1.06 SUBMITTALS

A. The Contractor shall submit, under the provisions of Section 01 33 00, "SUBMITTALS”, the following information:

1. Compliance: Supplier's certification that the material delivered to the site is in compliance with the Specifications. Include all test results and submittals stipulated in the references sections of AREMA Manual and Portfolio.
2. Shop Drawings: Submit shop drawings for diamond crossing, turnouts, and crossovers detailing trackwork layout and interconnection with other special trackwork, and showing switches, frogs, tie spacing, fasteners, switch stands, point of switch and appurtenant geometric relationships, dimensions and information. All shop drawings shall be approved by the Engineer prior to beginning manufacture or fabrication of special trackwork or production of ties.

PART 2 - PRODUCTS

2.01 TURNOUTS AND CROSSOVERS

A. Rail and frog casting shall be new, fabricated in the United States or Canada. Rail shall be 115RE and 136RE as shown on the Drawings. There is not a Buy America contract requirement.

B. Turnouts and crossovers shall have 16'-6" switch points with graduated risers and shall conform to AREMA Portfolio Plan No. 112-08. Turnouts and crossovers shall be furnished with appurtenant hardware for hand throw switches as indicated in these Specifications and as directed by the Engineer. Switch points shall be Knife Point type as indicated in the Drawings. Knife points shall be head hardened double reinforced knife point switch points conforming to AREA Detail 6100, with transit style clips. Turnouts and crossovers shall include curved, straight, closure rails utilizing 115 RE rail with screw spikes and elastic fasteners (Pandrol style). Switches shall have manganese tips (AREA 220).

C. Guardrails shall be 13'-0" long and conform to AREMA Plan No. 504-03 and fastened with screw spike plates and elastic fasteners.

D. The special trackwork components shall be designed to be hand thrown capable of providing 300 pounds of force at mid-stroke and 500 pounds of force at the end of the throw.

E. Frogs shall be one piece, rail-bound manganese, heavy wall, explosion hardened per AREMA M2.7 Depth Hardening. Frogs shall be radiographic tested per AREMA Portfolio Specification M2.5 Workmanship. Contractor shall use resilient fastening system for all frog base plates and gage plates.

F. Frogs shall conform to AREMA Portfolio of Trackwork Plans, Plan No. 623-03, rail bound manganese steel frog for 115 RE rail with screw spike plates and elastic fasteners. Frogs shall be drilled for three (3) bolts to match the specified rail.

G. The arm ends of the frogs shall be beveled as per AREMA Portfolio Plan No. 1005-03 "Beveling of Rail Ends for Special Trackwork". Rail bending shall be done with great care to avoid stress build up and injury to the rails. Rail shall be bent cold whenever possible. If heating the rail should be necessary, the surface temperature of the rail shall not exceed 800° F and the surface of the remainder of the rail section shall not exceed 1100° F. Heating shall be done in a manner so as to have a minimal adverse effect on the metal.

H. Insulated turnouts shall be provided for installation in select locations, as indicated on the ITB Attachment A – Offer Sheet. Insulated turnouts shall include all necessary insulated 6 hole joint bars.

I. Knife points shall be in accordance with AREA Detail 6100.

J. Adjustable rail braces, switch plates and plates under the closure rails shall conform to details for plates in AREMA Portfolio of Trackwork Plans Plan No. 224-08. Switch plates shall use screw spikes. Turnout plates shall conform to Plan No. 112-08 and as indicated.

K. Switch point guards shall be installed on all switches. Switch point guards shall be boltless adjustable switch point guard Model U69 as manufactured by A&K Railroad Materials, or approved equal. Switch point guards shall be furnished with appropriate switch plates and mounting hardware.

L. Switch stands shall be Racor Model 22-E trailable, adjustable switch stands with low banner, “Backsaver” handle, adjustable connecting rod and bolts with lock washers and cotter pins. The bolt hole in the switch stands, connecting rods and switch rods (42-inches) shall be the same matching diameter with matching size bolts. Mismatch of bolts and bolt holes will be cause for rejection.

M. Turnout and crossover sizes shall be as indicated in the Contract Drawings.

N. Turnouts and crossovers shall be of bolted design. All switch bolts shall be designed for use with cotter pins and shall be installed with lock washers for cotter pins.

O. Switch rods and clips shall be insulated with basket adjustment conforming to AREMA Plan No. 222-08. Switch rods and special rods for tandem leads shall conform to AREMA Specifications Section M6, Steel Forgings. The Contractor shall furnish switch rods with all associated slide and runoff plates.

P. Switch rods shall be insulated and shall conform to the AAR Signal Manual, Part 14.5.3, Signal Specifications, "Recommended Developmental Criteria for Insulating Material".

1. Fiber angles, plates and end posts shall be fabricated of fiberglass mat reinforced polyester, 3/16-inch thick, GPO- I sheet stock, NEMA Class B.

2. Fiber bushings shall be fabricated of NEMA Grade 10 epoxy glass fabric.

3. All cut edges of fiberglass shall be sealed with Sherwin Williams Polane, 2-part coatings or an accepted equal.

4. Prior to assembly, all contact metal surfaces shall be painted with General Electric Insulating Enamel, Red Glyptol No. 1202 or equal.

Q. Gage Plates

1. Gage plate shall be at least 3/4-inch thick and the width shall be 8 inches. Gage plates and switch plates within the turnout shall be manufactured in accordance with the AREMA Portfolio of Trackwork Plans No. 223 and shall be modified to suit elastic fasteners.

2. Plates shall conform to the AREMA "Specifications for Special Trackwork”, Section M7, rolled "Mild Steel".

3. Insulation shall conform to the AAR Signal Manual, Part 116, Signal Specifications, "Assembly and Test of Insulated Track Fittings”.

4. Insulated gage plates shall be provided for all turnouts and crossovers.

2.02 DIAMOND CROSSINGS

A. Crossings shall be manganese steel insert and shall conform to AREMA Portfolio Plan No. 757-02. Crossings shall be furnished with flared guard rails, joint bars, running rail and guard rail, special plates, flangeway fillers and space blocks and all appurtenant hardware as indicated in these Specifications and as directed by the Engineer.

B. Rail, castings and components shall conform to 136 RE rail section.

C. Guarding shall be provided per AREMA Plan No. 757-02.

D. Frogs shall be manganese steel insert, heavy wall, explosion hardened, manufactured per AREMA Specifications for Special Trackwork, Section M2, "Manganese Steel Castings", and with AREMA Plan No. 757-02 and as indicated. Frogs shall be radiographic tested per AREMA Portfolio Specification M2.5 Workmanship

E. Plates: Crossings shall be furnished with resilient fastening system for all base plates, all plates shall be 1 1/4” with 1/4” deep mill seating and no rail cant. Multi-tie plate shall be used under all casting areas.

F. The arm ends of the frogs shall be beveled as per AREMA Portfolio Plan No. 1005-03 "Beveling of Rail Ends for Special Trackwork".

G. For permissible variations in manufacture see AREMA Portfolio Plan No. 100, Section 7.

2.03 RAIL

A. Rail for turnouts and crossovers shall be new, 115 RE head hardened rail conforming to AREMA Chapter 4.

B. Rail for crossings shall be new, 136 RE head hardened rail conforming to AREMA Chapter 4.

2.04 TIES

A. Wood ties shall conform to Section 34 11 32, Timber Ties.

2.05 JOINT BARS AND COMPROMISE JOINTS:

A. Joint bars and compromise joints shall conform to Section 34 05 17, Railroad Work.

2.06 TIE PLATES:

A. Tie plates shall conform Section 34 05 17, Railroad Work.

2.07 TRACK BOLTS, NUTS, AND SPRING WASHERS:

A. Track bolts, nuts and washers shall conform to Section 34 05 17, Railroad Work.

2.08 ELASTIC RAIL CLIPS:

A. Elastic rail shall conform to Section 34 05 17, Railroad Work.

2.09 SCREW SPIKES:

A. Screw spikes shall conform to Section 34 05 17, Railroad Work.

PART 3 - EXECUTION

3.01 NOT USED

END OF SECTION

PART 1 - GENERAL

1.01 SECTION INCLUDES:

A. The Work of this Section consists of the furnishing, handling, and installation of timber cross ties for use in railroad track construction.

1.02 REFERENCES:

A. AMERICAN RAILWAY ENGINEERING AND MAINTENANCE OF WAY ASSOCIATION (AREMA) Chapter 30 - Ties

B. AMERICAN WOOD-PRESERVERS' ASSOCIATION (AWPA)

C. A1 - Analysis of Creosote and Oil-Type Preservatives

D. M2 - Standard for Inspection of Treated Timber Products

1.03 SUBMITTALS:

A. Submit the name, address and phone number of the timber tie supplier.

B. Submit the completed inspectors report form as described by AWPA M2 Standard for Inspection of Treated Timber Products, including step by step work sheets of preservative analysis and retention analysis. Submit to the Port prior to shipment of the ties from the treatment plant.

C. Submit Certificates of Compliance that ties comply with these specifications, AREMA specifications and AWPA standards prior to shipping timber ties.

PART 2 - PRODUCTS

2.01 TIMBER CROSS TIES:

A. General:

1. Crossties shall meet the requirements of AREMA Chapter 30 Part 3.

B. Material:

1. The following woods can be used for crossties:

a. Mixed hardwood consisting of black or honey locust, red or white oak.

C. Physical Requirements:

1. Except as hereinafter provided, all ties shall be free from any defects that may impair their strength or durability as cross ties, such as decay, large splits, large shakes, slanting grain, or large or numerous holes or knots.

D. Design:

1. Standard track ties shall be 7" x 9" x 8’-6". Track ties under paved crossing shall be 7" x 9" x 10'-0". Four track ties 8'-0" are needed near the crossover. Thickness, width, and length specified are minimum dimensions for green ties. Dry or treated ties may be 1/4 inch thinner or narrower than the specified sizes. Ties exceeding these dimensions by more than l inch shall be rejected. The grade of each tie shall be determined at the point of most wane on the top face of the tie within the rail-bearing areas. The rail-bearing areas are those sections between 20 inches and 40 inches from the center of the tie. The top of the tie shall be the narrowest face and/or the horizontal face farthest from the heart or pith center.

2. All rail-bearing areas shall measure as follows: 7-inch grade cross ties shall be 7" x 9" in cross section with a maximum of 1 inch of wane (uncut edge) in the top rail-bearing areas. A maximum of 20% of the ties in any given quantity may be square-sawn 7" x 8" in cross section with no wane in the rail-bearing areas. Wane shall be permitted on the bottom face so long as it does not exceed 1 inch at any given point.

E. Inspection:

1. Place: Ties shall be inspected when delivered on site.
2. Decay: Decay is the disintegration of the wood substance due to the action of wood destroying fungi. “Blue stain” is not decay and is permissible in any wood.
3. Holes: A large hole is one more than 1/2 inch in diameter and 3 inches deep within, or more than one-fourth the width of the surface on which it appears and 3 inches deep outside, the sections of the tie between 20 inches and 40 inches from its middle. Numerous holes are any number equalling a large hole in damaging effect. Such holes may be caused in manufacture or otherwise.
4. Knots: Within the rail bearing areas, a large knot is one having an average diameter more than 1/3 the width of the surface on which it appears; but such a knot will be allowed if it is located outside the rail bearing areas. Numerous knots are any number equalling a large knot in damaging effect.
5. Shake: A shake is a separation along the grain, most of which occurs between the rings of annual growth. One which is not more than 1/3 the width of the tie will be allowed, provided it does not extend nearer than l inch to any surface.
6. Split: A split is a separation of the wood extending from one surface to an opposite or adjacent surface. Do not count the end as a surface when measuring the length of a split. In unseasoned cross ties, a split no more than 1/8 inch wide and/or 4 inches long is acceptable. In a seasoned cross tie, a split no more than 1/4 inch wide and/or longer than the width of the face across which it occurs is acceptable. In seasoned cross ties, a split exceeding the limit is acceptable, provided split limitations and anti-splitting devices are approved by the buyer and properly applied.
7. Checks: A check is a separation of the wood due to seasoning which appears on one surface only. Do not count the end as a surface. Ties with continuous checks whose depth in a fully seasoned and/or treated tie is greater than 1/4 the thickness and longer than 1/2 the length of the tie will be rejected.
8. Slope of Grain: Except in woods with interlocking grain a slope in grain in excess of 1 in 15 will not be permitted.
9. Bark Seams: A bark seam or pocket is a patch of bark partially or wholly enclosed in the wood. Bark seams will be allowed provided they are not more than 2 inches below the surface and/or 10 inches long.
10. Manufacturing Defects: All ties must be straight, square-sawn, cut square at the ends, have top and bottom parallel, and have bark entirely removed. Any ties which do not meet the following characteristics of good manufacture will be rejected:
    a. A tie will be considered straight when a straight line from a point on one end to a corresponding point on the other end is no more than 1-1/2 inches from the surface at all points.

b. A tie is not well-sawn when its surfaces are cut into with scoremarks more than 1/2 inch deep, or when its surfaces are not even.

c. The top and bottom of a tie will be considered parallel if any difference at the sides or ends does not exceed 1/2, inch.

d. For proper seating of nail plates, tie ends must be flat, and will be considered square with a sloped end of up to 1/2 inch, which equals a 1 in 20 cant.

2.02 ANTI-SPLITTING DEVICES:

A. Timber cross ties shall be equipped with anti-splitting devices of the type specified regardless of whether or not the wood has shown any tendency to split. Products used shall conform to the AREMA Manual, Chapter 30, Part 1, Section 3.1.6, "Specifications for Devices to Control the Splitting of Wood Ties".

B. Timber cross ties shall be equipped on each end with gang nails (steel nail plates).

C. Anti-splitting devices shall be applied in accordance with the AREMA Manual, Chapter 30, Part 3, Section 3.1.7, "Application of Anti-splitting Devices".

2.03 INCISING:

A. Timber cross ties and switch ties shall be incised on all four sides in the pattern specified in the AREMA Manual, Chapter 3, Part 6, "Wood Preserving".

2.04 TIE PRESERVATIVE TREATMENT:

A. Timber cross ties and switch ties shall be pressure treated in accordance with AREMA Chapter 30 Part 3 Section 3.7.2 “Treatment” by the empty cell process. Process and preservative to be used on material and retention required shall be as follows:

1. Wood 50% Creosote / 50% Oil Process
2. Doug Fir 8 lb. or Refusal L&R
3. Hardwood (non oak) 7-1/2 lb. or Refusal L&R
4. Oak 7-1/2 lb. or Refusal Bethel or L&R

B. Ties will be accepted by the Engineer based on the Manufacturer’s Certification of Compliance and Treatment Inspection Reports.

C. Ties shall be free of excess preservative. Ties exuding a minor amount of preservative will be permitted.

2.05 TIE PRESERVATIVE FOR FIELD REPAIR OF DAMAGED TIES:

A. Tie preservative will be a greased based preservative compound such as Osmose Cop-R Plastic II or Tenino Copper Naphthenate or approved equal.

PART 3 - EXECUTION

3.01 HANDLING:

A. Timber ties shall be carefully handled to avoid damage in accordance with the AREMA Manual, Volume 1, Chapter 30, Part 3, Section 3.5.

3.02 PROTECTION:

A. Protection of timber ties from loss or damage shall be the responsibility of the Contractor. Ties shall be protected against surface damage caused by metal banding or other aspects of handling following tie treatment. Any damage done to a tie that exposes any white (untreated) wood shall be painted with tie preservative specified in this Section to the satisfaction of the Engineer.

END OF SECTION