DIVISION 2

DIVISION 2 – SITE WORK

PART 1 GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE

A. Drawings and general provisions of contract, including construction contract clauses and Division 1 Specification sections, apply to this section. Work related to this Section is described in:

1. Section 01315 – Regulated Materials Submittals
2. Section 01330 – Submittals
3. Section 01631 – Pollution Prevention Planning and Execution
4. Section 01860 – Construction Safety
5. Section 02081 – PCB Components Removal and Disposal
6. Section 02082 – Removal and Disposal of Fluorescent Lamps
7. Section 02083 – Fugitive and Silica Dust Control Procedures
8. Section 02085 – Asbestos Abatement

1.02 DESCRIPTION OF WORK

A. The Contractor shall establish, provide, and maintain lead controls for the duration of the Project. The Project is not considered a lead-abatement project however the Contractor may encounter lead coatings and lead containing materials during general construction and demolition.

B. The intent of this section is to require the Contractor to establish procedures and controls to prevent airborne lead emissions during general construction and demolition; comply with Washington Administrative Code (WAC) 296-155-176, Lead in Construction Standard; and manage debris waste in accordance with WAC 173-303, Dangerous Waste Regulations. The work may include:

1. Limited demolition of concrete, steel, siding, and other items that may consist of lead or contain lead coatings;
2. Waste designation including samples collected in accordance with ASTM Standard E 1908 and subsequent Toxic Characteristic Leaching Procedure analysis (EPA Method 1311) conducted by a laboratory certified by the Washington State Department of Ecology;
3. Disposal of lead debris waste in accordance with WAC 173-303, Dangerous Waste Regulations;
4. Providing personnel that have received training as defined in WAC 296-155-17625.

1.03 REFERENCES

A. The Contractor is responsible for monitoring work activities and determining conditions that require conformance with specified regulatory requirements and standards. The following rules, requirements, and standards may apply to the Work:

1. United States Occupational Safety and Health Administration (OSHA)
   a. 29 CFR 1910 - Occupational Safety and Health Standards

b. 29 CFR 1910.134 - Respiratory Protection

c. 29 CFR 1910.1200 - Hazard Communication

d. 29 CFR 1926.55 - Gases, Vapors, Fumes, Dusts, and Mists

e. 29 CFR 1926.57 - Ventilation

f. 29 CFR 1926.62 - Lead in Construction Standard

2. United States Environmental Protection Agency (EPA)

a. 40 CFR 260 - Hazardous Waste Management Systems: General

b. 40 CFR 261 - Identification and Listing of Hazardous Waste

c. 40 CFR 262 - Standards Applicable to Generators of Hazardous Waste

d. 40 CFR 263 - Standards Applicable to Transporters of Hazardous Waste

e. 40 CFR 268 - Land Disposal Restrictions

f. EPA Publication SW-846 - Test Methods for Evaluating Solid Waste, Physical/Chemical Methods

3. Department of Transportation

a. 49 CFR Subchapter C; Hazardous Materials Regulations

4. National Institute for Occupational Safety and Health (NIOSH)

a. NIOSH OSHA Booklet 3142 Lead in Construction

5. American Society for Testing and Materials

a. Standard E 1908 – Standard Guide for Sample Selection of Debris Waste from a Building Renovation or Lead Abatement Project for Toxicity Characteristic Leaching Procedure (TCLP) Testing for Leachable Lead (Pb)

6. Washington State Regulations codified in the Washington Administrative Code governing lead work and lead waste management include but are not limited to:

a. WAC 296-62 - General Occupational Health Standards

b. WAC 296-24 - Safety Standards for Construction Work

c. WAC 296-155-176 - Occupational Health and Environmental Control; Lead

d. WAC 173-303 - Dangerous Waste Regulations

1.04 DEFINITIONS

A. Action Level - Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air averaged over an 8-hour period. As used in this section, "30 micrograms per cubic meter of air" refers to the action level.

B. Air Monitoring - The process of measuring the concentration of lead in a specific volume of air in a stated period of time. Air samples shall be collected and analyzed in accordance with the methods specified by the National Institute for Occupational Safety and Health (NIOSH Method 7105) and as required by WAC-296-155-176.

C. Area Monitoring - Sampling of lead concentrations within the lead control area, inside the physical boundaries, which are representative of the airborne lead concentrations that may reach the breathing zone of personnel potentially exposed to lead.

D. Dangerous Waste – Solid wastes designated as dangerous wastes in WAC 173-303, Dangerous Waste Regulations. Dangerous Waste is the State of Washington's equivalent to Hazardous Waste under the Resource Conservation and Recovery Act (RCRA).

E. DOT – Department of Transportation

F. DOSH – The Washington State Department of Labor and Industries' Division of Occupational Safety and Health

G. Eight-Hour Time Weighted Average (TWA) – Airborne concentration of lead averaged over an 8-hour workday to which an employee is exposed.

H. Hazardous Waste – Solid Waste designated by 40 CFR Part 261 as hazardous and regulated as Hazardous Waste by the United States Environmental Protection Agency.

I. Lead - Metallic lead, inorganic lead compounds, and organic lead compounds.

J. Lead Permissible Exposure Limit (PEL) - Fifty (50) micrograms per cubic meter of air as an 8-hour time weighted average.

K. Personal Monitoring - Sampling of lead concentrations within the breathing zone of an employee to determine the 8-hour time weighted average concentration in accordance with WAC 296-155-176. Samples shall be representative of the employee's work tasks. Breathing zone shall be considered an area within a hemisphere, forward of the shoulders, with a radius of 6 to 9 inches and the center at the nose or mouth of an employee.

L. Industrial Hygienist – The Industrial Hygienist shall be subject to approval as specified under 1.06 Submittals of this specification section and shall have one of the following certifications:

1. Certified Industrial Hygienist certified by the American Board of Industrial Hygiene with prior experience in the health and safety aspects of a lead hazard control work project.

2. Professional Engineer or Certified Safety Professional with a minimum of three (3) years prior experience in industrial hygiene relating to lead hazard control work.

M. Waste Designation – The process of determining whether waste is regulated under WAC 173-303, Dangerous Waste Regulations.

1.05 QUALITY ASSURANCE

A. The Contractor shall submit a Lead Controls Work Plan pursuant to 1.06 Submittals of this Section. The Work Plan shall establish procedures and controls to: prevent airborne lead emissions during general construction and demolition, comply with (WAC) 296-155-176, Lead in Construction Standard and manage debris waste in accordance with WAC 173-303, Dangerous Waste Regulations. The Work Plan will be submitted to the Port for review and approval prior to the start of any lead work.

B. The Port will perform periodic observation of the site work to ensure that it is being performed in a manner consistent with the approved Work Plan and this specification. The Port's representative will have the authority to issue a "Stop Work" order for health and safety concerns or non-compliance with regulations or this specification.

1.06 SUBMITTALS

A. Contractors shall provide complete submittals as per Sections 01305 – Preconstruction Submittals, 01330 – Submittals, 01315 - Regulated Materials Submittals, and 01631 - Pollution Prevention, Planning and Execution for review by the Port. Review of submittals will be in accordance with Section 01330 - Submittals.

PART 2 PRODUCTS

2.01 MATERIAL AND EQUIPMENT

A. Containers

1. All wastes that designate as hazardous waste shall be packaged in sealed containers with appropriate UN Performance Package Ratings.

2. All drums and containers must be in shipping condition with gaskets intact.

B. Labels

1. All containers holding hazardous wastes will be labeled in accordance with WAC 173-303-190.

PART 3 EXECUTION

3.01 WORK AREA PREPARATION

A. Perform the following preliminary steps to prepare the Work Areas prior to demolition of lead coatings and lead containing material.

1. Establish a control area that includes a perimeter sufficient to perform the demolition work around each building or area that contains lead or lead-coated materials. The control area shall also consist of the pathway for transport of any lead-contaminated material to a stockpile or storage receptacle, if the demolition debris is not immediately transported from the site. Provide and display caution signs, in clearly visible areas, at entrances indicating that hazardous material work is being conducted, that state that unauthorized persons should not enter. Signs shall be comply with WAC 296-155-176 regulations.

2. Emergency Procedures: Establish and post written emergency procedures within each work area, including emergency contact names and contact phone numbers, plans for medical emergencies, temporary loss of

electrical power or water, and procedures for an emergency. The Contractor is responsible for establishing and posting contingency procedures for all workers on site.

3. Health and Safety Briefing: Conduct a health and safety briefing prior to the start of work and weekly to discuss the health and safety plan, hazardous materials, hazardous work and other related items per the specified Health and Safety Plan. More frequent briefings should be performed as required by project activities or changes in the work.

4. Utilities: Request and coordinate the use and shut down of all utilities. Request and coordinate the use of, including the shutdown of electric service to the work area and install temporary electric supply with ground fault interrupt protection.

    a. Prepare all storm drains, floor and area drains and drainage routes using the methods described in the approved work plan to prevent contaminated runoff.

5. Lead waste accumulation area: Prepare the lead-waste storage area as described in the approved Work Plan.

6. Decontamination Areas: Prepare the decontamination areas for use at all entrances and exits from the Work Area as described in the approved Work Plan.

3.02 WORK PROCEDURE

A. General Procedures: Perform all work and comply with the safety and health provisions in the site-specific Health and Safety Plan. The work includes all measures necessary to adequately protect workers, authorized personnel, Port staff and the public from lead exposures during the general demolition/renovation process and surface preparation activities.

B. Coordination of work of all trades: Coordinate the work of all trades to assure that work is performed in accordance with the applicable regulations and that the control limits are maintained at all times both inside and outside the control area.

C. Access to work Area: Access to work areas shall be through decontamination areas. Only the Contractor, subcontractors, authorized Port personnel, and project consultants shall have access to the Work Area.

D. Means of Egress: Establish and maintain emergency and fire exits from the work area.

E. Prevent dust generation at all times to the maximum extent practicable.

F. The use of water shall be restricted to the smallest quantity necessary to minimize dust and to avoid the potential of contaminant migration through run-off or ponding. In no case shall liquids generated during building demolition/renovation come into contact with uncontaminated soils, drains, surfaces or conduits which may constitute a release to the environment.

G. Demolition Procedures: Perform demolition in areas of lead-containing paints in accordance with approved Health & Safety Plans. Use procedures and equipment to limit occupational and environmental exposure to lead when lead-containing paint is impacted or when building components are demolished. The procedures

employed by the Contractor shall not create the potential for contaminating surrounding areas or materials with lead-containing coatings or dust. Dust generation shall be kept to a minimum. Dry scraping, dry sanding, or dry grinding on lead-containing paints or lead contaminated surfaces will not be permitted without a full enclosure.

H. Personnel and equipment decontamination shall occur whenever workers or equipment leave the work site as described in the approved work plan. Decontamination waste shall be packaged, stored, labeled and disposed according to all applicable requirements at the cost of the Contractor.

I. Any hazardous materials used or stored on the project shall be consistent with Section 01631 – Pollution Prevention, Planning and Execution.

J. The Port may inspect the Contractor's operations and work areas daily for job site cleanliness and conformance with the specifications.

K. While performing the work, the Contractor may be subject to onsite inspection by L&I/DOSH, OSHA, EPA/Ecology inspectors and/or local building or health officials. If found to be in violation of pertinent regulations, the Contractor shall cease all work immediately and may not resume work until the violation is resolved. Standby time required to resolve the violation shall be at the Contractor's expense. Complete sets of equipment (such as respirators and disposable clothing) that may be required for entry to the control area shall be made available at all times by the Contractor to the Port and/or agency inspectors for inspection of the control area. Such requests will only be made during working hours.

3.03 LEAD CONTROLS AND AIR MONITORING

A. LEAD CONTROLS

1. Restrict the spread of dust and debris from being distributed over the work area.

2. Prevent dust generation at all times to the maximum extent practicable. The use of water shall be restricted to the smallest quantity necessary to minimize dust and to avoid potential run-off or ponding.

B. AIR MONITORING

1. Monitoring of airborne concentrations of lead shall be in accordance with WAC 296-115-176, and as specified herein. Air monitoring, testing, and reporting shall be performed in accordance with an Air Monitoring Plan prepared and signed by the Contractor’s Industrial Hygienist. The plan shall include personal monitoring in accordance with regulatory requirements and area monitoring outside the lead control area.

a. Submit results of air monitoring samples, signed by the Contractor’s Industrial Hygienist, within 24 hours after the air samples were taken.

b. Notify the Port or Port’s Representative immediately of the corrective action taken if the exposure to lead is at or in excess of the action level of 30 micrograms per cubic meter of air outside of the lead control area.

c. If the area air monitoring results are above the action level of 30 micrograms, the Port or Port's Representative shall have the option of stopping all work until the work procedures and lead hazard controls are revised to the Port or Port's Representative's satisfaction.

3.04 CLEAN-UP, TESTING AND DISPOSAL

A. Cleanup

1. Maintain surfaces of the lead control area free of accumulation of paint chips and dust. Restrict the spread of dust and debris; keep waste from being distributed over the work area. The use of compressed air to clean up the area is strictly prohibited. At the end of each shift, clean the area of visible lead paint contamination by vacuuming with a HEPA filtered vacuum cleaner, wet mopping the area, or cleanup by other appropriate means.

2. All abated lead waste shall be stored in sealed steel containers with appropriate UN Performance Package Ratings.

3. Demolition Debris that is found to designate as Dangerous Waste can be stored in closed top roll off containers. Tops must be closed when not adding waste to the container.

B. Testing of Demolition Debris

1. The Port's Regulated Materials Consultant has conducted preliminary sampling of testing of the anticipated waste stream for the building demolition debris. The TCLP samples were below the limit of detection for the laboratory and the waste is not anticipated to be classified as a Dangerous Waste. If the Contractor's waste stream is significantly different than the pre-planning testing, the Contractor is responsible for sampling and testing of the actual demolition debris waste stream.

2. Sampling of demolition debris shall be in accordance with the most current version of ASTM Standard E 1908 - Standard Guide for Sample Selection of Debris Waste from a Building Renovation or Lead Abatement Project for Toxicity Characteristic Leaching Procedure (TCLP) Testing for Leachable Lead (Pb).

3. If any lead waste is found to designate as dangerous waste, the Contractor must immediately notify the Port or Port's Representative.

C. Disposal of Lead Demolition Waste. The following requirements shall be met for the disposal of any lead-containing Dangerous Waste:

1. The Contractor shall submit the name, address, and EPA Identification Number of the transporter and disposal facility to the Port's representative prior to shipment of any hazardous waste.

2. A representative from Port must be present for any Dangerous Waste shipment and will sign all hazardous waste manifests, waste material profiles, land disposal restriction forms and any other documents requiring generator signature. Contractor shall give notice of any Dangerous Waste shipments to Port at least 2 business days prior to shipment.

3. Any lead-containing Dangerous Waste for disposal must be packaged in appropriate UN performance packages or roll off containers according to all DOT specifications.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for the work required by this section. The costs for this portion of the work shall be considered incidental to, and included in the payments made for the applicable bid items on Bid Form 00410.

END OF SECTION

PART 1 GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of contract, including construction contract clauses and Division 1 Specification sections, apply to this section. Work related to this Section is described in:

1. Section 01315 – Regulated Materials Submittals
2. Section 01330 – Submittals
3. Section 01631 – Pollution Prevention, Planning and Execution
4. Section 01860 – Construction Safety
5. Section 02075 - Lead Controls in Construction and Demolition
6. Section 02082 - Removal and Disposal of Fluorescent Lamps
7. Section 02083 - Fugitive and Silica Dust Control Procedures
8. Section 02085 - Asbestos Abatement

1.02 DESCRIPTION OF WORK:

A. This section applies to all polychlorinated biphenyl (PCB)-containing light ballasts and transformers to be removed, managed, transported and recycled/disposed of at off-site United States Environmental Protection Agency (EPA)-approved treatment, storage and disposal (TSD) facilities, authorized universal waste recyclers, or other properly permitted solid waste disposal facilities authorized to receive such solid waste. This project involves the following:

1. Complete removal of light fixtures in the buildings.
2. Complete removal of light ballasts and inspecting and cleaning PCB oil from light fixtures.
3. Testing of potential PCB-containing oil from transformer.
4. Draining and decontaminating transformer hulk using a specialty company that has personnel instructed in PCB handling procedures, safety precautions, use of safety equipment and is familiar with applicable State and Federal legislation and regulations.
5. Removal, packaging, transportation, and disposal of PCB-containing oils and articles.

B. Contractor shall provide competent and properly trained employees for safe and lawful transporting of the hazardous materials named in this bid proposal and assume full and complete responsibility for the competency, judgment, and actions of said employees at all times, and Using Agency will not assume, and will be under no obligation whatsoever for the same.

C. Contractor shall assume full liability for any spill, leak, or uncontrolled discharge from any item made a part of this bid proposal, once the contractor commences work. In event of any spill, leak, or uncontrolled discharge, contractor shall provide all necessary cleanup, labor, equipment, materials, and assume all associated costs resulting from the incident with all such cleanup material being transported

and disposed of in accordance with all Federal, State, local statutes, laws, rules, regulations, and ordinances in effect at time of incident and cleanup operations.

D. Contractor shall assume all fluorescent ballasts contain PCBs unless they are electronic ballasts. Contractor shall properly remove all PCB containing ballasts from lighting fixtures, containerize in approved drums, label the drums, and dispose or recycle.

1.03 SUBMITTALS:

A. Contractors shall provide complete submittals as per Sections 01305 – Preconstruction Submittals, 01330 – Submittals, 01315 - Regulated Materials Submittals, and 01631 - Pollution Prevention, Planning and Execution for review by the Port. Review of submittals will be in accordance with Section 01330 - Submittals. No PCB-related work will be permitted prior to submittals being approved by the Port of Seattle. Review of submittals will be in accordance with Section 01330.

B. Pre-Work Submittals. The Contractor shall submit to the Engineer for review and acceptance the Contractor's Work Plan as a pre requisite to issuance of the Notice to Proceed in accordance with Section 01305. The work plan must be reviewed and signed by a Certified Industrial Hygienist chosen by the Contractor. The plan must be suitably titled and indexed, providing detailed information concerning the following items as a minimum in the order listed below:

1. Submit complete lists of all materials and equipment proposed for use in the work. List shall include such items as protective clothing, breathing apparatus, sorbents, solvents, drums, Article and Item containers, etc. Give name of manufacturer, brand name and catalog number of each item where applicable. In addition, submit material safety data sheets, OSHA Form 176 or equivalent, for all materials for which such data sheets are available.

2. Submit listing addresses of Hazardous Materials clean-up agencies, twenty-four hour manned telephone numbers, personnel working on project home telephone numbers by work status.

3. Submit method of removal and routes to be taken to exterior and loading area required.

4. Submit completed PCB Waste Manifest.

5. Submit a Statement of Qualifications for review and approval. The Contractor shall submit the statement sufficiently far in advance of the performance of the work as to permit adequate time for the consultant to review and accept a firm to perform the work. The statement shall provide sufficient data and information to prove to the satisfaction of the consultant that the firm performing the work of this section is fully experienced in the removal, handling, transportation and storage of PCB and PCB contaminated Articles and Items.

1.04 QUALITY ASSURANCE:

A. Single Party Responsibility: The firm performing the work of this section shall be responsible for all PCB related activities as noted on the drawings and included herein.

B. License Requirements: The firm performing the work of this section must be currently licensed by the applicable regulatory agency and have a current EPA authorization number for the transporting and hauling of extremely hazardous wastes including PCBs.

1.05 APPLICABLE REGULATIONS:

A. The applicable sections, latest editions and addenda of the following government regulations, codes, industry standards and recommended practices, form a part of these specifications.

1. EPA - Environmental Protection Agency
2. DOT - Department of Transportation
3. NEC - National Electric Code
4. NEMA - National Electrical Manufacturers Association
5. WISHA - Washington State Industrial Safety & Health Act
6. WSDE - Washington State Department of Ecology
7. All other applicable Federal, State, County Codes, Standards and Regulations.
8. City in which project site is located.

B. The Contractor is cautioned that it is responsible for ascertaining the extent to which these regulations affect the operations and to comply therewith.

1.06 COORDINATION:

A. Coordinate ballast removal with Port of Seattle Electrician for disconnect and lockout of electrical service.

1.07 SAFETY PROCEDURES AND WORKER PROTECTION:

A. Work Area Protection and Marking: Prior to commencing any PCB related work activities, provide barricades and warning signs to clearly identify and effectively guard against unauthorized entry into work area.

B. Protective Clothing and Equipment: At all times when PCB materials in any volume are not sealed in drums, containers or electrical equipment, workers shall wear:

1. Disposable, non-porous gloves.
2. Disposable whole body clothing impermeable to PCB.
3. Respiratory protection (NIOSH/MSHA approved) against organic vapors and particles (at least the level of particulate protection required at that stage of work for asbestos protection).
4. Eye protection.

C. The Contractor shall provide protective clothing, eye protection and respiratory protection as required for Government Protection Personnel monitoring work activities within the work area and for firefighters responding to incidents. Provide protective clothing, eye protection and respiratory protection as necessary.

D. Personnel Protection and Procedures: The PCB work area shall at no time be left unattended after procedures have begun and until all ballasts and incidentals have been sealed in approved containers. If immediate transportation to the PCB disposal facility is not feasible, the work area must be secured in a manner approved by the Port. During procedures and at all times when PCB ballasts or mixtures in any volume are not sealed in drums, containers or electrical equipment, all personnel entering the work area must don protective clothing and equipment listed herein. Upon exiting the work area, all disposable protective clothing shall be placed in open-top drums, sealed and removed from building property when other materials in same areas are removed.

PART 2 PRODUCTS

2.01 MATERIAL AND EQUIPMENT:

A. Storage Containers:

1. All ballasts containing PCB material shall be stored in sealed DOT 17E closed top drums.

2. All PCB solid wastes and items including disposable items used in the course of the work such as rags, sorbents, and protective clothing, shall be stored in sealed DOT 17C open type drums.

B. Solvents, Sorbents and Cleaners:

1. Solvents: Diesel fuel, deodorized kerosene or other solvents recognized for a high degree of PCB solubility.

2. Sorbents: Material recognized for a high degree of absorption.

3. Liquid Cleaners: Concentrated liquid alkaline base cleaner.

PART 3 EXECUTION

3.01 REMOVAL AND PACKAGING OF BALLASTS AND TUBES

A. Perform removal of PCB-containing light fixture ballasts in conjunction with other Work. All unlabeled, non-electronic light fixture ballasts shall be considered PCB-containing. Non-electronic light fixture ballasts shall be considered PCB-containing even if labeled with “No PCBs.”

B. Contractor shall ensure that all electrical fixtures are disabled and de-energized prior to removing light fixtures and ballasts. A qualified and trained electrician is required to verify that all light fixtures are de-energized prior to initiating Work.

C. Remove fluorescent light fixture tubes in accordance with procedures in 02082 and PCB-containing light fixture ballasts from light fixtures. Exercise caution to avoid both skin and respiratory exposures.

D. If PCB-containing light fixture ballast has leaked, scrape and wipe up residue with appropriate solvent. Dispose of contaminated cleaning materials with PCB-containing light fixture ballasts.

E. Insert plastic bags (6-mil) in container to form a liner. Place one to three inches of absorbent material in each lined disposal container.

F. Place non-leaking PCB-containing light fixture ballasts in each impermeable container in layers. Place leaking PCB-containing light fixture ballasts in a

separate container and label it as such (labeling). Containers (both non-leaking and leaking) shall be labeled as containing hazardous waste.

G. Place one to three inches of absorbent material between layers of PCB-containing light fixture ballasts.

H. Temporarily store all containers inside the Work Area. Inform Resident Engineer of location of stored containers.

I. The Contractor shall be responsible to remove and dispose of containers that have PCB-containing light fixture ballasts.

J. Record the number of drums and the contents and label as such with the date. Provide documentation to the Resident Engineer.

3.02 REMOVAL AND PACKAGING OF TRANSFORMER OILS

A. Contractor is responsible for verifying PCB concentrations. Contractor shall include removal and disposal of PCB-containing oils in concentrations provided in the plans, specifications, and addenda in the base bid price.

B. Contractor shall ensure that all electricity is disabled and de-energized prior to working on transformers. A qualified and trained electrician is required to verify that all transformers are de-energized prior to initiating Work.

C. If PCB-containing oil has leaked, scrape and wipe up residue with appropriate solvent. Dispose of contaminated cleaning materials with PCB-containing oil.

D. Insert plastic bags (6-mil) in container to form a liner. Place appropriate amount of absorbent material in each lined disposal container.

E. Place PCB-containing oil in each impermeable container in layers.

F. Temporarily store all containers inside the Work Area. Inform Resident Engineer of location of stored containers.

G. The Contractor shall be responsible to remove and dispose of containers that have PCB-containing articles.

H. Record the number of drums and the contents and label as such with the date. Provide documentation to the Resident Engineer.

3.03 SPILL CLEANUP, CONTAINERIZATION AND MARKING:

A. Cleanup of Work Area, PCB Articles and Spills:

1. Equipment and Tools: After the last ballast is removed from fixture, all tools and equipment used in the work shall be decontaminated and properly stored for reuse.

   a. Where work surfaces have contacted PCB fluids they shall be scraped clean, flushed with solvent, wiped clean and all debris placed in open type drums.

   b. All tools that may have come in contact with PCB at any concentration shall be thoroughly flushed with solvent, wiped clean and properly stored.

2. PCB Articles (Electrical Equipment): All exterior surfaces of electrical equipment to be removed that may have come in contact with PCBs or

contaminated oils or fluids either during the course of work activities or due to past leaks shall be thoroughly cleaned with solvent and wiped clean.

3. Slabs, Floors and Walls: All concrete (or other surfaces) which have come in contact with PCBs or PCB mixtures in the course of work as a result of past leaks shall be thoroughly cleaned using a combination of sorbent, solvent and cleaners.

4. Where feasible, the Contractor shall arrange to remove such Articles directly to transport vehicles prior to general cleanup.

B. Containerization and Marking:

1. All liquids generated as a result of work activities and cleanup operation shall be placed in closed top drums and sealed.

2. All solids such as sorbents, rags, disposable protective clothing, and other incidentals shall be placed in open top drums and sealed.

3. All drums (and article containers where used) shall be permanently marked as to specific contents and dated. In addition, each drum (and container) shall be marked with the standard EPA, PCB, ML label.

4. All PCB Articles such as ballasts and other equipment to be removed shall have a record of such action sealed in a weatherproof envelope displayed on the unit. Label record must include the type of action taken, date of action, and the name of the technician in charge. A duplication of this label information shall be furnished to the Port of Seattle.

3.04 HANDLING AND TRANSPORTATION OF OFF-SITE DISPOSAL FACILITIES:

A. Handling: Prior to submitting the hazardous waste manifest for a shipment of waste to the Port of Seattle for signature, the Contractor shall make available the transport vehicle and the waste for inspection by the Port of Seattle so the Port of Seattle can check the amount of waste (for example, number of bags or drums, or volume of waste) and its condition (for example, whether the bags or drums appear to be sealed and not leaking).

B. Transportation to Disposal Facility:

1. All PCB Articles such as ballasts and all drums containing liquids, solids, and incidentals shall be transported to the off-site PCB disposal facility.

2. The firm performing the work outlined in this section shall be licensed for the transportation and hauling of extremely hazardous wastes. The firm shall provide a routing plan which clearly identifies the routes he proposes to follow while transporting PCB items from the various work areas (points of generation) to the off-site PCB disposal facility.

3. A minimum of two operators shall be in attendance at all times when PCB Items are being loaded and unloaded.

4. Vehicles used for transporting of PCB Items must be plainly and visibly marked with a minimum of four EPA type ML PCB labels.

5. Vehicles shall not be loaded in excess of 75% of rated load capacity.

6. Drums: All closed and open top drums must be permanently sealed and marked prior to loading on transport vehicle. Filled drums shall be loaded on the transport vehicle by any of the following methods:
    a. By a hoist or lift truck utilizing a two-point drum lifter.
    b. By a hoist or lift truck provided with a band-around type drum lifter.
    c. By a lift truck lifting the drums from underneath by a pallet attached to the drum by a banding arrangement.
    d. Drums shall not be lifted by:
        (1) Any rope, chain or cloth slings tied about the drum,
        (2) Placement of drums on bare lift-truck forks,
        (3) Forcing drums between forks of a lift truck, or
        (4) Any commercial drum lifters exerting force on the sides of a drum.
    e. All drums or Article containers shall be secured to the transport vehicle to prevent movement in transit.

3.05 UNLOADING AND RECORDKEEPING:

A. Unloading and Placement in Storage:

1. Immediately following unloading of the PCB transport vehicle, the cargo area shall be inspected to check for any fluid leaks. If any fluid leaks are found, the source of the leaking drum or item shall be identified and sealed.
2. The contaminated cargo area shall be thoroughly cleaned with sorbents, solvents and liquid cleaner. Cleaning solvents and solids shall be placed in proper drums.

B. Upon completion of all PCB work related activities the firm performing the work outlined in this section shall provide a complete record and storage data to the Port of Seattle. The record shall include the following data:

1. Name of the firm performing the work outlined in this section and technician in charge.
2. Ballasts and Electrical Equipment removed:
    a. Manufacturer and serial number
    b. Date removed from service and location
    c. Date placed in disposal site
    d. Weight in pounds
3. Drums (and article containers where applicable):
    a. Drum size (30 to 55 gallons)
    b. Identification of contents, i.e., ballasts, cleaning solvents, etc.; for solids, rags, sorbents, etc.
    c. Weight in kilograms of contents of each drum (or container)

d. Date items were destroyed and location and company

4. The contract work will not be considered complete until receipt of listed record data by the Port.

a. Hazardous waste manifest(s) signed by the Contractor, additional transporter(s), transferer(s) and/or treater(s), and by the disposal facility(ies) shall be provided to the Port within ten (10) days of the time at which the hazardous materials are received at the disposal facility.

b. Completed certificate(s) of destruction signed by the Contractor, the disposal facility(ies), additional transporter(s), transferer(s) and/or treater(s), and the destruction facility(ies) shall be provided to the Port within ten (10) days of the time at which the hazardous materials are destroyed. For any state requiring registration of hazardous waste hauling vehicles and/or hazardous waste hauling drivers, the Contractor shall provide proof that all such vehicles and/or hazardous waste hauling drivers used in the contract are currently registered.

3.06 SUPERVISION:

A. The Contractor shall provide the services of a qualified PCB Service Supervisor.

B. All PCB-related work including separating of ballasts from light fixtures and handling of PCB items or fluids of any type shall be under the direct supervision of a qualified PCB Services Supervisor. No movement or handling of PCB fluids, solids, or other PCB items or material shall take place unless so directed by the PCB Supervisor under the authority of, or as ordered by, the Port of Seattle.

C. The qualification of the PCB Supervisor shall be:

1. Prior attendance at and satisfactory completion of an examination following a documented formalized training course on regulations and procedures for handling, marking, transportation, disposal spill prevention/cleanup, safety precautions, and testing of PCB items.

2. Training in and awareness of obligations and responsibilities for protection of people, property and environment from hazardous waste exposure or contamination.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for the work required by this section. The costs for this portion of the work shall be considered incidental to, and included in the payments made for the applicable bid items on Bid Form 00410.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE:

A. The provisions and intent of the contract, including the General Conditions, Special Conditions, and General Requirements apply to this work as if specified herein. Related work is described in:

1. Section 01315 – Regulated Materials Submittals
2. Section 01330 – Submittals
3. Section 01631 – Pollution Prevention, Planning and Execution
4. Section 01860 – Construction Safety
5. Section 02075 - Lead Controls in Construction and Demolition
6. Section 02081 – PCB Components Removal and Disposal
7. Section 02083 - Fugitive and Silica Dust Control Procedures
8. Section 02085 - Asbestos Abatement

1.02 DESCRIPTION OF WORK:

A. The Contractor's employees involved with the removal, handling, transportation, or recycling of fluorescent light tubes shall receive hazard communication training for mercury in accordance with WAC 296-62, Part C.

B. The Contractor shall supply all labor, materials, vehicles, services, insurance, special permits and equipment necessary to remove and recycle fluorescent light tubes. The fluorescent tubes shall be packaged and transported to an off-site Owner-approved recycling facility. The contractor shall carry out the work in accordance with all applicable federal, state and local regulations and these specifications.

C. The work specified herein includes the removal, transportation, and recycling of all fluorescent light tubes in accordance with all applicable federal, state and local regulations and these specifications.

D. All required permits, certificates, registrations or licenses shall be kept valid for the duration of the work addressed by the permit.

E. All shipping/receiving logs shall be legibly filled out in INK. Forms shall include all information requested and must contain the Port Maintenance Work Request Number corresponding to the project.

1.03 REFERENCE STANDARDS:

A. General Requirements:

1. All work under this contract shall be done in strict accordance with all applicable regulations, standards and codes governing mercury and in accordance with best available technology and practice. This includes any other work, including trade work conducted in conjunction with the project.

B. Specific Standards:

C. The most recent edition of any relevant regulation, standard, document or code shall be in effect during the work, regardless of the effective date of this

specification's governing contract. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be utilized.

D. United States Environmental Protection Agency (EPA) -

1. Title 40 Code of Federal Regulations Part 61, Subparts A and M (Revised Subpart B) National Emission Standard for Asbestos.

E. State of Washington Department of Labor & Industries (L&I) -

1. Chapter 296-24 Safety Standards,
2. Chapter 296-62 Occupational Health and Safety Regulations, including:
3. Chapter 296-62-054 - Hazard Communication Standard
4. Chapter 296-62-071 WAC - Respiratory Protection.
5. Chapter 296-155 Construction Standards.

F. Washington State Department of Ecology (Ecology) -

1. WAC 173-303, Dangerous Waste Regulations

G. Puget Sound Clean Air Agency (PSCAA) -

1. Article 4

H. Other guidelines, codes or documents:

1. United States Department of Transportation (DOT) Hazardous Materials Regulations, Code of Federal Regulations Title 49.

1.04 DEFINITIONS:

A. AIHA American Industrial Hygiene Association
475 Wolf Ledges Parkway
Akron, OH 44311

B. ASTM American Society for Testing and Materials

C. Authorized Visitor - Designated representatives of the contractor, tenant or the Port, and representatives of a regulatory or other agency having jurisdiction over the project.

D. Certified Industrial Hygienist (CIH) - An industrial hygienist certified in the Comprehensive Practice of Industrial Hygiene by the American Board of Industrial Hygiene.

E. Contractor - The individual or business with which the Owner arranges to perform the hazards abatement.

F. Ecology - Washington State Department of Ecology

G. EPA - United States Environmental Protection Agency

H. HEPA Filter - A high efficiency particulate air filter capable of removing particles greater than 0.3 microns in diameter with 99.97% efficiency.

I. L & I - Washington State Department of Labor & Industries
805 Plum Street, S. E. (HC-412)
Olympia, Washington 98504

J. NESHAP - The National Emission Standard for Hazardous Air Pollutants (40 CFR Part 61).

K. NIOSH - The National Institute for Occupational Safety and Health
Building "J" N.E., Room 3007
Atlanta, GA 30333

L. OSHA - The Occupational Safety and Health Administration
200 Constitution Avenue
Washington D.C. 20210

M. PSCAA - Puget Sound Clean Air Agency

N. WAC - Washington Administrative Code as enforced by the Washington State Department of Labor and Industries.

O. WISHA - Washington Industrial Safety and Health Act as enforced by the Washington State Department of Labor and Industries

1.05 SUBMITTALS AND NOTICES:

A. Portions of this contract are very unique and are under strict control of several regulatory agencies. Therefore, "approval by the Port of Seattle" or similar phrases, are not to be construed as a transfer of liability; only a statement that the information, material or equipment submitted appears to comply with the requirements of the Contract and the regulatory agencies and that no objection has been raised based upon the submittal information.

B. Contractors shall provide complete submittals as per Sections 01305 – Preconstruction Submittals, 01330 – Submittals, 01315 - Regulated Materials Submittals, and 01631 - Pollution Prevention, Planning and Execution for review by the Port. Review of submittals will be in accordance with Section 01330 - Submittals. No fluorescent lamp-related work will be permitted prior to submittals being approved by the Port of Seattle.

1.06 RESPONSIBILITIES:

A. TRAINING:

1. The Contractor shall be responsible for assuring the following training has been completed prior to the Commencement of work:

a. Hazard communication for mercury in accordance WAC 296-62, Part C.

b. Special on-site training on equipment and procedures unique to this job site shall be performed as required.

c. Training in emergency response and evacuation procedures shall be performed.

B. Prior to Commencement of Work the Contractor shall:

1. Provide to the Port of Seattle information concerning the need for access to areas, and shutdown and protection requirements of certain equipment and systems in the work area. Contractor shall coordinate with the Resident Engineer to include other equipment and systems as needed, including Port of Seattle owned systems and equipment.

1.07 PRODUCT DELIVERY, STORAGE AND HANDLING:

A. Deliver all materials in good condition in the original packages, containers or bundles visibly/legibly bearing the name of the manufacturer and the brand name of the product.

B. Store all materials in a manner that will prevent their damage or contamination. Replacement materials shall be stored outside of the work area until abatement is completed.

C. Damaged, deteriorating or previously used materials shall not be used and shall be removed from the worksite and disposed of properly.

1.08 SITE CONDITIONS:

A. The removal area may have domestic water and sewer lines, sprinkler lines, electrical and communication conduit with active wiring, cable trays, light fixtures and HVAC equipment located in the project area. The Contractor shall verify location of all equipment and protect as required.

PART 2 PRODUCTS

2.01 EQUIPMENT AND SUPPLIES

A. Personal Protective Equipment:

1. Respiratory Protection: All employees cleaning up broken fluorescent light tubes shall be provided with and required to use adequate and appropriate respiratory protection in accordance with WAC 296-62, Part E.

2. For workers cleaning up broken fluorescent light tubes, full body disposable protective clothing incorporating head, body and feet covering shall be provided in sufficient quantities and adequate sizes to accommodate movement without tearing, to all workers and authorized visitors.

3. Additional safety and fall protection equipment (e.g., hard hats meeting the requirements of ANSI Standard Z89.1 2009, eye protection meeting the requirements of ANSI Standard Z87.1 2003, safety shoes meeting the requirements of ASTM Standards F2412-05 and F2413-05, and ANSI Standards ANSI Z41-1999 and Z41-1991, disposable PVC gloves) as necessary shall be provided to all workers and authorized visitors.

B. Removal Equipment:

1. A sufficient supply of scaffolds, ladders, lifts and hand tools (e.g., screwdrivers) shall be provided as needed.

2. Additional support equipment as needed.

C. Packaging Equipment and Material:

1. Fiberglass drums

2. Fluorescent light tube shipping boxes

2.02 SUBSTITUTIONS:

A. The Port of Seattle will consider proposals for substitutions of materials, equipment and methods only when such proposals are accompanied by full and complete

technical data and all other information required by the Port to evaluate the proposed substitution.

B. Do not substitute materials, equipment or methods unless such substitution has been specifically approved in writing for this work by the Port of Seattle.

PART 3 EXECUTION

3.01 INSPECTIONS:

A. Prior to Commencement of Work:

1. The Contractor and the Port of Seattle have inspected the site to make sure that work can begin.

2. The Contractor and the Port of Seattle have made sure that the work of others has been completed.

B. Throughout the Project: Port staff and Consultants will perform routine inspections of the site to assure compliance with applicable regulations and this specification. The Port of Seattle may also conduct spot checks throughout the project.

3.02 SITE SECURITY:

A. The work area is to be restricted only to authorized, trained and protected personnel. These may include the contractor's employees; employees of subcontractors; tenant and Port of Seattle employees and representatives; federal, state and local inspectors and other authorized or designated individuals. A list of authorized personnel shall be established by the contractor prior to job start and posted as directed by these specifications. With the exception of emergency response personnel, the contractor prior to project area entry shall approve unannounced visitors.

B. Entry into the work area by unauthorized individuals shall be reported immediately by the contractor to the Port of Seattle.

C. Airport and project area access for this work will be assisted by and coordinated through the Resident Engineer.

3.03 EMERGENCY PLANNING:

A. Emergency contingency plans shall be developed by the Contractor for approval by the Port of Seattle prior to initiation of any work. These plans shall be a component of the Contractor's Health and Safety Plan and must include Port of Seattle electrical Lockout, Tag-out procedures.

B. Emergency procedures shall be in written form and prominently posted in the equipment storage area or as directed by the Port of Seattle. Prior to performing any removal activities, all personnel must read and sign these procedures to acknowledge an understanding of work site layout, location of emergency exits and the contents of the plan.

C. Employees shall be trained in evacuation procedures in the event of workplace emergencies.

D. Telephone numbers of all emergency response personnel shall be prominently posted in the equipment room or as directed by the Port of Seattle. To assist the contractor, the Port of Seattle will provide a list of phone numbers for emergency response to the project.

3.04 PREPARATION OF THE WORK AREA:

A. Contractor shall coordinate with the Resident Engineer to ensure that the Contractor is performing any required shut down and lock out of utilities such as electric power, water or HVAC lines to the project area. The Contractor shall provide temporary power and lighting. Insure safe installation (including ground faulting) of temporary power sources and equipment by compliance with all applicable electrical codes and WISHA requirements for temporary electrical systems.

3.05 REMOVAL PROCEDURES

A. Removal and Packaging of Fluorescent Light Tubes:

1. Tubes shall be removed in a manner to prevent breakage. If a tube breaks immediately clean-up debris and place in a box specified for broken tubes. Broken tubes shall also be recycled but must be separated from unbroken tubes.

2. Tubes shall be placed in boxes or fiberglass drums in a manner to prevent breakage. These boxes shall be shipped to an Owner approved recycling facility. Contractor shall complete shipping papers.

3. Tubes shall not be taped together.

B. Clean-up Procedures for Broken Fluorescent Light Tubes:

1. Contractor shall have cleanup kit on site prior to removing/dismantling fluorescent light fixtures.

2. Broken tubes shall be cleaned-up immediately.

3. Use calcium polysulfide wetting solution on spilled lamp material to inhibit vaporization

4. Following removal of broken glass, clean the floor with diluted trisodium phosphate solution according to manufacturer's recommendations.

5. Identify, seal, and mark all containers with broken bulbs for special handling.

6. Mark and seal all drums of collected phosphate powder.

3.06 HANDLING AND TRANSPORTATION TO OFF-SITE FACILITIES:

A. The fluorescent light tubes shall be packaged and transported to an Owner approved recycling facility. The Contractor shall provide a shipping record to the Owner at the time of shipment. Following completion of processing, Contractor shall provide Owner with a certificate of recycling from the recycling facility indicating exact number of tubes recycled and date of processing.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for the work required by this section. The costs for this portion of the work shall be considered incidental to, and included in the payments made for the applicable bid items on Bid Form 00410.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE:

A. The provisions and intent of the contract, including the General Conditions, Special Conditions, and General Requirements apply to this work as if specified here. Related work is described in:

1. Section 01315 – Regulated Materials Submittals
2. Section 01330 – Submittals
3. Section 01631 – Pollution Prevention, Planning and Execution
4. Section 01860 – Construction Safety
5. Section 02075 – Lead Controls in Construction and Demolition
6. Section 02081 – PCB Components Removal and Disposal
7. Section 02082 – Removal and Disposal of Fluorescent Lamps
8. Section 02085 – Asbestos Abatement

1.02 DESCRIPTION OF WORK:

A. Furnish all labor, materials, facilities, equipment, services, employee training and testing, and agreements necessary to perform the work required for fugitive dust and potential silica-generating construction dust control activities in accordance with these specifications and the latest regulations from the Washington State Department of Labor and Industries (L&I), Puget Sound Clean Air Agency (PSCAA) and any other applicable federal, state, and local government regulations. Whenever there is a conflict or overlap of the above references, the most stringent provisions are applicable.

B. In all cases where potential silica dust exposures may occur, the Contractor shall use any and all feasible engineering and work practice controls to reduce and maintain employee exposure levels to or below the Washington State Permissible Exposure Limit. It shall be assumed that the workers generating the silica dust are exposed above the Permissible Exposure Limit until the Contractor air monitoring demonstrates levels below the Permissible Exposure Limit.

C. The work specified herein shall be performed by competent persons, trained, knowledgeable and qualified in both fugitive and silica dust evaluation and control methods.

D. If respirable crystalline silica dust concentrations exceed 0.05 mg/m^3 (Alpha-Quartz) and/or 0.025 mg/m^3 (cristobalite, tridymite) beyond the perimeter of the work area, the Port is authorized to stop work. The Contractor shall perform all necessary corrective actions to eliminate visible dust and reduce respirable crystalline silica concentrations to less than 0.05 mg/m^3 and/or 0.025 mg/m^3 before resuming work. The Port may visually monitor for fugitive dust and collect air samples for respirable crystalline silica at any time.

1.03 SCOPE OF WORK:

A. All Construction work will potentially generate fugitive dust. It is the responsibility of the Contractor to control the release of all fugitive dust levels.

B. Construction site work that requires control of silica shall include chipping, sanding, sawing, jack hammering on concrete, flooring, plaster, and sheetrock associated with this project.

C. Work activities shall include the following, as applicable:

1. Provision of site security to assure that no member of the public is able to gain access to the construction work area at any time. The Contractor shall maintain access and egress routes at all times.

2. In the case of concrete and demolition work, the Contractor shall provide worker training, respiratory protection, and medical examinations, as necessary, to meet applicable silica regulations and regulatory guidance regarding silica exposures.

3. Provision of good work practices to prevent the release of fugitive and silica dust outside of the work area, as described in the Execution portion of this Section, Part 3.

4. Provisions for worker and equipment decontamination. Worker decontamination and equipment areas shall be cleaned daily or as required more frequently to prevent dust emissions.

5. Protection of security, life safety, and energy management systems, including associated wiring, which shall remain operational throughout the work activities.

6. Decontamination of work area(s). Concrete dust shall be cleaned from the work area using wet methods and HEPA vacuuming equipment at the completion of concrete demolition activities, before barriers are removed. When wet sawing or coring concrete, the water shall be cleaned and vacuumed prior to drying. If dust remains after the area dries, the Contractor shall use wet methods to clean residual dust.

1.04 PERSONAL PROTECTION:

A. Respiratory Protection: Where exposures to respirable crystalline silica may exceed the Permissible Exposure Limit (of 0.1 mg/m^3 (alpha-quartz) and 0.05 mg/m^3 (cristobalite, tridymite) based on an 8-hour time-weighted average per WAC 296-62-07515), workers shall be provided, as a minimum, with personally issued and marked respirators equipped with high efficiency particulate air (HEPA) filters approved by NIOSH (99.97% efficient) to be worn in the designated work area. Sufficient filters shall be provided for replacement as required by the workers or applicable regulations. Disposable respirators shall not be used.

B. The Contractor shall comply with OSHA 29 CFR Part 1926.134, WAC 296-62-071 (Respiratory Protection) and ANSI Standard Z88.2-1990 "Practices for Respiratory Protection".

C. No worker shall be exposed to levels greater than 0.1 mg/m^3 (alpha-quartz) and 0.05 mg/m^3 (cristobalite, tridymite) respirable crystalline silica as determined by the protection factor of the respirator worn and the work airborne area respirable crystalline silica levels.

D. A sufficient supply of replacement parts and HEPA filter cartridges shall be provided to the workers.

E. The Contractor shall maintain daily inspection(s) of all respirators to verify cleanliness and to replace damaged, worn or missing parts.

1.05 PROTECTIVE CLOTHING:

A. Workers shall be provided with sufficient sets of protective full-body clothing to be worn in the designated work area whenever a potential exposure to respirable crystalline silica concentrations above the PEL exists. Such clothing shall include, but not be limited to coveralls and eye protection.

B. Protective clothing shall not be worn outside the work area. Non-disposable-type protective clothing and footwear shall be left in the work area.

C. Eye protection shall be provided and worn as required by applicable safety regulations. Equipment shall conform to ANSI Z87.1-2003.

D. Head Protection: Hard hats or other head protection shall be provided as required by applicable safety regulations. Hard hats shall conform to ANSI Z89.1-2009, Class A or B.

E. Foot Protection: Nonskid footwear shall be provided to all workers. Footwear shall conform to F2412-05 and F2413-05, and ANSI Standards ANSI Z41-1999.

F. Workers shall not eat, drink, smoke, or chew gum or tobacco in or near the respirable silica work areas.

1.06 FUGITIVE DUST AND SILICA CONTROL SUBMITTALS:

A. Contractors shall provide complete submittals as per Sections 01305 – Preconstruction Submittals, 01330 – Submittals, 01315 - Regulated Materials Submittals, and 01631 - Pollution Prevention, Planning and Execution for review by the Port. Review of submittals will be in accordance with Section 01330 - Submittals. No silica-related work will be permitted prior to submittals being approved by the Port of Seattle. Review of submittals will be in accordance with Section 01330 - Submittals.

B. Silica Air Sampling Evaluation by Contractor:

1. The Contractor shall conduct air sampling of workers and subcontractors for respirable crystalline silica in accordance with the National Institute for Occupational Safety and Health (NIOSH) Method 7500. This sampling is performed to evaluate workers' exposure levels. The Contractor shall submit an air-monitoring plan as part of work plan.

2. The Contractor shall conduct outside area air sampling in areas of the terminal occupied by the Public and Port Employees for respirable crystalline silica in accordance with the National Institute for Occupational Safety and Health (NIOSH) Method 7500. The Contractor shall submit an air-monitoring plan as part of work plan.

3. The Contractor shall conduct air sampling in accordance with the NIOSH Method 7500 to collect a sufficient enough volume to determine if the airborne silica dust levels are below the Permissible Exposure Limits and specified limits for outside area sampling. If the sampling detection levels are above the Permissible Exposure Limits and/or outside area specified limits, the Contractor is required to re-sample at no expense to the Port of Seattle.

4. Results of air samples collected by the Contractor shall be submitted to the Port's Resident Engineer within 48 hours after sample collection.

PART 2 PRODUCTS

2.01 TOOLS AND EQUIPMENT:

A. Provide suitable tools for dust collection and water-jet dust suppression systems.

B. Provide sufficient number of HEPA-filtered vacuum cleaners to clean-up visible dust and slurry residues.

1. Air filtration devices shall utilize high efficiency particulate air (HEPA) filtration systems bearing a UL 586 label indicating its ability to perform under specified conditions. Provide filters marked with the name of the manufacturer, serial number, airflow rating, efficiency and resistance, and the direction of the test airflow. Units shall have two stages of pre-filtering, as follows:

2. The first stage pre-filter shall be a low efficiency type for particle sizes 100 micrometers and larger.

3. The second stage pre-filter shall be a medium efficiency type effective for particle sizes down to 5 micrometers.

4. Pre-filters shall be installed either on or in the intake grid to the exhaust unit and shall be held in place with special housings or clamps.

5. Air filtration devices shall also include:

a. An elapsed time meter showing the total accumulated hours of operation.

b. An electrical interlock preventing operation of the unit without a HEPA filter.

c. An automatic shutdown system to stop the fan in case of a rupture in the HEPA filter or a blocked air discharge.

d. Warning lights to indicate normal operation (green), moderately high pressure drop across the filters, such as due to filter overloading (yellow), and too high of a pressure drop due to an overloaded or ruptured HEPA filter or obstructed discharge (red).

e. An audible alarm if the unit shuts down due to operation of the safety systems.

f. Electrical components approved by the National Electrical Manufacturers Association (NEMA) and the Underwriter's Laboratories (UL). Each unit shall be equipped with overload protection sized for the equipment. The motor, fan, fan housing, and cabinet shall be properly grounded.

PART 3 EXECUTION

A. Options for the control of fugitive and silica concentrations are given in the following paragraphs.

1. WET METHOD:

a. Use “wet” systems that eliminate or reduce dust generated by demolition activities. Clean up sludge and /or waste immediately following its generation.

2. ENCLOSURE METHOD:

a. Use negative pressure enclosures as listed in Section 02085 – Asbestos Abatement in conjunction with air filtration devices, as described in Section 02085 – Asbestos Abatement Paragraph 2.01. Air shall be moved through the filtration unit with a minimum of 1500 CFM. Provide HEPA filter-based shop vacuum units to control dust generated at the work face and use tools that include dust control features.

3. NEGATIVE AIR PRESSURE SYSTEMS:

a. If respirable crystalline silica concentrations exceed 0.10 mg/m^3 (alpha-quartz) and/or 0.05 mg/m^3 (cristobalite, tridymite) outside of the work area or if visible levels of dust emissions are observed outside the work area while using HEPA-vacuum and wet methods, the Contractor shall provide differential air pressure systems for each work area in accordance with Appendix J of the EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings," EPA 560/5-85-024.

b. Negative air pressure shall be continuously monitored by the Contractor using continuous read strip chart, or similar digital recording differential pressure meter (manometer). The location of the pressure measurement tap shall be approved in advance by the Port. During the operation of the unit(s), recordings shall be collected on a daily basis, dated, and signed by the Contractor representative present onsite. Negative pressure shall be checked at least four times per day by a person familiar with the operation of the negative pressure filtration units, as well as the recording device. Each check shall be documented with a time and date notation on the circular chart, along with the initials of the person performing the check. A copy of the circular chart record shall be submitted to the Port on a daily basis. Connect recording instrument to an audible alarm that will activate at pressure differential of -0.020 inches water gauge air pressure. Defective or non-operating instrumentation may require temporary cessation of work until instrumentation is replaced.

NOTE: Use of linear strip recorders is acceptable only as approved by the Port.

c. Exhaust air shall only be vented to the exterior of the building at locations approved by the Port unless otherwise noted or directed. Such outlets shall not be near or adjacent to other building intake vents or louvers or at entrances to the building.

d. The Contractor shall provide onsite certification of the negative pressure units to document adequate filtration efficiency for all units exhausting internally within the building or as otherwise required by

the Port. Testing may need to be repeated if the unit(s) or their filtration systems have been repaired or replaced during the course of the work, following movement between zones, or if damage has occurred since the units were previously tested. Certification shall be by DOP or Portacount testing and signed by an independent tester or the contractor's trained Health and Safety personnel. DOP testing shall verify an in-situ efficiency of 99.97% or greater. Portacount testing shall verify an in-situ efficiency of 99.3% or better. The tester(s) shall show knowledge of the testing procedures and limitations to the satisfaction of the Port, including but not limited to knowledge of test modes, variability of results, calibration techniques, and equipment operating procedure. Where knowledge or testing procedures are deemed inadequate, a Professional Engineer or Certified Industrial Hygienist shall sign test results.

e. The work area shall have a minimum differential air pressure of -0.020 inches w.g. at all times during concrete demolition activities.

3.02 OVERSIGHT:

A. An environmental consultant (Consultant) may be retained to advise the Port in all matters pertaining to the work performed in accordance with these specifications and requirements. Where an outside consultant is not hired, Port personnel will serve as this consultant. References to the consultant herein shall include the outside Consultant or Port personnel.

B. The Consultant will act as the Port's liaison in technical matters involving the fugitive dust and silica-related work.

C. The Consultant is authorized by the Port to have free access to all fugitive dust/silica work areas, to assist in interpretation of procedures, and to advise on all provisions of the contract documents pertaining to the control of dust.

D. The Consultant will advise the Port to stop work if in the course of performing their monitoring duties, they observe an instance of substantial nonconformance with the contract documents and/or a situation presenting a health hazard to workers, Port employees, or the public. Work shall not resume until corrective measures have been enforced. Instances of substantial non-conformance shall include but not be limited to the following:

1. Visible dust emissions outside of the work area barriers.
2. Respirable crystalline silica dust emissions outside of the work area at levels exceeding 0.10 mg/m^3 (alpha-quartz) and 0.05 mg/m^3 (cristobalite, tridymite).
3. Loss of negative pressurization (if required).
4. Activities or misconduct affecting worker's or building occupant's safety.
5. Breaches of containment that could substantially damage building life safety systems.
6. If poor work practices are observed, the Consultant/Port shall direct the Contractor to make the necessary corrections. If appropriate corrections are not made, or if there is an immediate threat that silica dust could be

released outside the work area, work shall be stopped. The decision to stop work shall be made by the Port's representative.

E. The Consultant may perform air sampling inside and outside the work area during the project. The Contractor shall cooperate fully with the Consultant and ensure the cooperation of his workers during collection of air samples and work area inspections.

F. The Consultant's role in advising the Port on environmental health matters does not relieve the Contractor's obligation to comply with all applicable health and safety regulations promulgated by the federal, state, or local governments. Air monitoring results generated by the Consultant shall not be used by the Contractor to represent compliance with regulatory agency requirements for monitoring of workers exposure to airborne silica, nor shall any other activity on the part of the Consultant represent the Contractor's compliance with applicable health and safety regulations.

3.03 WORK AREA ISOLATION AND CLEANUP:

A. The Contractor shall ensure that fugitive dust and silica contaminants from the work area do not contaminate the interior of the building.

B. Work areas where fugitive dust and silica-containing materials will be disturbed shall be isolated from other parts of the building with 6 mil polyethylene critical barriers on all doors, windows, and work area penetrations. Other methods may be approved upon written requests. Coordinate with Section 01500 - Temporary Facilities and Controls for additional information regarding barriers to the public.

C. The work areas will be considered clean when all visible dust and debris has been removed.

3.04 RECORD KEEPING:

A. The Contractor shall maintain for at least thirty (30) years, a record of the project. Furnish one copy to the Port’s representative. The record shall include the following information:

1. The starting and completion dates of the project.

2. A copy of all analytical results.

3. Copies of negative pressure documentation records (as required).

4. The name and address of the analytical laboratory used for silica analyses; and

5. The name, address, and social security number of all persons who were engaged in the concrete demolition activities.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT

A. No separate measurement or payment will be made for the work required by this section. The costs for this portion of the work shall be considered incidental to, and included in the payments made for the applicable bid items on Bid Form 00410.

END OF SECTION

PART 1 GENERAL

1.01 RELATED WORK DESCRIBED ELSEWHERE:

A. The provisions and intent of the contract, including the General Conditions, Special Conditions and General Requirements apply to this work as if specified in this Section. Work related to this Section is described in:

1. Section 01315 – Regulated Materials Submittals
2. Section 01330 – Submittals
3. Section 01631 – Pollution Prevention, Planning and Execution
4. Section 01860 – Construction Safety
5. Section 02075 – Lead Controls in Construction and Demolition
6. Section 02081 – PCB Components Removal and Disposal
7. Section 02082 – Removal and Disposal of Fluorescent Lamps
8. Section 02083 – Fugitive and Silica Dust Control Procedures

1.02 DESCRIPTION OF WORK:

A. The asbestos abatement work of this project is in preparation for structure demolition. The contractor shall supply all labor, materials, services, insurance, special permits, and equipment necessary to remove and dispose of all asbestos containing materials identified on the drawings and in the *Revised Regulated Building Materials Assessment Report* prepared by Argus Pacific, Inc. dated March 4, 2013 included as Attachment A.

B. The regulated materials abatement work involves removal electrical panels, electrical wiring, and gaskets.

C. Failure to complete the specified tasks identified within the allotted contract time will result in serious and substantial special, incidental, and consequential damages. Prior to submitting a bid for this work, Contractor is responsible to review the scheduled work and ensure that adequate resources have been identified to complete the proposed work tasks on schedule.

D. GENERAL REQUIREMENTS

1. The Contractor shall supply all labor, materials, services, insurance, special permits and equipment necessary to remove and dispose of asbestos containing materials (ACM) in accordance with all applicable federal, state and local regulations and these specifications.
2. Contractor is responsible to notify and provide all necessary communications to the responsible regulatory agencies for all required work.
3. Contractor is responsible to take appropriate measures ensuring that the project site will be safeguarded from contamination during the asbestos abatement project period.
4. Building materials in the project area shall be treated as ACM or asbestos-contaminated unless otherwise noted.

5. All work is to be performed in accordance with applicable codes, standards, regulations, and accepted industry practices. This includes compliance with regulatory requirements applicable at the time the work is performed and is not limited to requirements at the time of bid. All work, including work practices, is to be craftsman-like and is subject to inspection by the Port, the Port's Regulated Materials (RM) Designer, and regulatory agency personnel.

E. All required permits and notifications shall be kept valid for the duration of the contract. This includes any permit and/or notification revisions, such as changes of abatement dates, shift times, work locations, Contractor personnel, etc.

F. All air and bulk monitoring information shall be legibly entered on Port of Seattle forms. Copies of the applicable Port forms are available through the Resident Engineer.

G. All employees involved in asbestos abatement activities shall be the bearer of a current Certified Asbestos Worker card issued by the Washington State Department of Labor and Industries. Cards shall be available for inspection at the jobsite. The Contractor shall also provide, as a minimum, one (1) person certified by L&I as an Asbestos Abatement Supervisor and this person shall be responsible for overall abatement activities. This person shall be immediately available on-site when any project work is done. If abatement work is performed on multiple shifts, each shift shall have a certified Asbestos Abatement Supervisor.

H. Use of the Site: Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed.

I. Smoking or open fires will not be permitted within the building enclosure or on the premises.

J. Site Conditions: The removal area may have domestic water and sewer lines, electrical and communication conduit with active wiring, cable trays, light fixtures and HVAC equipment located in the project area. The Contractor shall verify location of all equipment and protect and maintain it as required.

K. The contractor shall follow all Port rules and regulations regarding access to and from the work site including but not limited to badging and escort requirements.

L. Contractor is responsible for all air sampling for WISHA and other local, state and federal compliance. Refer to Paragraph 1.08 of this section for requirements for Contractor air monitoring.

M. On-site Observation:

1. The safety and protection of the Contractor's employees, sub-contractor's employees, Port's employees, consultant, the facility, and the public is the sole responsibility of the Contractor.

2. The Resident Engineer, RM Project Designer, or representatives of local, State or Federal agencies may make unannounced visits to the site during the work. The Contractor shall provide two complete sets of clean, protective clothing and respirators with the same protection factor as required in the regulated area available daily for such visitor use. It is the visitor’s responsibility to insure all necessary medical qualification, training,

and "fit test" certificates are current prior to using any respirator or protective clothing provided by the Contractor.

3. If the Resident Engineer, RM Project Designer or agency visitor determines that practices are in violation of applicable regulations, or are endangering workers, the general public or the facility, they will immediately notify the Contractor orally that operations must cease until corrective action is taken. Such notification from the Resident Engineer will be followed by written confirmation within three (3) workdays.

4. Contractor shall immediately stop work after receiving such notification verbally or written. The work may not be restarted until the Contractor receives written authorization from the Resident Engineer.

5. All costs resulting from such stop work order and any necessary corrective actions will be borne solely by the Contractor and will not be a basis for an increase in the contract amount or an extension of time.

1.03 ASBESTOS ABATEMENT DEFINITION:

A. Port of Seattle (POS) Asbestos Definitions:

1. *RM Project Monitor*: The RM Project Monitor is a Port on-site representative directly involved with project oversight, abatement inspections and record keeping. The RM Project Monitor reports directly to the Project Designer and RM Construction Manager.

2. *RM Project Designer* – The person or firm under contract with the Port of Seattle for project designs associated with the removal/abatement of Regulated Materials. The RM Project Designer reports directly to the RM Construction Manager.

B. Definitions Relevant to Asbestos Abatement: (Some of these definitions may be found in other sections of the contract documents.)

1. *Abatement:* Procedures to control fiber release from asbestos-containing materials. Includes removal, encapsulation, enclosure, repair, demolition and renovation activities.

2. *ACGIH:* American Conference of Governmental Industrial Hygienists.

3. *Aerosol*: A system consisting of particles, solid or liquid, suspended in air.

4. *AIHA:* American Industrial Hygiene Association.

5. *Airlock:* A system for permitting ingress and egress with minimum air movement between a contaminated area and an uncontaminated area, typically consisting of two curtained doorways separated by a distance of at least 3 feet.

6. *Air Monitoring*: The process of measuring the fiber content of a known volume of air collected during a specific period of time. The procedure most commonly utilized in industry for asbestos follows the WISHA reference method outlined in WAC 296-62-07735, Appendix A, and WAC 296-62-07737, Appendix B. For clearance air monitoring, aggressive monitoring techniques are used and shall be conducted in accordance with EPA document #560/5-85-024 (June 1985). Electron microscopy methods

may also be utilized for lower detectability as well as specific fiber identification.

7. *Air Sampling Firm (ASF):* A professional firm providing specialized services by trained and certified or qualified personnel in the field of asbestos abatement and project management, contracted with or employed by the Contractor or tenant to supervise and/or conduct inspection, monitoring, and analysis services.

8. *Amended Water:* Water to which a surfactant has been added in order to accomplish more thorough penetration and saturation of the asbestos-containing material.

9. *ANSI:* American National Standards Institute.

10. *Asbestos:* The mineral varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite (amosite), anthophyllite, actinolite and tremolite. For purposes of determining respiratory and worker protection, both the asbestiform and non-asbestiform varieties of the above minerals and these minerals that have been chemically treated and/or altered shall be considered as asbestos.

11. *Asbestos-Containing Material (ACM):* Any material containing more than one percent (1%) asbestos as defined under NESHAPS CFR 40, Part 61, and OSHA 29 CFR Part 1926.1101, WAC 296-62-07703, and Regulation III of the Puget Sound Clean Air Agency.

12. *Asbestos-Containing Waste Material:* Any material, which is or is suspected of being or any material contaminated with an asbestos-containing material, which is to be removed from a work area for disposal.

13. *Asbestos-Containing Waste:* Asbestos containing or contaminated materials or objects requiring disposal.

14. *ASF:* Air Sampling Firm.

15. *ASTM:* American Society for Testing and Materials.

16. *Authorized Visitor:* Designated representatives of the Contractor, or the Port and representatives of a regulatory or other agency having jurisdiction over the project.

17. *Breathing Zone:* A hemisphere forward of the shoulders with a radius of approximately 6 to 9 inches.

18. *Bridging Encapsulant:* The application of a sealant over the surface of asbestos-containing material to prevent the release of asbestos fibers.

19. *Category I; Non-friable Asbestos-Containing Material (ACM):* Asbestos-containing packings, gaskets, resilient floor covering and asphalt roofing products containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy.

20. *Category II; Non-friable ACM:* Any material, excluding Category I Non-friable ACM, containing more than 1 percent asbestos as determined using the methods specified in appendix A, subpart F, 40 CFR part 763,

section 1, Polarized Light Microscopy that, when dry, cannot be crumbled, pulverized, or reduced to *powder by hand pressure.*

21. *Certified Industrial Hygienist (CIH):* An industrial hygienist certified in the Comprehensive Practice or Chemical Aspects of Industrial Hygiene by the American Board of Industrial Hygiene.

22. *Class I Asbestos Work:* Activities involving the removal of thermal system insulation or surfacing ACM/PACM.

23. *Class II Asbestos Work:* Activities involving the removal of ACM, which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

24. *Class III Asbestos Work:* Repair and maintenance operations where "ACM", including TSI and surfacing ACM and PACM, may be disturbed.

25. *Class IV Asbestos Work:* Maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

26. *Clean Room:* An uncontaminated area or room, which is a part of the worker decontamination enclosure system with provisions for storage of worker's street clothes and clean protective equipment.

27. *Containment:* An enclosure system.

28. *Contractor:* The individual or business with which the Port contracts with to perform the asbestos abatement.

29. *Competent Person:* The individual onsite (a representative of the contractor) who is capable of identifying existing asbestos, hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate them as specified in WAC 296-62-07728. The competent person shall meet all requirements specified in WAC 296-62-07728. The competent person shall be certified as an asbestos supervisor in compliance with WAC 296-65-030(3) and 296-65-012.

30. *Curtained Doorway:* A device to allow ingress or egress from one room to another, typically constructed by placing three overlapping sheets of plastic over an existing or temporarily framed doorway.

31. *Cutting:* To penetrate with a sharp-edged instrument and includes sawing, but does not include shearing, slicing, or punching.

32. *Demolition:* The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning of any facility.

33. *Differential Pressure System:* A containment system utilizing HEPA machines in an airtight enclosure.

34. *Disposal Bag:* 6-mil thick leak-tight plastic bags used for transporting asbestos waste from the work site and to the disposal site. Each shall be labeled in accordance with WAC 296-62-07721 and 40 CFR 61.150 and PSCAA 4.05(b) 10.

35. *DOSH*: The Washington State Department of Labor and Industries' Division of Occupational Safety and Health

36. *Encapsulant:* A material which is applied to asbestos-containing material to reduce or control the potential release of asbestos fibers from the material, either by creating a membrane over the surface (bridging encapsulant), or by penetrating into the material and binding its components together (penetrating encapsulant).

37. *Encapsulation:* The application of an encapsulant to asbestos-containing materials in accordance with the manufacturer's specifications.

38. *Enclosure:* A semi-air tight system used to segregate and isolate an asbestos abatement area, and which is continuously served by a negative pressure ventilation system once abatement activities start.

39. *EPA:* U.S. Environmental Protection Agency, Region X.

40. *Equipment Room:* An area or room, which is part of the worker decontamination enclosure system with provisions for storage of contaminated clothing and equipment.

41. *Excursion Limit:* The maximum personal exposure concentration of asbestos fibers in air for any 30-minute period (1.0 f/cc).

42. *Facility:* Any institutional, commercial, public, industrial, or residential structure, installation, or building (including any structure, installation, or building containing condominiums or individual dwelling units operated as a residential cooperative, but excluding residential dwellings having four or fewer dwelling units); any ship; and any active or inactive waste disposal site. For purposes of this definition, any building, structure or installation that contains a loft used as a dwelling is not considered a residential structure, installation, or building.

43. *Facility Component:* Any part of a facility including equipment.

44. *Filter:* A media component used in respirators or equipment to remove solid or liquid particles from air or water.

45. *Fixed Object:* A piece of equipment or furniture in the work area, which cannot be removed from the work area.

46. *Friable Asbestos Material:* Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763 section 1, Polarized Light Microscopy, that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure.

47. *Friable Upon Removal:* A non-friable material, which becomes friable when disturbed during removal.

48. *Fugitive Source:* Any source of emissions not controlled by an air pollution control device.

49. *Glovebag Technique:* A method for removing small amounts of friable asbestos-containing material from fireproof beams, HVAC ducts, short piping run, valves, joints, elbows and other non-planar surfaces in a non-contained (plasticized) work area. The glovebag assembly is a

manufactured or fabricated device consisting of a bag (typically constructed of plastic), two inward projecting long sleeve gloves, an internal tool pouch and an attached or pre-printed label. All workers who are permitted to use the glovebag technique must be trained, experienced and skilled in this abatement method.

50. *Grinding:* To reduce to powder or small fragments and includes mechanical chipping or drilling.

51. *HEPA Filter:* A high efficiency particulate air filter capable of removing particles greater than 0.3 microns in diameter with 99.97% efficiency using Dop testing methodology.

52. *HEPA Vacuum:* A vacuum system equipped with HEPA filtration.

53. *HEPA Machine*: Negative air machine.

54. *HVAC:* Heating, Ventilating and Air Conditioning System.

55. *Installation:* Any building or structure or any group of buildings or structures at a single demolition or renovation site that are under the control of the same owner or operator (or owner or operator under common control).

56. *L&I:* Washington State Department of Labor and Industries.

57. *Leak-Tight:* Solids or liquids cannot escape or spill out. It also means dust-tight.

58. *Malfunction:* Any sudden and unavoidable failure of air pollution control equipment or process equipment or of a process to operate in a normal or usual manner so that emissions of asbestos are increased. Failures of equipment shall not be considered malfunctions if they are caused in any way by poor maintenance, careless operation, or any other preventable upset conditions, equipment breakdown, or process failure.

59. *Material Decontamination Unit:* A decontamination system, which is utilized for transferring containerized waste from inside to outside of the work area.

60. *Movable Object:* A piece of equipment or furniture in the work area, which can be removed from the work area.

61. *MSDS:* Material Safety Data Sheet.

62. *Negative Air Machine:* A specially designed fan mounted in a cabinet that draws air from the contaminated space into pre-filters and a HEPA filter.

63. *Negative Pressure Respirator:* A respirator in which the air pressure inside the respirator is negative during inhalation in relation to the air pressure outside the respirator.

64. *Negative Pressure Enclosure:* The negative pressure/local exhaust system, utilizing HEPA filtration capable of maintaining a negative pressure of 0.02 inches of water inside the work area and a minimum of four (4) air exchanges per hour from adjacent areas into the work area and exhausting clean, filtered air outside work area.

65. *Negative Pressure:* Air pressure lower than surrounding areas, generally caused by exhausting air from within the containment work area. A sufficient volume or air shall be exhausted to create a minimum pressure of -0.02 inches of water within the enclosure with respect to the area outside of the containment work area.

66. *NESHAP:* The National Emission Standard for Hazardous Air Pollutants (40 CFR Part 61).

67. *Non-Friable Asbestos-Containing Material:* Any material containing more than 1 percent asbestos as determined using the method specified in appendix A, subpart F, 40 CFR part 763, section 1, Polarized Light Microscopy, that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

68. *NIOSH:* The National Institute for Occupational Safety and Health.

69. *OSHA:* The Occupational Safety and Health Administration.

70. *Outside Air:* The air outside building, structure, negative air enclosure or containment.

71. *Owner or Operator of a Demolition or Renovation Activity:* Any person, who owns, leases, operates, controls, or supervises the facility being demolished or renovated or any person, who owns, leases, operates, controls, or supervises the demolition or renovation operation or both.

72. *PACM:* Presumed Asbestos-Containing Material, means thermal system insulation and surfacing material found in building, vessels, and vessel sections constructed no later than 1980.

73. *PAT Program:* Proficiency Analytical Testing Program to determine quality of laboratory performing PCM analysis, as administered by the AIHA.

74. *PCM:* Phase Contrast Microscopy.

75. *PLM:* Polarized Light Microscopy.

76. Particulate Asbestos Material: Finely divided particles of asbestos or material containing asbestos.

77. *Penetrating Encapsulant:* Liquid material applied to asbestos-containing material to control airborne fiber release by penetrating into the material and binding its components together.

78. *Personal Monitoring:* Sampling the asbestos fiber concentrations within the breathing zone of an employee during representative operations as required by applicable regulations.

79. *Protection Factor:* The ratio of the ambient concentration of an airborne substance to the concentration of the substance outside the respirator to the concentration inside the respirator at the breathing zone of the wearer.

80. *Prior Experience:* Experience required of the Contractor on asbestos projects of similar nature and scope to insure the capability of performing asbestos abatement in a satisfactory manner. Similarities shall be in areas related to material composition, project size, abatement methods required,

number of employees and the engineering, work practice and personal protection controls required.

81. *Regulated Area:* An area established by the Contractor to demarcate areas where airborne concentrations of asbestos exceed, or can reasonably be expected to exceed the permissible exposure limits. The regulated area may take the form of (a) a temporary enclosure, as required by WAC 296-62-07711, or (b) an area demarcated in any manner that minimizes the number of employees exposed to asbestos.

82. *Regulated Asbestos-Containing Material (RACM):* (a) Friable asbestos material, (b) Category I Non-friable ACM that has become friable, (c) Category I Non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II Non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations regulated by this subpart.

83. *Removal:* To take off asbestos containing materials from surfaces or components of a facility.

84. *Renovation:* Altering a facility or one or more facility components in any way, including the stripping or removal of RACM from a facility component. Operations in which load-supporting structural members are wrecked or taken out are demolitions.

85. *Respirator:* A device designed to protect the wearer from the inhalation of harmful atmospheres.

86. *Shower Room:* A room between the clean room and the equipment room within the worker decontamination system supplied with hot and cold running water controllable at the tap and suitably arranged for complete showering.

87. *Staging Area:* Either the holding area or some areas near the waste transfer airlock where containerized asbestos waste has been placed prior to removal from the work area.

88. *Structural Member:* Any loaded-bearing member of a facility, such as beams and load-bearing walls or any non-load supporting member, such as ceilings and non-load supporting walls.

89. *Surfactant:* A chemical wetting agent added to water to improve penetration.

90. *"Tattle-Tale":* A material or method providing a positive visual method of checking material leakage such as cardboard or chalk, which becomes noticeably darker when wet.

91. *Time Weighted Average (TWA):* The average exposure to a contaminant in air measured during a specific time period, usually a shift, adjusted to eight hours.

92. *Visible Emissions:* An emission containing particulate asbestos material that is visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

93. *Waste Generator:* Any owner or operator of a source covered by Department of Transportation regulations whose act or process produces asbestos-containing waste material. All demolition debris materials, including asbestos-containing materials, except those containing substances classified as hazardous or dangerous by controlling local, state or federal regulatory agencies, shall upon their demolition became the property of the Contractor.

94. *Waste Shipment Record:* The shipping document, required to be originated and signed by the waste generator, used to track and substantiate the disposition of asbestos-containing waste material.

95. *Wet Cleaning:* The process of eliminating asbestos contamination from building surfaces and objects by using cloths, mops, or other cleaning utensils which have been dampened with water and afterwards thoroughly decontaminated or disposed of as asbestos contaminated waste.

96. *Work Area:* Designated rooms, spaces, or areas of the project in which asbestos abatement actions are to be undertaken or which may become contaminated as a result of such abatement actions.

97. *Worker Decontamination System:* A series of connected rooms, consisting of a clean room, a shower room and an equipment room separated from each other and from the work area by curtained doorways. This system is used for all worker entries and exits from the work area.

98. *WSDOT:* Washington State Department of Transportation.

1.04 REFERENCE STANDARDS:

A. General Requirements:

1. All work under this contract shall be done in strict accordance with all applicable regulations, standards and codes governing asbestos abatement and in accordance with the “Standards of the Industry”.

2. The Port will utilize and enforce the recommendations of various references as guides including:

a. Skoog, Robert F., and Twombly, Jr., Robert C. “The Asbestos Abatement Worker’s Handbook”, and

b. Levins, Hoag, “The Glove Bag Book and Asbestos Maintenance Safety Guide”.

3. The most recent edition of any relevant regulation, standard, document or code shall be in effect during the work, regardless of the effective date of this specification’s governing contract. Where conflict among the requirements or with these specifications exists, the most stringent requirements shall be utilized**.**

B. Standards: Which govern asbestos abatement work or hauling and disposal of asbestos waste materials include the following:

1. American National Standards Institute (ANSI).

2. Fundamentals Governing the Design and Operation of the Local Exhaust Systems Publication Z 9.2-79.

3. Practices for Respiratory Protection Publication Z 88.2-80.
4. American Society for Testing and Materials (ASTM).
5. Specification for Encapsulant for Friable Asbestos Containing Building Materials Proposal P-18.
6. Safety and Health Requirements Relating to Occupational Exposure to Asbestos E 849-82.

C. EPA Guidance Documents: Which discuss asbestos abatement work or hauling and disposal of asbestos waste materials are listed below for the Contractor's information only. These documents do not describe the work and are not a part of the work of this contract. EPA maintains an information number (800) 334-8571.

1. Asbestos-Containing Materials in Buildings - A Guidance Document. Parts 1&2 (Orange Books) EPA C00090 (out of print).
2. Guidance for Controlling Asbestos-Containing Materials in Buildings (Purple Book) EPA 560/5-85-024.
3. Friable Asbestos-Containing Materials in Schools: Identification and Notification Rule (40 CFR Part 763).
4. Evaluation of the EPA Asbestos-in-Schools Identification and Notification Rule. EPA 560/5-84-005.
5. Asbestos in Buildings: National Survey of Asbestos-Containing Friable Materials. EPA 560/5-84-006.
6. Asbestos in Buildings: Guidance for Service and Maintenance Personnel. EPA 560/5-85-018.
7. Asbestos Waste Management Guidance. EPA 530-SW-85-007.
8. Asbestos Fact Book. EPA Office of Public Affairs.
9. Asbestos in Buildings. Simplified Sampling Scheme for Friable Surfacing Materials.
10. Commercial Laboratories with Polarized Light Microscopy Capabilities for Bulk Asbestos Identification.
11. A Guide to Respiratory Protection for the Asbestos Abatement Industry. EPA-560-OPTS-86-001.

1.05 CODES AND REGULATIONS:

A. General Applicability of Codes, Regulations and Standards: Except to the extent that more stringent requirements are written directly into the contract documents, all applicable codes, regulations and standards have the same force and effect and are incorporated into the contract documents by reference as if copied directly into the contract documents.

B. Contractor Responsibility: The Contractor shall assume full responsibility and liability for compliance with all applicable federal state and local regulations pertaining to work practices, hauling, disposal and protection of workers, visitors to the site, and persons occupying areas adjacent to the site. The Contractor is responsible for providing medical examinations and maintaining medical records of his personnel as required by the applicable federal, state and local regulations.

The Contractor shall hold the Port and Port's Representative harmless for failure to comply with applicable work, hauling, disposal, safety, health or other regulation on the part of himself, his employees or his subcontractors including without limitation: the costs of compliance, payment of all fines levied against the Port and Port's representative, and payment of all attorney's fees and costs incurred in defense of the Port or Port's representative for alleged regulatory violations.

C. Federal Requirements: Which govern asbestos abatement work or hauling and disposal of asbestos waste materials including but not limited to the following:

1. U.S. Department of Labor, Occupational Safety and Health Administration, (OSHA), including but not limited to:

    a. Occupational Exposure to Asbestos, Tremolite, Anthophyllite and Actinolite; Final Rules Title 29, Part 1910, Section 1001 and Part 1926, Section 58 of the Code of Federal Regulations.

    b. Respiratory Protection Title 29, Part 1910, Section 134 of the Code of Federal Regulations.

    c. Construction Industry Title 29, Part 1926, of the Code of Federal Regulations.

    d. Access to Employee Exposure and Medical Records Title 29, Part 1910, Section 2 of the Code of Federal Regulations.

    e. Hazard Communication Title 29, Part 1910, Section 1200 of the Code of Federal Regulations.

    f. Specifications for Accident Prevention Signs and Tags Title 29, Part 1910, Section 145 of the Code of Federal Regulations.

2. U.S. Environmental Protection Agency (EPA), including but not limited to:

    a. Regulation for 40 A of the Code of Federal Regulations 763.

    b. National Emission Standard for Hazardous Air Pollutants; Asbestos, NESHAP Revision; Final Rule, 40 CFR, Part 61, of the Federal Register.

    c. Office of Solid Waste publication Asbestos: Waste Management Guidance (EPA/530-SW-85-007).

3. Department of Transportation (DOT) including, but not limited to the following:

    a. Hazard Material Regulations (HMR) 49 CFR parts 171-180.

    b. 49 CFR part 107, et. seq., Performance-Oriented Packaging Standards; Changes of Classification, Hazard Communication, Packaging and Handling Requirements Based on UN Standards and Agency Initiative; Final Rule.

D. Washington State Requirements: WISHA and DOSH rules which govern asbestos abatement work or hauling and disposal of asbestos waste material including but are not limited to the following:

1. General Occupational Health Standards Chapter WAC 296-62.

2. Asbestos Removal and Encapsulation Chapter WAC 296-65.

3. Safety Standards for Construction Work Chapter WAC 296-155.
4. Parts – Demolition WAC 296.155.975.
5. Respirators Standard Chapter WAC 296-842.
6. WISHA Regional Directives 79-23 (Amended) regarding minimum airborne fiber concentration for initiation and continuing asbestos medical examinations, 80-16 (amended) regarding respirable air supplied by oil-lubricated compressors, 83-10 (Amended) regarding respirator requirements for removal, demolition, and spraying of asbestos, 87-2 Respiratory Protection Requirements for negative pressure enclosures, 23-10 Occupational Exposure to Asbestos.
7. Safety Standards Chapter WAC 296-24.

E. Local Requirements which govern asbestos abatement work or hauling and disposal of asbestos waste materials include but are not limited to the following:

1. Puget Sound Clean Air Agency (PSCAA) Regulation III, Article 4- Asbestos Control Standard.

1.06 ASBESTOS ABATEMENT SUBMITTALS:

A. Portions of this contract are very unique and are under strict control of several regulatory agencies. It is understood that this work is so designed and these contract requirements are so stated that the materials and equipment specified are required for the hazards abatement project and the final function of the facility. Therefore, “approval by the Port” or similar phrases are not to be construed as a transfer of liability; only a statement that the information, material or equipment submitted appears to comply with the requirements of the contract and the regulatory agencies and that no objection has been raised upon the submittal information.

1.07 CONTRACTOR AND PORT RESPONSIBILITIES:

A. The Contractor shall coordinate with the Port to accomplish the following tasks, prior to Commencement of Work.

B. Prior to commencement of Abatement Activities, the Contractor shall:

1. The Contractor shall place and maintain an information board at the project site for the duration of the project. Information board shall be a minimum of 2’x4’ in dimensions and placed in a conspicuous location where the Contractor’s employees, Port and Port’s Representative(s), and authorized visitors may view project information. Typical locations include staging area, entrance to clean room of decontamination unit, job trailer, or similar location. On multiple work areas, information shall be kept at a central meeting place.
2. The following information shall be placed on the information board:
   a. A telephone contact list containing the names, addresses, telephone numbers, including cell phone, numbers of Port emergency, Contractors, Contractor’s air sampling firm, the Resident Engineer, Project Monitor, supervisors, RM Project Designer and any other persons who may assist and other personnel involved in the project. These contacts must include

persons with decision-making authority and provide for 24 hour 7 days a week availability.

b. Notifications to appropriate Federal, State and local regulatory agencies including building permit if applicable.

c. Air monitoring results.

d. Current prevailing wages rates.

e. Current project schedule.

f. Washington State Industrial Insurance and Workman's Compensation information.

g. Hazard communication information.

h. Asbestos Abatement Contractor's License.

i. Current work plan/working drawing form.

j. Other information the Contractor wishes to convey to personnel, which may be affected by the work or which is required by governing regulations.

C. The contractor will notify the Resident Engineer in writing utilizing the daily work log of work area, start and stop time of work, outline of work, and areas the will be effected by the work. The Port will notify occupants of work areas that may be disrupted by abatement work.

D. Provide to the Port information concerning access, shut down and protection requirements of certain equipment and systems in the work area. The Resident Engineer shall coordinate with Seaport Maintenance to include other equipment and systems as needed, including Port-owned equipment.

1.08 AIR MONITORING:

A. The following describes air monitoring to verify that the building beyond the work area and the outside environment remain uncontaminated. This section also sets forth airborne fiber levels both inside and outside the work area as action levels and describes the action required by the Contractor if an action level is met or exceeded.

B. The Port's RM Project Monitor may monitor inside and outside the work area, as well as collect personal samples used for quality control. Note: The purpose of the Port's RM Project Monitor's air monitoring and inspection activities is to provide quality assurance only, not to replace any air monitoring and/or inspections required of the Contractor by Federal, State, or local regulations or by this Section. The Contractor shall perform the monitoring required by L&I Asbestos regulations for inside and outside areas of the abatement work.

C. In addition to the air monitoring requirements described elsewhere in this section, the Contractor is responsible for all air monitoring as required by Washington State Department of Labor and Industries, including pre-abatement samples, personal time-weighted average and short-term excursion limit samples, negative pressure enclosure samples at the entrance to the decontamination chamber and the discharge from the HEPA exhaust, post- abatement clearance sampling, and "other" sampling as required by Federal, State, or local regulations. In addition,

the Contractor is responsible for post-abatement final inspection to determine that all required asbestos has been removed and that the area is sufficiently clean for post-abatement clearance sampling. The Port and the Port's RM Project Monitor shall be held harmless from any legal action taken as a result of such sampling. The Contractor shall also indemnify, hold harmless, and defend the Port, its agents, and employees for the use of any Port supplied air-monitoring data.

D. The Contractor is required, at its own expense, to take its own employee air samples per the following regulations:

1. WAC 296-62-07709 - (Exposure Monitoring)
2. WAC 296-62-07735 - (Appendix A)

E. The air samples must be analyzed by a laboratory in accordance with the following:

1. Personnel conducting on site asbestos air sample analysis shall be listed on AIHA's Registry of Proficiency and shall have successfully completed NIOSH 582 (or equivalent) training.
2. The laboratory conducting bulk sample analysis shall be accredited by the United States Department of Commerce, National Institute of Standards and Technology's NVLAP program.
3. The laboratory conducting analysis of air samples shall be satisfactory participants in the NIOSH Proficiency Analytical Testing (PAT) program and AIHA Registry and shall produce their PAT number and results on request.
4. All air monitoring information must be placed on Port of Seattle Air Monitoring Data Sheet – Asbestos or Port of Seattle approved equivalent.

F. See Paragraph 3.11 of this specification section for additional requirements relating to Clearance Requirements.

G. Air Monitoring Requirements:

1. Baseline/Pre-abatement Air Monitoring: Prior to beginning asbestos abatement tasks, the Contractor shall conduct pre-abatement air monitoring.
2. Outside Work Area Air Monitoring: The Contractor shall daily conduct air monitoring to document acceptable condition or detect faults in the work procedures and engineering controls. Samples will be collected outside the work area at HEPA exhausts and at the decontamination entrance every shift.
3. Personal Samples: The Contractor shall daily conduct representative personal monitoring in each abatement work area on each representative work activity. This requirement is a Port requirement and is greater in frequency then the requirements stated in the Washington State Department of Labor and Industries regulations. In addition to those required to be collected by the Contractor, the Port's RM Project Monitor reserves the right to monitor airborne fiber levels produced by some workers to determine the effectiveness of work practices. This implies no agency relationship with the Contractor's employees.

4. Clearance: The regulated area will remain in place until the Port certifies visual clearance and that Contractor's post- abatement air sampling results meet acceptable levels. Article 3.11 details the work area clearance process.

5. Where feasible, samples shall be collected according to the WISHA Reference Method (WAC 296-62-07735, Appendix A) and Detailed Procedure for Asbestos Sampling and Analysis (WAC 296-62-07737, Appendix B) and NIOSH Method 7400 (as revised). All samples shall be collected at a height of approximately 60 inches above the working floor for projects with 8-10 foot ceiling heights, unless otherwise directed.

H. Airborne Fiber Counts:

1. Personnel Exposures on workers inside "regulated areas". Contractor shall notify the Resident Engineer in writing regarding elevated levels above 0.1 f/cc. The Contractor and the Resident Engineer and/or RM Project Designer will conduct an assessment of removal procedures. The Contractor shall identify corrective action and ensure that corrective action is taken to lower fiber counts at no additional cost or delay to the Port.

2. Outside Work Area: If any air sample taken outside of the work (outside enclosures) exceeds 0.01 f/cc, the Contractor shall:

   a. The Contractor shall notify the Resident Engineer Manager immediately.

   b. Investigate with the Resident Engineer and/or RM Project Designer for possible causes of elevated fiber levels. The Contractor shall ensure that corrective action is taken to lower fiber counts at no additional cost or delay to the Port.

   c. After corrective action is taken, the Contractor will resample the area. If airborne level is below 0.01 f/cc, the work may recommence with appropriate changes in work practices authorized by the RM Project Designer. If the airborne fiber levels remain above 0.01 f/cc, The Contractor and the Resident Engineer and/or RM Project Designer will continue to conduct assessments of removal procedures until acceptable air counts (0.01 f/cc or less) are reached. The Contractor shall ensure that corrective action is taken to lower fiber counts at no additional cost or delay to the Port

   d. If the analytical results of any outside area sample exceed .05 f/cc for any sample taken, the Contractor shall **stop all removal work**, leave negative air system in operation and re-clean the entire work area. The **Contractor shall notify Resident Engineer immediately**. The Contractor shall not recommence work until the cause of the elevated count is corrected and the Port authorizes start up. The Port will not be charged for the cleanup time, materials, and air monitoring costs or delay costs. Delays resulting from non-compliant analytical results will not constitute an extension to the project time.

   e. If the Contractor has stopped work due to elevated airborne fiber counts, the Contractor shall secure air samples in the same area as

the samples with elevated readings. These samples shall be analyzed by transmission electron microscopy in accordance with NIOSH 7402. The Contractor may not resume work until the average of airborne asbestos fibers in all samples taken is at or below .01 fibers per cubic centimeter. The cost of such analysis and any delays will be born solely by the Contractor.

I. Analytical Methods: The following methods will be used for analyzing filters used to collect air samples:

1. Twenty five millimeter (25 mm) cellulose ester filters with 50 mm conductive cowl extensions will be used for all sampling. Sampling and analysis for personal samples will be conducted according to the OSHA/WISHA Reference Method. Area clearance samples will be analyzed according to the NIOSH Method 7400 using airflow rates between 1 - 10 liters per minute. At least 1200 liters of air will be sampled for area air samples. All inside and outside air sampling shall be continuous throughout work shift.

2. TEM analysis will be NIOSH Method 7402.

J. Laboratory Testing:

1. The Contractor will have a qualified laboratory perform analysis of the air samples required to monitor abatement procedures. The laboratory results, signed by the lab manager, shall be returned to the site prior to the start of abatement for the same workshift the following day. A complete record of inspections and all air monitoring tests and results will be furnished to the Port and the Contractor daily.

2. Written Reports: All air monitoring test results and daily inspection logs will be posted at the job board on a daily basis.

K. Conflicts in air monitoring analytical results: QA/QC discrepancies identified in any of the reported analytical results will be resolved by TEM analysis (NIOSH 7402 method).

1. The Contractor and the Resident Engineer and/or RM Project Designer will conduct an assessment of air monitoring results.

2. The Contractor shall resample the area. The Port's RM Project Monitor may resample the area.

3. The Port will not be charged for any and all costs associated with any additional sampling resulting from QA/QC air monitoring conflicts.

1.09 ASBESTOS ABATEMENT - SPECIAL REPORTS:

A. Except as otherwise indicated, the Contractor must submit special reports directly to the Resident Engineer and others affected by occurrence within (24) hours of occurrence requiring special report.

B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary enclosures), the Contractor must prepare and submit a special report listing chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects and similar pertinent information. When such events are known

or predictable, the Contractor must advise the Port in advance at earliest possible date.

C. Reporting Accidents: The Contractor must prepare and submit reports of significant accidents, at site and anywhere else work in progress. Record and document data and actions; comply with industry standards. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

PART 2 PRODUCTS

2.01 MATERIALS:

A. GENERAL:

1. Deliver all materials in the original packages, containers or bundles bearing the name of the manufacturer and the brand name (where applicable).

2. Store all materials subject to damage off the ground, away from wet or damp surfaces and under cover sufficient to prevent damage or contamination. Replacement materials shall be stored outside the work area until abatement is completed.

3. Damaged, deteriorating or previously used materials shall not be used and shall be removed from the worksite and disposed of properly.

4. Polyethylene sheeting for walls and stationary objects shall be a minimum of 6-mil thick. For floors and all other uses sheeting of at least 6-mil thickness shall be used in widths selected to minimize the frequency of joints. Polyethylene shall be fire retardant per UL Ratings and ASTM standards D-2898-81 and D-3201-79.

5. Method of attaching polyethylene sheeting shall be agreed upon in advance by the Contractor and the Port and selected to minimize damage to equipment and surfaces. The Contractor will be responsible for any damage to equipment and surfaces created by this attachment of polyethylene sheeting. If the Contractor uses foam, the foam shall be fire retardant as per UL ratings and the Contractor shall cut the foam back to within 1/4 inches of base surface if applied to an asbestos-containing material for all other materials it shall be completely removed.

6. Polyethylene sheeting utilized for worker decontamination enclosure shall be opaque white or black in color.

7. Disposal bags shall be 6-mil polyethylene, pre-printed with labels as required by EPA regulation 40 CFR 61.150 (a) (i) (iv) (v) or WISHA Chapter 296-62-0072.

8. Disposal drums shall be metal or fiberboard with locking ring tops; labeled in accordance with EPA regulation 40 CFR 61.150 (a) (i) (iv) (v).

9. Warning signs as required by WISHA Chapter 296-62-07721.

10. The wood framing shall adhere to Uniform Building Code 23-4 and 23-5.

11. Tape: Tape shall be capable of sealing joints of adjacent sheets of plastic sheet and for attachment of plastic sheet to finished or unfinished surfaces

of dissimilar materials and capable of adhering under dry wet conditions, including use of amended water. Minimum 2" wide tape must be used.

12. Other materials: The Contractor shall provide all other materials such as lumber, nails and hardware, which may be required to construct and dismantle the decontamination area and the barriers that isolate the work area, and as required to complete the work as specified.

B. SURFACTANT: (wetting agent): shall be a 50/50 mixture of Polyethylene ester and polyoxyetylene ester, or equivalent, mixed in a proportion of 1 fluid ounce to 5 gallons of water as specified by manufacturer. (An equivalent surfactant shall be understood to mean a material with surface tension of 29 dynes/cm as tested in its properly mixed concentration, using ASTM method D1331-56- "Surface and Interfacial Tension of Solutions of Surface Active Agents.")

C. ENCAPSULATION PRODUCTS:

1. Encapsulation materials shall be applied to asbestos containing material to control the release of asbestos fibers. Both "Bridging" and "Penetrating" encapsulation products will be used under this contract.

2. The contractor shall encapsulate the edges of ACM that remain throughout the project area with pink or other approved colored bridging encapsulant.

3. Encapsulation materials shall conform with the following characteristics:

a. Encapsulants should not be solvent-based or utilize a vehicle consisting of hydrocarbons. Tinting of the encapsulant may be required.

b. Encapsulants shall be non-flammable.

c. Contractor must provide certification that encapsulant is compatible with specified fireproofing replacement material.

D. ENCLOSURE:

1. Enclosure materials shall be fire-retardant and conform to the applicable local fire codes.

2. The enclosures shall be constructed of materials such that when the enclosure is completed there is limited potential for impact damage to the enclosure and no potential for fiber release.

3. Wood framing used for enclosure shall be pressure treated and fire retardant and shall conform to International Building Code 2009.

2.02 EQUIPMENT:

A. GENERAL (all abatement projects using negative pressure enclosures):

1. A sufficient quantity of negative pressure ventilation units equipped with HEPA filtration and operated in accordance with ANSI 29.2-79 (local exhaust ventilation requirements) and EPA guidance document EPA 560/5-83-002 Guidance for Controlling Friable Asbestos-Containing Materials in Buildings Appendix F: Recommended Specifications and operating procedures for the use of negative pressure systems for asbestos abatement shall be utilized so as to provide one work place air change every 15 minutes.

To calculate total air flow requirement:

Total ft ^{3}/min = Vol. of work area (in ft ^{3})
15 min

To calculate the number of units needed for the abatement:

Number of units needed = [Total ft ^{3}/min]
[Capacity of unit in ft ^{3}/min x 70%]

If air-supplied respirators are utilized, estimate the volume of supplied air and add to work place air volume when calculating ventilation requirements. For small enclosures and glove bags, a HEPA filtered vacuum system may be utilized to provide negative air pressure. A sufficient quantity of air shall be exhausted to create a minimum pressure of -0.02 inches of water at all times within the enclosure with respect to outside the enclosure.

2. Contractor shall install and maintain a continuous read strip chart, or similar digital recording differential pressure meter (manometer).
   a. Adhere strictly to manufacturer's recommendations for calibration of manometer.
   b. Location of manometer must be approved by the Resident Engineer.
   c. Manometer records must be submitted, on 8-1/2 X 11 paper, weekly to the Resident Engineer along with current calibration data.
   d. The manometer must be equipped with an audible system programmed to sound if pressure within the enclosure in respect to pressure outside the enclosure drops to -0.01 inches of water or lower.
3. Type "C" air supplied respirators operated in the pressure demand mode with full face pieces and escape cylinders or HEPA filters are required by WISHA for negative pressure containment abatement work until the successful completion of final clearance air monitoring. Spectacle kits and eyeglasses must be provided for employees who wear glasses and who must wear full-face piece respirators. Respirators shall be provided that have been tested and approved by the National Institute of Occupational Safety and Health for use in asbestos contaminated atmospheres.
4. Compressed air systems shall be designed to provide air volumes and pressures to accommodate respirator manufacturer's specifications. The compressed air systems shall have a receiver of adequate capacity to allow escape of all respirator wearers from contaminated areas in the event of compressor failure. Compressors must meet the requirements of 29 CFR 1910.134(d). Compressors must have an in-line carbon monoxide monitor, and periodic inspection of the carbon monoxide monitor must be evidenced. Documentation of adequacy of compressed air systems/respiratory protection system must be retained on site at all times. This documentation will include a list of compatible components with the maximum number and type of respirators that may be used with systems

providing air of sufficient quality (Grade D breathing air as described in Compressed Gas Association Commodity Specifications G-7.1.)

5. At least two (2) dedicated airlines and respirators shall be available to the Port or Port's Consultants or regulatory agency personnel at all times. Contractor shall provide clean respirators in good repair for the Port's or regulatory agency personnel's use. The Contractor shall provide airlines for the Port's, RM Project Designer's, or regulatory agency personnel and Project Monitor's use upon demand.

6. Full body disposable protective clothing, including head, body and foot coverings (unless using footwear as described in Paragraph 2.02A.8) consisting of material impenetrable by asbestos fibers shall be provided to all workers and authorized visitors in sizes adequate to accommodate movement without tearing.

7. Additional safety and fall protection equipment (e.g., hard hats, eye protection and disposable gloves meeting the requirements of ANSI Standard Z87.1-2003 and safety shoes meeting the requirements of ANSI Standard F2414-05 and F2413-05) as necessary shall be provided to all workers and authorized visitors and shall be sized to fit the wearer.

8. Non-skid footwear shall be provided to all abatement workers. Disposable clothing shall be adequately sealed to the footwear to prevent body contamination.

9. Only single-use, disposable towels and clothing will be allowed.

10. A sufficient supply of disposable mops, rags and sponges for work area decontamination shall be available.

11. For mini-enclosures and glove bags, a HEPA filtered vacuum system shall be utilized to provide negative air.

B. REMOVAL EQUIPMENT:

1. A sufficient supply of scaffolds, ladders, lifts and hand tools (e.g., scrapers, wire cutters, brushes, utility knives, wire saws, etc.) shall be provided by the Contractor.

2. Rubber dustpans and rubber squeegees shall be employed for cleanup.

3. Brushes utilized for removing loose asbestos containing material shall have nylon or fiber bristles, not metal.

4. A sufficient supply of HEPA filtered vacuum systems shall be available during cleanup.

C. ENCAPSULATION EQUIPMENT:

1. Encapsulants shall be applied in accordance to manufacturer's specifications.

2. Tools, sprayers, and other additional support and fall protection equipment as needed.

3. The nature of the encapsulant may affect the requirements for respiratory protection. Vapors that may be given off during encapsulant application

must be taken into account when selecting respirators, if types other than air supplied are used.

D. ENCLOSURE EQUIPMENT:

1. Hand tools equipped with HEPA filtered local exhaust ventilation shall be utilized during the installation of enclosures and supports if there is any need to disturb asbestos containing materials during this process. (As alternative asbestos material may be partially removed following proper removal procedures prior to the installation of supports and enclosures.)

2. Tools, ladders, and other additional support equipment as needed.

2.03 FABRICATION:

A. Equipment or items fabricated to suit this project shall be as selected by the Contractor and agreed upon by the Port's RM Project Designer. Submit shop drawings and/or other information in sufficient detail for the Port's RM Project Designer to review for approval.

PART 3 EXECUTION

3.01 INSPECTIONS:

A. Pre-abatement: The abatement work shall not begin until:

1. Pre-abatement air monitoring has been conducted by the Contractor and the results have been reviewed and approved by the Port.

2. The Contractor and the Port have inspected the site to ensure that work can begin.

3. The work area enclosure system has been inspected and approved by the Port. When enclosure systems are in use, the Contractor's Certified Asbestos Supervisor shall inspect the enclosure on a daily basis as it is being constructed and approve the completed enclosure, controls, and decontamination and waste load-out facilities when completed. Enclosure systems shall be smoke tested prior to ACM removal.

4. Negative pressure ventilation and supplied air systems, if used, are functioning adequately. Contractor must test all systems. Submit written verification that the system has been tested as per specifications to the Resident Engineer prior to ACM removal.

5. All required pre-work submittals, notifications, postings and permits have been provided and are satisfactory to the Port (see Paragraph 1.05).

6. All equipment for abatement cleanup and disposal are on hand.

7. All worker and supervisor training, certification and medical monitoring are current and documentation is available on the job site.

B. Throughout the Project: The Contractor's competent person shall perform daily inspections of the site. The Port's RM Project Monitor may perform routine inspections of the site to assure compliance with applicable regulations and the project plans and specifications. The Resident Engineer and the Port's RM Project Designer may also conduct spot checks throughout the project. The Contractor's competent person must generate a written daily report. The Contractor's

competent person will also be required to co-sign the daily quality control report generated by the Port's RM Project Monitor.

C. Post-Abatement: The Clearance process is discussed in Paragraph 3.11 of this specification.

3.02 SITE SECURITY:

A. The work area is to be restricted only to authorize, trained and protected personnel. These may include the Contractor's employees; employees of subcontractors; and Port employees and representatives; federal, state and local inspectors and other authorized or designated individuals.

B. Secure the work area from access by occupant's, staff or users of the building. Accomplish this where possible by locking doors, windows, or other means of access to the work area, or by constructing temporary framing with plywood or gypsum board barriers. All emergency exits/corridors must be kept open.

C. Entry into the work area by unauthorized individuals shall be reported immediately by the Contractor to Port Security and the Resident Engineer.

D. For projects requiring the use of a negative pressure enclosure, a logbook shall be maintained in the clean room area of the worker decontamination system. Everyone who enters the work area must sign in, recording; name, affiliation (Contractor, Port, regulatory agency, etc.), work phone number, purpose of entry, acknowledge existence, review and understanding of the project's emergency contingency plan and time in and time out for each entry.

E. Contractor shall be responsible for site security during abatement operations.

3.03 EMERGENCY PLANNING:

A. Emergency contingency plans shall be developed by the Contractor for approval by the Port prior to initiation of any work. These plans shall be a component of the Contractor's Health and Safety Plan.

B. Emergency procedures shall be in written form and prominently posted in the clean room, adjacent to the containment in the project area, or as directed by the Port. Prior to performing any abatement activities, all personnel must read and sign these procedures to acknowledge an understanding of work site layout, location of emergency exits and the contents of the plan.

C. Emergency planning shall include written notification of police, fire and emergency medical personnel of planned abatement activities, work schedule and layout of containment area, particularly barriers that may affect response capabilities. These notifications will be coordinated through the Resident Engineer.

D. Emergency planning shall include consideration of containment collapse (through negative pressure pull-down) or breach (hit, cut or torn by), fire explosion, toxic atmosphere, electrical hazards, slips, trips and falls, confined spaces and heat related injury. Written procedures shall be developed and employee training in these procedures shall be provided and documented. Emergency planning shall include procedures to follow in the event of power disruptions during work in a negative air enclosure.

E. Employees shall be trained in evacuation procedures in the event of workplace emergencies.

1. Non-life threatening situations - employees injured or otherwise incapacitated shall decontaminate following normal procedures with assistance from fellow workers if necessary, before exiting the work place to obtain proper medical treatment.

2. For a life-threatening injury or illness, measures to stabilize the injured worker, remove them from the work place and secure proper medical treatment shall take priority over worker decontamination.

F. Telephone numbers of all emergency response personnel shall be prominently posted in the clean room, adjacent to the containment in the project area, or as directed by the Port. To assist the Contractor, the Port will provide a list of phone numbers for emergency response to the project at the Pre-Construction meeting.

G. General Requirements:

1. If at any time after barriers or enclosures have been erected, any visible material is observed outside of the work area or if damage to the barrier or enclosure occurs, work shall immediately stop, repairs shall be made and debris and residue shall immediately be cleaned up using appropriate HEPA vacuuming and wet cleaning procedures. Area air monitoring shall be started immediately in the public space to measure the asbestos concentration in the public area as a result of breaching the enclosure.

2. Clean and isolate the work area in accordance with these specifications.

H. The Contractor must provide a minimum of three phone numbers at which its supervisory personnel may be contacted on or off site at any time during the contract duration. The telephone used outside the work area must be non-coin operated type.

3.04 PERSONNEL PROTECTION REQUIREMENTS:

A. Training: All personnel accomplishing asbestos abatement shall be the bearer of current “Certified Asbestos Worker Certificate” issued by the Washington State Department of Labor and Industries.

1. Special on-site training specific to equipment and procedures unique to this job site shall be performed as required.

2. Training in emergency response and evacuation procedures shall be provided.

B. Safety Meeting: The Contractor shall conduct a safety meeting at the beginning of the contract and weekly thereafter. Topic to be discussed include, but are not limited to: emergency exiting routes and procedures, location of telephone and emergency numbers, fire extinguisher locations, first aid kit, special precautions for toxic or hazardous materials (MSDS information), protective equipment, scaffolding procedures, proper use of ladders, electrical safety, previous week’s air sample results, etc. Minutes of these meetings shall be recorded with copies provided to the Resident Engineer weekly. All attendees shall sign an acknowledgment of attendance.

C. Protective Clothing: Provide protective equipment to all workers in the work area per Paragraph 2.02, “Equipment”.

D. Additional Protective Equipment: Respirators, disposable coveralls and footwear shall be provided by the Contractor to the Port or the Port's representative or other authorized visitors inspecting the jobsite. Provide up to two personally issued respirators, and air lines where required by the Port. Removal of workers from the work area to provide airlines will not be acceptable.

3.05 PREPARATION OF THE WORK AREA:

A. Post barrier tape and caution signs meeting the specifications of WISHA Chapter 296-62-07711 at the locations and approaches to a location where airborne concentrations of asbestos may be expected to exceed the pre-abatement concentration. Signs shall be posted at a distance sufficiently far enough away from the work area to permit an employee to read the sign and take the necessary protective measures to avoid exposure. Additional signs may need to be posted following construction of work place enclosures or barriers. Placement of these signs will be behind the construction barrier walls erected by the Contractor and shall not be placed in a location visible to the public outside of the project area.

B. All conduit joints, junction boxes, motor connections, motors, conveyors, control panels and associated equipment in the work areas shall be protected from amended water. All wire in conduit that passes through the work area shall remain energized at all times; however, the Contractor is responsible for all electrical safety.

C. Control panels, gauges, etc., in the project area may require Port access during abatement. Contractor shall coordinate with the Port to identify which items/areas must remain accessible to Port personnel. Provide access for those items/areas without the need for personnel to enter the abatement enclosure.

D. Pre-clean, remove furnishings and install drop cloths using HEPA filtered vacuums or wet cleaning methods as appropriate. Do not use methods that would raise dust such as dry sweeping or vacuuming with equipment not equipped with HEPA filters. Do not disturb asbestos containing materials during the pre-cleaning phase.

E. Remove from the work area all objects that are movable to protect them from potential asbestos contamination.

3.06 GENERAL REMOVAL PROCEDURES:

A. Wet all asbestos containing material with amended water solution using equipment capable of providing a fine spray mist. Avoid knocking the material loose during the wetting operation. Saturate the material to substrate prior to removal; however, do not allow excessive water to accumulate in the work area. Keep all removed material saturated until it can be containerized for disposal. Maintain a high humidity in the barrier or enclosure throughout the abatement period by misting or spraying to ensure material saturation and reduce the potential for elevated airborne concentrations. Wetting procedures are not equally effective on all types of asbestos containing materials. Nonetheless, they shall be used in all cases.

B. Saturated asbestos containing material shall be removed in manageable sections. Containerize removed material immediately and prior to moving it to a new location for continuance of work. Adjacent areas shall be periodically sprayed and

maintained in a saturated condition until all visible material is sealed and removed from the barrier or enclosure.

C. Removed material shall not be dropped or thrown. Remove material intact or as components whenever possible and carefully lower to the floor. If this cannot be feasibly accomplished, a dust-tight chute shall be constructed to transport the material to containers on the floor, or the material may be containerized at elevated levels (e.g., on scaffolds) and carefully lowered to the ground by mechanical means.

D. Double bag all waste material prior to removal from the enclosure system or immediately upon removal of the barrier (glove bag).

E. Disposal bags shall not be overfilled. Additionally, handcarts or equivalent shall be used to transport waste containers or materials. Waste containers or materials shall be raised and securely transported, and shall not be dropped or slid.

F. Disposal containers shall be securely sealed to prevent accidental opening and leakage by taping in a gooseneck fashion, then labeled and dated. Do not seal bags with wire or cord. Bags may be placed in drums for staging and transportation to the landfill. Bags shall be decontaminated on exterior surfaces by wet cleaning and HEPA vacuuming.

G. Large components removed intact may be wrapped in 2 layers of reinforced 6-mil polyethylene sheeting secured with tape for transport to the landfill.

H. The work area shall be cleaned of all suspect ACM prior to the visual inspection by the designated Project Monitor and Project Designer. If any accumulation of residue is observed, it will be assumed to be asbestos. Re-cleaning may be required, at no additional cost to the Port, until all suspect material is removed. Re-cleaning and inspection will continue until no visible suspect material remains. After the work area passes the visual inspection, the Contractor shall perform encapsulation of all cleaned surfaces.

I. Refer to Paragraph 3.11 of this specification for work area clearance process.

3.07 CONTAINMENT ENTRY AND EXIT PROCEDURES:

A. Personnel Entry and Exit:

1. All workers and authorized personnel shall enter the containment area through the worker decontamination enclosure system.

2. All personnel who enter the containment area must sign the entry log located in the clean room upon entry and exit.

3. All personnel before entering the containment area shall read and be familiar with all posted regulations, personnel protection requirements (including work place entry and exit procedures), and emergency procedures. A sign-off sheet shall be used to acknowledge that these have been reviewed and understood by all personnel prior to entry.

4. When entering a containment, all personnel shall proceed first to the clean room, remove all street clothes and don appropriate respiratory protection and disposable coveralls, head covering and foot covering. Hard hats, eye protection and gloves shall also be utilized as required. Clean respirators

and protective clothing shall be provided and utilized by each person for each separate entry into the containment area.

5. Personnel wearing designated personal protective equipment shall proceed from the clean room through the shower room and equipment room to the main containment area.

6. Before leaving the containment area, all personnel shall remove gross contamination from the outside of respirators, air hoses, and protective clothing. Each person shall clean bottoms of protective footwear just prior to entering the equipment room.

7. Personnel shall proceed to equipment room where they remove all protective equipment except respirators. Deposit disposable clothing into appropriately labeled containers for disposal.

8. Reusable contaminated footwear shall be stored in the equipment room when not in use in the containment area. Upon completion of abatement it shall be disposed of as asbestos contaminated waste (rubber boots may be decontaminated for reuse at the completion of the abatement).

9. Still wearing respirators, personnel shall proceed naked to the shower area, clean the outside of the respirators and the exposed face area under running water prior to removal of respirator, and shower and shampoo to removal residual asbestos contamination. The HEPA filters on airline respirators are for emergency escape only. The airline may not be disconnected in the equipment room. The airline shall be placed in a bucket of clean water or hung on a hook next to the shower. A powered air purifying respirator face piece will have to be disconnected from the filter/power pack assembly, which is not waterproof upon entering the shower. A dual cartridge respirator may be worn into the shower. Tape over inlet(s) into HEPA filter(s) between usages.

10. After showering and drying off, proceed to the clean room and don clean disposable clothing if there will be later re-entry into the containment area or street clothes of it are the ends of the work shift.

11. These procedures shall be posted in the clean room and equipment room or as directed by the Resident Engineer.

B. Waste Container Pass-Out Procedures:

1. Asbestos contaminated waste that has been containerized shall be transported out of the containment area through the material decontamination facility.

2. Waste pass-out procedure shall utilize two teams of workers, an “inside” team and an “outside” team.

3. The inside team wearing appropriate protective clothing and respirators for inside the containment area shall clean the outside, including bottoms, of properly labeled containers (bags, or wrapped components) using HEPA vacuums and wet wiping techniques. The workers shall then enclose the single layered ACM waste with another 6-mil layer of plastic sheeting or disposal bag. The double-bagged material must be carefully placed into

the middle chamber of the material decontamination unit. No worker from the inside team shall further exit the containment area through this airlock.

4. The outside team, wearing protective clothing and HEPA-filtered respirators, shall enter the airlock from outside the containment area, enclose the labeled container in a second clean, labeled, 6-mil polyethylene bags and remove them from the airlock to outside and placed into a secure storage/transport container. No worker from the outside team shall further enter the containment area through this airlock. Public view shall be blocked with a temporary screen constructed around the load out during pass-out.

5. The exit from this airlock shall be secured to prevent unauthorized entry.

3.08 NEGATIVE PRESSURE ENCLOSURE:

A. Prepare work area as indicated in Paragraph 3.05, this section.

B. Verify shut down and lock out all heating, cooling and air conditioning system (HVAC) components that are in, supply, or pass through the containment area, if possible. Seal all ducts and smoke test the containment before beginning abatement work within the enclosure.

C. Pre-clean all fixed objects in the containment area using HEPA filtered vacuums and/or wet cleaning techniques as appropriate. Careful attention must be paid to machinery bind grills or gratings where access may be difficult, but contamination significant. Pay particular attention to wall, floor, and ceiling penetrations behind fixed items. After pre-cleaning, enclose fixed objects in 6-mil polyethylene sheeting and seal securely in place with tape.

D. Seal off all windows, doorways, elevator openings, corridor entrances, drains, ducts, grills, grates, diffusers and all other openings between the containment area and uncontaminated areas outside of the containment area including the outside of the building, tunnels and crawl spaces with 6-mil polyethylene sheeting and tape (see Paragraph 3.05 - Isolating work area from occupied areas).

E. Cover floors in the containment area with polyethylene sheeting as follows:

1. Seal all floor drains and other floor openings in area with 6-mil sheeting and duct tape. Do not allow any water into Port's waste drain system.

2. Floors shall be covered with three (3) individual layers of 6-mil (minimum) sheeting. Use "tattle-tales" beneath sheeting in order to detect water leaks from the enclosure. The RM Project Monitor shall approve each layer of sheeting prior to installation of next layer. Protect layers of sheeting as necessary against rips and tears. Install one (1) additional layer 6-mil poly sheeting as drop clothes to aid in cleanup of bulk materials.

3. Plastic shall be sized to minimize seams. If the floor area necessitates seams, those on successive layers of sheeting shall be staggered to reduce the potential for water to penetrate to the flooring material. A distance of at least 6 feet between seams is required. Do not locate seams at wall/floor joints or cracks in the concrete flooring. Pre-seal all cracks in floors before placing any plastic to the satisfaction of the Resident Engineer.

4. Floor sheeting shall extend to at least 12” up the sidewalls of the containment area.

5. Sheeting shall be installed in a fashion so as to prevent slippage between successive layers of material. (Vinyl sheeting may be used for improved traction of floors.)

F. Provide sufficient lighting throughout the work area to maintain a minimum lighting level of 50-foot candles at any surface where asbestos is to be removed. Hand held lights, such as flashlights, are not acceptable except for augmentation beyond 50-foot candle minimum illumination.

G. Clearly identify and maintain emergency and fire exits from the work area.

H. Cover walls in the containment area with polyethylene sheeting as follows:

1. Seal all opening in wall with critical barriers with 6-mil polyethylene sheeting and duct tape. Insure airtight seal.

2. Each wall surface shall be covered with three (3) layers of 6-mil polyethylene sheeting.

3. Plastic shall be sized to minimum seams. Seams shall be staggered and separated by a distance of at least 6 feet.

4. Wall sheeting shall overlap floor sheeting by at least 12 inches beyond the wall/floor joint to provide a better seal against water damage and for negative pressure.

5. Wall sheeting shall be secured adequately to prevent it from falling away from the walls. This will require additional support/attachment when negative pressure ventilation systems are utilized. Wall sheeting shall not be taped to asbestos materials.

6. Install two or more transparent plastic viewing ports in the walls of the enclosure in such a manner to allow unobstructed viewing of all components within the enclosure, which are involved in the project. Existing windows shall be utilized for viewing ports as needed. Movable curtains on the outside shall cover viewing ports. The Resident Engineer shall approve location of view port.

I. Worker Decontamination Facility:

1. Worker decontamination enclosure systems shall be provided for workers entering or exiting the containment area. The worker decontamination shall consist of a clean change room, a shower and an equipment room, each separated from each other and from the containment area by curtained doorways. The decontamination unit shall be constructed of metal, wood or plastic framing systems. **A worker decontamination facility is required for any Class I asbestos work involving greater than 25 linear feet or 10 square feet.** Remote decontamination facility may be required for projects less than 25 linear feet or 10 square feet and class III work; coordinate with the Resident Engineer for location.

2. The worker decontamination enclosure systems constructed at the work site shall utilize 6-mil opaque black or white polyethylene sheeting or other acceptable materials for privacy.

3. The worker decontamination facility should be constructed contiguous to the negative - pressure work area or regulated area for Class I work. Where construction contiguous to work area is not feasible, the decontamination facility shall be constructed with a polyethylene lined tunnel connecting the decontamination facility to the work.

4. Entry to and exit from all material decontamination chambers and decontamination enclosure systems shall be through curtained doorways consisting of two (2) sheets of overlapping polyethylene sheeting. One sheet shall be secured at the top and left side, the other sheet at the top and right side. Both sheets shall have weights attached to the bottom to insure that they hang straight and maintain a seal over the doorway when not in use. Doorway designs providing equivalent protection and acceptable to the Resident Engineer may be utilized. Inverted T double sheet doorway with a flap door is also acceptable.

5. Access between any two rooms in the decontamination enclosure system shall be through a curtained doorway. Pathways in from clean to contaminated, and out from contaminated to clean in the containment area shall be clearly designated.

6. Clean room shall be sized to adequately accommodate the work crew. Benches shall be provided as well as storage for employees' street clothes. Shelves for storing respirators shall also be provided in this area. Clean work clothes (if required under disposables); clean disposable clothing, replacement filters for respirators, towels and other necessary items shall be provided in adequate supply at the clean room. A location for postings shall be provided in this area. Lighting, heat, and electricity shall be provided as necessary for comfort. This shall not be used for storage of tools, equipment or materials, except as specifically designated by the RM Project Designer.

7. Shower room shall be lighted, heated and contain one or more showers as necessary to adequately accommodate workers. Each showerhead shall be supplied with hot (100 degrees F. minimum) and cold water adjustable at the tap. The shower enclosure shall be constructed to ensure against leakage of any kind. The Contractor shall supply an adequate supply of soap, shampoo and towels at all times. See Paragraph 3.13 Paragraph A for water filtration/disposal procedures.

8. The equipment room shall be used for storage of equipment and tools at the end of a shift after they have been decontaminated. A walk-off pan, a small children's swimming pool or equivalent, filled with water shall be located in the containment area just outside the equipment room for workers to clean off foot coverings and contaminated air hoses after leaving the containment area and prevent excessive contamination of the worker decontamination enclosure system. A 6-mil polyethylene bag for collection of disposable clothing shall be located in this room. Contaminated foot wear (e.g., rubber boots, other reusable footwear) shall be stored in this area for reuse the following workday.

J. Material Decontamination Facility and Emergency Exits:

1. The Material Decontamination Facility shall be constructed separate from the worker decontamination facility. Wherever possible, this shall be located where there is direct access from the containment area to the outside of the building.
2. The Material Decontamination Facility shall consist of an airlock, a container storage area and another airlock with access to outside the containment area.
3. The Material Decontamination Facility shall be constructed in similar fashion to the worker decontamination facility using similar materials and airlock and curtain doorway design.
4. This Material Decontamination Facility airlock shall not be used to enter or exit the containment.
5. Emergency exits shall be established and clearly marked with duct tape arrows or other effective designations to permit easy location from anywhere within the containment area. They shall be secured to prevent access from uncontaminated areas and permit emergency exiting. These exits shall be properly sealed with polyethylene sheeting, which can be cut to permit egress if needed. These exits may be the worker decontamination facility, the material decontamination facility and/or other alternative exits satisfactory to the Port Fire officials.

K. Air Pressure Differential:

1. Provide a fully operational negative air system within the work area and continuously maintain a pressure differential across work area enclosures of negative 0.02 inches column of water. Demonstrate to the RM Project Monitor the pressure differential by use of a pressure differential meter or a manometer recording with strip chart, or similar digital equipment with alarm before disturbance of any asbestos containing materials.
2. Provide fully operational negative pressure systems supplying a minimum of one air change every 15 minutes. Determine the volume in cubic feet of the work area by multiplying floor area by ceiling height. Determine total ventilation requirement in cubic feet per minute (cfm) for the work area by dividing this volume by the air change rate.
    a. Vent to Outside of Building, unless authorized in writing by the Resident Engineer.
3. Supplemental Makeup Air Inlets: Provide where required for proper airflow through the workspace in location approved by the RM Project Designer.
4. Test negative pressure system for a 24 hour time period before any asbestos-containing material is wetted or removed. After the work area has been prepared, the decontamination facility set up, and the exhaust unit(s) installed, start the unit(s) (one at a time). Demonstrate operation and testing of negative pressure system to the Resident Engineer. Indications of correct negative air system shall include the following:
    a. Plastic barriers and sheeting move lightly in toward work area.
    b. Curtain of decontamination units moves lightly in toward work area.

c. There is a noticeable movement of air through the decontamination unit. Use smoke tube to demonstrate air movement from the Clean Room to Shower Room, from Shower Room to Equipment Room, and from Equipment Room to Work Area.

d. Use smoke tubes to demonstrate a positive motion of air across all area in which work is performed.

e. Use a differential pressure meter or manometer to demonstrate a pressure difference of at least 0.02 inches column of water across every barrier separating the Work Area from the balance of the building or outside.

f. Modify the Negative Pressure System as necessary to successful demonstrate the above.

g. Contractor's on-site competent person shall smoke test the NPE at least once every shift and document testing in daily log.

5. Provide a minimum of one back-up negative air for every four primary negative air units used. A minimum of one back-up negative air unit will be required if less than four primary units are used. The back-up negative air unit(s) shall be of equal capacity to primary unit(s).

L. Maintenance of Containment Barriers and Worker Decontamination Facility:

1. Following completion of the construction of all polyethylene barriers and decontamination system enclosures, the negative air machines shall be turned on. The Contractor shall continuously maintain a pressure differential across work area enclosures a minimum of negative 0.02 inches column of water for a 24-hour settling time to insure that barriers will remain intact and secured to walls and fixtures before beginning actual abatement activities.

2. All polyethylene barriers inside the containment, in the worker decontamination enclosure system, in the waste container pass-out airlock and at partitions constructed to isolate the area from occupied areas, shall be inspected by the Contractor at least twice daily including prior to the start of each day's abatement activities. Document inspections and observations into the daily project log and submit to Resident Engineer weekly at the weekly progress meetings.

3. Damage and defects in the enclosure system are to be repaired immediately upon discovery. Use smoke tubes to test the effectiveness of the barrier system when directed by the Port's RM Project Monitor.

4. At any time during the abatement activities after barriers have been erected, if visible material is observed outside of the containment area or if damage occurs to barriers, the work shall immediately stop, repairs made to the barriers, and debris/residue cleaned up using appropriate HEPA vacuuming and wet mopping procedures.

5. If air samples collected by the Port's RM Project Monitor or the Contractor outside of the containment area during abatement or pre-abatement activities indicate airborne fiber concentrations greater than 0.01 f/cc, or the pre-abatement concentrations, work shall immediately stop for inspection

and repair of barriers. Cleanup of surfaces outside of the containment area using HEPA vacuums or wet techniques is required at no additional cost to the Port.

6. Install and initiate operation of negative pressure ventilation equipment as needed to provide one air change in the containment area every 15 minutes. Openings made in the enclosure system to accommodate these units shall be made airtight. If more than one unit is installed, they should be turned on one at a time, checking the integrity of wall barriers for secure attachment and need for additional reinforcement. Insure that adequate power supply is available to satisfy the requirements of the ventilating units. Negative pressure ventilation units shall be HEPA filtered and exhausted to the outside of the building to locations approved by the Resident Engineer. They shall not be exhausted into occupied areas of the building. Twelve inch diameter extension ducting shall be used to reach from the containment area to the outside when required. Careful installation, air monitoring and daily inspections shall be done to ensure that the negative pressure ventilation exhaust does not release fibers into uncontaminated building areas.

M. Once constructed and reinforced as necessary with negative pressure ventilation units in operation as required, test enclosure for leakage utilizing smoke tubes. Repair or reconstruct as needed.

N. Clearly identify and maintain emergency and fire exits from the containment area.

O. Remove, clean and enclose in polyethylene the ceiling mounted objects such as lights and other items that may interfere with the abatement process and were not previously cleaned and sealed off. Utilize localized spraying of amended water and/or HEPA vacuums to reduce fiber dispersal during the removal of these fixtures.

P. Alternate Procedures:

1. Procedures described in this specification are to be utilized at all times.

2. If non-specified procedures are to be considered, a request must be made in writing using a Port Request for Information form providing details of the problem encountered and recommended alternates.

3. Alternate procedures shall provide equivalent or greater protection than the procedures they replace.

4. An alternate procedure must be approved in writing by the RM Project Designer prior to implementation.

3.09 PROCEDURES FOR EMERGENCY SPILLS AND UNCONTROLLED RELEASES OF ASBESTOS OR PACM

A. This procedure shall be used in any situation involving an uncontrolled release of asbestos or PACM such as, but not limited to, dislodging of asbestos materials by accident, a rupture in a containment, breaking of a glove bag, tearing open of previously wrapped material, spills of drums for disposal, the use of asbestos contaminated clothing, tools or equipment in an unregulated area, or similar event where asbestos or PACM may be or has the potential to be introduced into the air in an uncontrolled manner.

B. Specific Work Procedure:

1. Evacuate the immediate area of all unprotected personnel.
2. Establish a regulated area. The work area shall be identified and access restricted in any manner that minimizes the number of persons within the work area and protects persons outside the work area from exposure above the action level in accordance with WAC 296-0771. Seal all openings into work area including drains.
3. Use caution to assure personnel are not tracking asbestos-containing debris to areas outside the regulated area and spreading the contamination.
4. Immediately contact the Resident Engineer.
5. Wet down, encapsulate and pick up large chunks and place in a properly labeled asbestos disposal bag. Asbestos disposal bags shall meet the requirements of WAC 296-62-07721.
6. Vacuum the entire area using a HEPA equipped vacuum.
7. Wet wipe the entire contaminated area with clean wet rags and/or mops.
8. Encapsulate all surfaces within the work area. Protect equipment, furnishings and other items in work area during encapsulation.
9. The cleanup procedures shall include the entire affected area.
10. Contractors and Project Monitor logs for the shift when the spill occurred shall include a description of spill and corrective action.
11. Provide the Resident Engineer with a detailed written report of the causes of the accident, the Contractor's response, the results of actions taken and steps to be implemented to avoid future occurrences within 24 hours of the spill.
12. All work performed under this procedure shall be undertaken by Certified Asbestos Workers in protective clothing with half-face respirators as a minimum. Air monitoring shall be undertaken as specified in Paragraph 1.08.

3.10 CLEAN-UP OF ASBESTOS-CONTAINING DEBRIS

A. Work of this Paragraph is limited to the cleanup of a small quantity of amassed debris that has fallen from an architectural finish, fireproofing, or thermal insulation on pipes, boilers and other equipment.

B. Remove asbestos-containing debris and decontaminate the area involved using the following sequence:

1. Shut down all ventilation directed into room.
2. Seal entry to Work Area with 6-mil polyethylene. Slit polyethylene for entry. Install a flap to cover the slit automatically; tape slit closed after entry.
3. Start HEPA vacuum or HEPA filtered fan unit before entering the area.
4. Use the HEPA vacuum to clean a path at least 6 feet wide from the entry point of the Work Area to the site of the fallen material.

5. Remove all small debris with the HEPA vacuum.
6. Pick up large pieces of debris and place in the bottom of a disposal bag. Place pieces in the bag without dropping, avoiding unnecessary disturbance and release of material. Wet contents of bag.
7. Remove all remaining visible debris with HEPA vacuum.
8. HEPA vacuum, in two directions each at right angles to the other, an area 3 feet beyond the location that visible debris was found.
9. Place a polyethylene drop cloth immediately on top of the HEPA vacuumed area before performing any repair work on site from which fall-out occurred.
10. HEPA vacuum the site from which material fell, removing all loose material that can be removed by the vacuum's suction.
11. Repair or remove remaining material.
12. HEPA vacuum ladder and/or any tools used and pass out of the Work Area.
13. HEPA vacuum all surfaces in the room that may have been contaminated, starting at the top of wall and working downward to the floor. Then start at corner of floor farthest from entrance to Work Area and proceed towards entrance.
14. HEPA vacuum the floor using a floor attachment with rubber floor seals and adjustable floor to attachment height. Adjust the height so that the rubber seals just touch the floor if carpeted and are within 1/16 inch of hard surface floors. Vacuum the floor in parallel passes with each pass overlapping the previous by one-half the width of the floor attachment. At the completion of one cleaning, vacuum the floor a second time at right angles to the first.

C. If there are objects in the Work Area, perform the following:

1. Decontaminate objects wherever possible on a plastic drop sheet.
2. HEPA vacuum all surfaces of object and immediate area before moving the object.
3. Pick-up object, if possible, and HEPA vacuum all surfaces.
4. Hand to off-sheet worker who will wet-clean object, if possible, and place in storage location.
5. Decontaminate area where object was located by HEPA vacuuming twice, in perpendicular directions. Wet clean if necessary to remove any debris.
6. Return object to its original location.

3.11 WORK AREA CLEARANCE:

A. The abatement work is complete when the work area is visually clean and airborne fiber levels have been reduced to the level specified below.

B. To determine if the elevated airborne fiber counts encountered during abatement operations have been reduced to the specified level, the Contractor will conduct a final visual inspection of the Work Area for completeness of work and the presence

of any visible debris following all abatement per ASTM E1368-02, "Standard Practice for Visual Inspection of Asbestos Abatement Projects." Following the Contractors successful visual inspection the work area must pass the following visual inspection process.

1. The RM Project Designer will perform a visual inspection of the project area and note deficiencies. If less than 10 sq. ft. of surfacing material is removed, the visual inspection may be performed by an AHERA Project Designer or RM Project Monitor.
2. If deficiencies are noted, the inspector shall create a punch list and forward to the Contractor. Contractor shall resolve all punch list items
3. If the Contractor fails the visual inspection after a punchlist has been created, all future visual inspection costs will be borne solely by the Contractor. The minimum costs for any one visual inspection is $1,000.00. The Port will not be charged for the cleanup time, materials, air monitoring costs, or delay costs. Delays resulting from non-compliant visual inspections will not constitute an extension to the project time.
4. Once the inspector gives the final visual clearance, the Port will provide the Contractor with signed clearance forms.
5. Upon receipt of signed visual clearance forms, the Contractor shall apply a lockdown type asbestos encapsulant to surfaces on which asbestos has been removed.
    a. In cases when negative pressure enclosures have been used, maintain operation of negative air system during the encapsulation process.
    b. Mix ratio of encapsulant shall be per manufacturer's recommendations.
    c. Apply encapsulant with airless sprayer onto substrate.
6. After encapsulation, the Contractor shall conduct final clearance sampling as per this section.
7. Allow encapsulant to dry for eight (8) hours (min) or until surfaces are dry before removing containment.

C. Following the successful visual inspection, the Contractor will secure air clearance samples and have them analyzed according to the following procedures.

1. All enclosures clearance samples will be taken using sampling techniques as follows.
    a. Samples will be collected in areas subject to normal air circulation away from room corners, obstructed locations and sites near windows, doors or vents in areas coinciding with pre-abatement sample locations.
    b. The HEPA machines must be left running during the procedure.

D. General: The number and volume of air samples taken and analytical methods used will be in accordance with the following schedule. Sample volumes given may vary depending upon the analytical instruments used.

E. In each work area after completion of all cleaning work, a minimum of one (1) sample will be taken at a flow rate of 1 to 12 liters per minute with a minimum of 1200 liters of air to be sampled and analyzed as follows:

1. Analysis: Fibers on each filter will be measured using the NIOSH 7400 procedures and WISHA reference method. This shall include at a minimum the analysis of two blanks from the same lot as the filters used for sample collection, the Contractor shall provide the blanks for analysis.

2. Release Criteria: Decontamination of the work area is complete when every clearance sample is equal or less than 0.01 fibers/cc or less than pre-abatement levels, whichever is lower. If any sample exceeds 0.01 fibers/cc, then the decontamination is incomplete and re-cleaning is required.

3. The services of a testing laboratory will be employed by the Contractor to perform laboratory analysis of the air samples. Verbal laboratory results will be available within eight (8) hours of taking clearance samples. A complete record of all air monitoring tests and inspections will be furnished to the Port via the Contractor within 24 hours of sample collection.

F. After acceptable clearance samples are received, the Contractor will provide the Resident Engineer with signed visual clearance forms with air sampling results attached.

G. The Project Monitor shall conduct a final visual inspection after all containment and equipment has been removed.

3.12 DISPOSAL PROCEDURES:

A. Shower water shall be drained, collected and filtered through a system with at least a 5.0-micron particle size collection capability.

B. Sealed and labeled containers of asbestos containing waste shall be removed from the immediate project area and transported to the prearranged disposal location as the work progresses.

C. Labeling: Each bag of asbestos waste shall be pre-labeled in accordance with 29 CFR 1910.1200 (f) of OSHA's Hazard communication Standard as follows:

DANGER CONTAINS ASBESTOS FIBERS AVOID CREATING DUST CANCER AND LUNG DISEASE HAZARD

In addition, a second pre-printed label must be present on each bag in accordance with 49 CFR Parts 171 and 172 of U.S. Department of Transportation regulation as follows:

RQ HAZARDOUS SUBSTANCE SOLID, NOS ORM-E, NA 9188 (ASBESTOS)

The Contractor shall mark each container with a permanent label listing the contractor's name, the name of the Certified Asbestos Supervisor, the contractor's phone number, the contractor's certification information, the date of removal, the location where the waste was generated, the facility owner (Port of Seattle), the POS contract number, and the Port's project number.

D. All demolition debris materials, including asbestos-containing materials, except those containing substances classified as hazardous or dangerous by controlling local, state or federal regulatory agencies, shall upon their demolition became the property of the Contractor. All such material, including those containing hazardous or dangerous substances, shall be removed and properly disposed of away from the site and on property not owned by the Port of Seattle.

E. Disposal must occur at an authorized site in accordance with regulatory requirements of PSCAA, Article 4, Regulations III and applicable state and local guidelines and regulations.

F. Waste shipment, waste manifest, and disposal records shall be delivered to the Port within 45 days of completion of the abatement work. This information shall document the pickup site and disposal site, the quantity of the asbestos waste and the type of containers used. The Contractor and the Disposal Site Operator shall sign waste manifest. If a separate hauler is employed, their name, address, telephone number and signature shall also appear on the manifest.

G. Transportation to the Landfill:

1. All transportation of asbestos containing waste material shall adhere to federal, state and local regulations, including, but not limited to:

    a. Hazard material regulation 48 CFR parts 171.180.

    b. 49 CFR part 107

2. Once drums, bags and wrapped components have been removed from the work areas, they shall be loaded into an enclosed or covered truck for transportation.

3. Utilize hand trucks or carts when moving containers. Containers shall not be dragged, dropped, or thrown.

4. The enclosed cargo area of the truck shall be free of debris and lined with 6-mil polyethylene sheeting to prevent contamination from leaking or spilling containers. Floor sheeting shall be installed first and extend up the sidewalls. Wall sheeting shall be overlapping and taped into place.

5. Containers shall be placed on level surfaces in the cargo areas and packed tightly together to prevent shifting and tipping. Large structural components shall be secured to prevent shifting and bags placed on top. Do not throw containers into truck cargo area.

6. Personnel transferring or loading asbestos containing waste shall be protected by disposable clothing (including head, body; and foot protection) and, at a minimum, half-face respirators using HEPA filters.

7. Any debris or residue observed on containers or surfaces outside the work area shall be immediately cleaned up using HEPA filtered vacuum equipment, or wet methods.

8. Large metal dumpsters are sometimes used for asbestos waste disposal. These shall have doors or tops that can be closed and locked to prevent vandalism or other disturbances. Containers shall be placed, not thrown, into these containers to avoid rupture.

9. Asbestos-containing or-contaminated wastes shall be segregated and transferred separately from non-asbestos wastes.

10. No personnel shall be allowed to ride in the cargo compartment of any vehicle hauling asbestos-containing waste materials.

H. Disposal at the Landfill:

1. Upon reaching the landfill, trucks are to approach the dump location as closely as possible for unloading of the asbestos containing waste.

2. Personnel off-loading containers at the disposal site shall wear protective equipment consisting of disposable head, body, and foot protection, and at a minimum, half-face piece, air-purifying respirators equipped with high-efficiency filters.

3. Bags, drums and components may be inspected, as they are off-loaded at the disposal site. Material in damaged containers shall be repacked in empty drums or bags as necessary.

4. Waste containers shall be placed on the ground at the disposal site, not pushed, thrown or dumped out of trucks.

5. Following the removal of all containerized waste, the truck cargo shall be decontaminated using HEPA vacuums or wet methods to meet the no visible residue criteria. Polyethylene sheeting shall be removed and discarded along with contaminated cleaning materials and protective clothing in bags or drums at the disposal site.

3.13 RE-ESTABLISHMENT OF THE WORK AREA AND SYSTEMS:

A. Re-establishment of the work area shall occur following the completion of cleanup procedures and after clearance air monitoring has been performed and documented per contract documents.

B. Polyethylene barriers shall be removed from walls and floors at this time, maintaining decontamination enclosure systems and barriers over floors, windows, etc., as required.

C. Refer to Clearance procedures listed in Paragraph 3.11 of this specification.

D. Following satisfactory clearance of the work area, remaining polyethylene barriers may be removed and disposed of in accordance with these specifications.

E. Re-secure mounted objects removed from their former positions during area preparation activities.

F. Relocate objects that were removed to temporary locations back to their original positions.

G. Re-establish HVAC, mechanical and electrical systems in proper working activities.

H. Repair all areas of damage that occurred as a result of abatement activities.

I. After all plastic barriers have been removed; the Port's RM Project Monitor may collect another set of clearance samples in cases where debris has been discovered. These samples must indicate that the airborne fiber concentration is equal to or less than the pre-abatement levels or 0.01 f/cc, whichever is lower. If fiber levels are not met, remedial clean up shall be conducted by the Contractor at no additional cost to Port.

J. Comply with safety standards and governing regulations for cleaning operations. Remove waste materials from the site and dispose of in a lawful manner.

K. Following this section is an example of "Certificate of Clearance". This certification is to be completed by the Contractor, the Port's RM Project Designers, and the Resident Engineer during the clearance process.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT AND PAYMENT:

A. No separate measurement or payment will be made for the work required by this section. The costs for this portion of the work shall be considered incidental to, and included in the payments made for the applicable bid items on Bid Form 00410.

END OF SECTION

CERTIFICATE OF CLEARANCE

CONTRACTOR CERTIFICATION OF VISUAL INSPECTION
In accordance with Section 02085, Paragraph 3.11 "Work Area Clearance", the Contractor's supervisor/competent person hereby certifies that he/she has visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and has found no dust, debris or residue.

Identity of Work Area:_____

by: (Signature of Supervisor/Competent Person)_____ Date_____

(Print Name/Title)_____ Certificate #_____Expiration Date _____

CONTRACTOR'S AIR CLEARANCE CERTIFICATION
The Contractor hereby certifies that he/she has conducted air clearance sampling according to the specifications and this sampling is valid to the best of his/her knowledge and belief. Contractor must attach chain of custody and final laboratory results.

Identity of Work Area_____Air Sample Identification #: _____

Flow Rate: _____ Volume _____

Air Sampling Results:_____Analyzed By:_____Time Sample Taken:_____

PORT'S RM PROJECT DESIGNERS' CERTIFICATION OF VISUAL INSPECTION
In accordance with Section 02085, Paragraph 3.11 "Work Area Clearance" the Port's RM Project Designers hereby certify that they have visually inspected the work area (all surfaces including pipes, beams, ledges, walls, ceiling and floor, Decontamination Unit, sheet plastic, etc.) and have found no dust, debris or residue.

Identity of Work Area:_____

by: (Signature)_____Date_____ Pass / Fail (see punchlist)

(Print Name/Title)_____ PD Certificate # & Expiration Date_____

by: (Signature)_____ Date_____ Pass / Fail (see punchlist)

(Print Name/Title)_____ PD Certificate # & Expiration Date_____

CONTRACTOR'S FINAL AIR CLEARANCE CERTIFICATION
The Contractor hereby certifies that he/she has conducted air clearance sampling (after encapsulation) according to the specifications and this sampling is valid to the best of his/her knowledge and belief. Contractor must attach chain of custody and final laboratory results.

Identity of Work Area_____Air Sample Identification #: _____

Flow Rate: _____ Volume _____

Air Sampling Results:_____Analyzed By:_____Time Sample Taken:_____

RESIDENT ENGINEER APPROVAL FOR RE-OCCUPANCY

by: (Signature)_____ Date_____

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Establishing and managing secured and exclusion zones.

B. Establishing and managing contamination reduction zones (CRZ).

C. Establishing and managing decontamination areas in the exclusion zones and CRZ.

D. Decontamination methods.

E. Decontaminating vehicles and equipment.

F. Decontaminating materials.

G. Decontaminating personnel.

1.02 RELATED SECTIONS

A. Section 01305 – Work Plans.

B. Section 02222 – Tank Farm Area Preparation.

C. Section 02223 – Utility Demolition and Management.

D. Section 02224 – Pipeline Decommissioning.

E. Section 00227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

F. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

G. Section 02332 – Soil Excavation and Management.

H. Section 02333 – SWMU 30 Excavation and Backfill.

I. Section 02335 – Exploratory Trench Excavation.

J. Section 02405 – Waste Collection Storage Profiling and Disposal.

K. Section 02469 – Cutoff Wall.

L. Section 02621 – LNAPL Recovery Trenches.

1.03 REFERENCES

A. NIOSH/OSHA/USCG/U.S. EPA Publication, "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.” October, 1985.

B. Chapter 173-303 WAC, "Dangerous Waste Regulations."

C. Guidance For Clean Closure of Dangerous Waste Units and Facilities. Publication #94-111. Ecology. May 2005.

D. WAC 296-843-150, “Worker and Equipment Decontamination.”

1.04 DEFINITIONS AND ACRONYMS

A. Contaminated asphalt and concrete: Concrete or asphalt that has free oily products adhering to the surface that can be removed with pressure washing. Contamination does not include staining that occurred from products that are no longer in contact with the asphalt or concrete.

B. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings. {Note to Reviewers - currently shown in Figure 8 of the EDR; will be added to drawings once outline approved by Ecology}

C. Construction Quality Assurance Consultant (CQAC).

D. Contamination Reduction Zone (CRZ): The transition area between the exclusion zone and the secured zone that is used for personnel and equipment decontamination, and storage of material that will be characterized.

E. Decontamination: the process of removing or neutralizing contaminants that have accumulated on personnel, equipment, and demolition debris.

F. Exclusion Zone: The contaminated area with controlled access due to a potential threat to human health.

G. Health and Safety Plan (HASP): A written plan which identifies expected hazards that could impact the health and safety of persons performing work that includes safe work procedures to mitigate, reduce or control the identified hazards.

H. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

I. Hotline: The outer boundary of the Exclusion Zone that is clearly marked by lines, placards, hazard tape and / or signs or enclosed by physical barriers such as chains, fences, or ropes.

J. Level D: Per OSHA (29 CFR 1910.120), this level of PPE has no respiratory protection and minimal skin protection, referring to normal work clothes. Work shirt, safety boots, and safety glasses are all examples of PPE used at this level. Dust masks used on a voluntary basis would still fall under Level D protection.

K. Level C: Per OSHA (29 CFR 1910.120), this level of PPE is required when the concentration and type of airborne substances is known and the criteria for using air purifying respirators is met. Typical Level C equipment includes full-face air purifying respirators, inner and outer chemical-resistant gloves, hard hat, escape mask, and disposable chemical-resistant outer boots. The main criterion for Level C is that atmospheric concentrations and other selection criteria permit wearing an air-purifying respirator. .

L. National Institute for Occupational Safety and Health (NIOSH): The agency of the federal government responsible for conducting research and making recommendations for the prevention of work-related injury and illness.

M. Occupational Safety and Health Administration (OSHA): The agency of the federal government that was created to regulate and enforce workplace safety and health.

N. Permissible Exposure Limit (PEL): The legal limit in the United States for exposure of an employee to a chemical substance or physical agent. For chemicals, the chemical regulation is usually expressed in parts per million (ppm), or sometimes in milligrams per cubic meter (mg/m3). Units of measure for

physical agents such as noise are specific to the agent. Permissible exposure limits are established by the Occupational Safety and Health Administration (OSHA).

O. Personal Protective Equipment (PPE): Specialized clothing or equipment worn by employees or personnel for protection against existing or expected health and safety hazards.

P. Secured Zone: The area enclosed by a perimeter fence erected around a cleanup work area that is secured and locked during non-work hours.

Q. Tank Farm Area (TFA).

R. Tank Farm Affected Area (TFAA).

S. Tank Farm Lease Parcel (TFLP).

T. Vehicles Entrance: Entrance to the Secured Zone.

U. Vehicle Exit: Exit from the Secured Zone.

V. Washington Department of Ecology (Ecology): The agency of the State of Washington responsible for developing and implementing environmental laws and regulations. Ecology is the lead governmental agency for the Terminal 91 Tank Farm Cleanup project.

W. Washington Administrative Code (WAC): The codification of the regulations for the State of Washington.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. As part of the Project Work Plan prepare a Health and Safety Plan. Comply with Section 01305.

B. As part of the Project Work Plan described in Section 01305, prepare a Decontamination Plan that contains the following:

1. The number and location of decontamination and wheel wash stations along with their approximate sizes and locations with respect to the Secured Zone and CRZ.

2. Proposed decontamination equipment.

3. Procedures for decontaminating personnel, equipment, materials, and demolition debris.

4. Procedures to prevent contamination outside the CRZ and the AOC.

5. Methods and procedures to minimize worker contact with contaminants during removal of personal protective clothing and equipment.

6. Procedures for inspection and decontamination of vehicles leaving the site.

7. Procedures for disposal of clothing and equipment, including personal protective equipment that is not completely decontaminated.

8. Procedures for the collection, treatment, handling and disposal of all decontamination water, sludges and wastes.

9. Procedures for decontaminating pipelines before they are removed from the TFA and AOC

10. Procedures for using surfactants and detergents in the CRZ.

PART 2 PRODUCTS

2.01 DECONTAMINATION EQUIPMENT

A. Provide containment structures, sumps, sump pumps, delivery systems and all appurtenances required for set up and operation of decontamination in the CRZ, Exclusion Zone, and Secured Zone

PART 3 EXECUTION

3.01 ESTABLISHING AND MANAGING SECURED AND EXCLUSION ZONES.

A. Control access to the Secured Zone during working hours through access control points.

B. Establish the outer boundaries of Exclusion Zones within the general Secured Zone using the following criteria:

1. Visually survey the immediate work site environs.

2. Determine the locations of:

a. Hazardous substances.

b. Drainage, leachate and spilled material.

c. Visible discolorations.

3. Evaluate data from previous site investigations and site reconnaissance indicating the presence of:

a. Combustible gases and flammable liquids.

b. Organic and inorganic gases, particulates, or vapors.

c. Surface soil and water contamination.

d. Reported releases.

4. Consider the distances needed to prevent an explosion or fire from affecting personnel outside the Secured and Exclusion Zones.

5. Consider the physical area needed for pipe cleaning, and other material cleaning or decontaminating activities.

6. Consider meteorological conditions and the potential for contaminants to be blown or washed from the area.

7. Secure and mark the limits of the Exclusion Zone.

8. Modify the limits of the Exclusion Zone, if necessary, as additional information becomes available, or as conditions change due to weather or movement of contaminated material during site work.

C. Establish Exclusion Zones in areas where site work occurs, and where contract work is expected to be conducted in and around contaminated material.

D. Establish access control points with temporary fences, at the periphery of the Secured Zone and all active Exclusion Zones to control the flow of personnel and equipment into and out of these zones.

E. Wear the level of protection required by the Contractor Health and Safety Plan or as directed by Contractor's Health and Safety Representative when working within the Secured Zone and all active Exclusion Zones.

F. Secure and lock the Secured Zone during non-working hours.

3.02 ESTABLISHING AND MANAGING CONTAMINATION REDUCTION ZONES IN THE AOC

A. Establish a CRZ for decontaminating equipment, materials and personnel working inside the AOC.

B. Dispose of all materials collected during the decontamination per Section 02405.

C. Locate the CRZ inside the AOC.

D. Establish a vehicle entrance to each CRZ through a stabilized construction entrance.

E. Conduct vehicle washing as needed in the CRZ prior to entering the Secure Zone.

F. Conduct personnel decontamination in the CRZ according to the accepted Decontamination Plan, and this specification.

G. Place spent or contaminated personal protective equipment in sealed drums.

H. Vehicle exits: Exit Exclusion Zones through the CRZ.

I. Provide suitable facilities for personnel decontamination including but not limited to emergency eyewash, hand washing and shower facilities.

J. Construct a vehicle and equipment decontamination facility, which allows for containment and collection of liquid and solid residuals removed from construction vehicles and trucks during decontamination.

K. Provide splash protection around the decontamination facility that minimizes potential contamination from splatter and mist during the vehicle and equipment decontamination process.

L. Provide splash protection that is temporary, but stable, and capable of being dismantled in the event of high winds.

M. Provide a drainage and collection system for water generated during decontamination procedures that allows for collection and disposal prior to it entering a storm sewer, sanitary sewer, or water body.

3.03 ESTABLISHING AND MANAGING CONTAMINATION REDUCTION ZONES OUTSIDE THE AOC

A. Establish a CRZ for decontaminating equipment, materials and personnel working in areas outside of the AOC.

B. Locate the CRZ(s) at locations approved by the Port.

C. Establish a vehicle entrance to each CRZ through a construction pad entrance.

D. Conduct vehicle washing as needed in each CRZ after leaving the Exclusion Zone and prior to entering the Secure Zone.

E. Conduct personnel decontamination in each CRZ according to the accepted Decontamination Plan, and this specification.

F. Place spent or contaminated personal protective equipment in sealed drums.

G. Vehicle exits: Exit Exclusion Zones through the CRZ.

H. Provide suitable facilities for personnel decontamination including but not limited to emergency eyewash, hand washing and shower facilities.

I. Construct a vehicle and equipment decontamination facility, which allows for containment and collection of liquid and solid residuals removed from construction vehicles and trucks during decontamination.

J. Provide splash protection around the decontamination facility that minimizes potential contamination from splatter and mist during the vehicle and equipment decontamination process. Provide splash protection that is temporary, but stable, and capable of being dismantled in the event of high winds.

K. Provide a drainage and collection system for water generated during decontamination procedures that allows for collection and treatment, or collection and disposal prior to it entering a storm sewer, sanitary sewer, or water body.

3.04 DECONTAMINATION METHODS

A. PPE for decontamination personnel: Wear Level D, at a minimum, or a higher level of protection, as determined by the accepted Health and Safety Plan.

B. Perform decontamination in each established Exclusion Zone or CRZ.

C. If surfactants and detergents are proposed, provide details for their use in the Decontamination Plan.

D. Physical decontamination methods: include, but are not limited to, brushing and spraying with a pressure washer.

E. Use brush or brooms to remove loose materials.

F. Use a pressure washer to apply water of sufficient pressure, residence time, and agitation to remove soil and contaminated residuals from surfaces.

G. Provide overspray barriers on each side of the decontamination area to prevent contamination of adjacent areas.

H. Perform decontamination of materials derived from demolition such as pipelines, concrete, asphalt tank bases, utilities, buildings, etc. in the Exclusion Zone or in the CRZ.

I. Material decontamination standards:

1. Materials that will be removed from the site: prior to removal from the CRZ, decontaminate to the extent necessary to facilitate transport and disposal or recycling at an approved facility and comply with Section 02405.

2. Materials that will be recycled and reused on site: prior to removal from the CRZ, remove free flowing hydrocarbon products and highly contaminated soil to facilitate stockpiling, processing and reuse.

J. Take extreme care when performing decontamination activities to avoid unnecessary contamination of personnel, and the surroundings.

3.05 DECONTAMINATING VEHICLES AND EQUIPMENT

A. Perform all decontamination of vehicles and equipment that leave Exclusion Zones in the CRZ.

B. Perform decontamination of all vehicles to the chassis including the under carriage, suspension and tires, and other parts of the vehicle known to have been contaminated or visually appearing to be contaminated.

C. Continue decontamination until all potentially contaminated material including soil/sludge, mud and debris is removed from the vehicle or equipment.

D. Document information about every vehicle leaving the CRZ including:

1. Date and time.
2. Vehicle type and registration.
3. Weather.
4. Contents and estimated quantity of contents.
5. Destination of material being removed from the CRZ.

E. Take extreme care while decontaminating vehicles to avoid unnecessary contamination of personnel, other parts of the vehicle or equipment, or the surroundings.

F. After completion of all field activities, decontaminate the on-site equipment and vehicles used for cleanup activities.

G. Handle any material collected from decontaminating equipment that is moved out of the AOC per Section 02405.

3.06 DECONTAMINATING DEMOLITION MATERIALS

A. Document information about all decontaminated material leaving the CRZ including:

1. Date and time.
2. Material type and estimated quantity.
3. Weather.
4. Destination of material.

3.07 DECONTAMINATING PERSONNEL

A. Ensure that personnel leaving the Exclusion Zone perform decontamination as required in this section prior to exiting the CRZ.

B. Place spent or contaminated personal protective equipment in sealed drums.

3.08 MANAGING DECONTAMINATION RESIDUALS AND WASTE

A. Comply with Section 02405.

3.09 QUALITY CONTROL

A. Inspect and document inspection of each truck bound for disposal or recycling facilities.

B. Inspect all vehicles and equipment that have been in the Exclusion Zone prior to their exiting the CRZ.

C. Certify that all decontamination equipment has been decontaminated prior to its removal from the CRZ.

D. Provide a signed and approved waste manifest in each vehicle hauling a load of hazardous waste for disposal.

3.10 QUALITY ASSURANCE

A. Decontaminated vehicles are subject to spot checks from CQAC.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 14, Establish Site Controls, will be made by the lump sum (LS).

B. No separate measurement will be made for conducting decontamination of personnel, equipment, and debris.

4.02 PAYMENT

A. Payment for Bid Item 14, Establish Site Controls includes all costs to furnish, install, and maintain all equipment, products and labor required to establish site controls as shown on the Drawings, as described in Section 02211, and as described in the accepted Work Plans.

B. No separate measurement or payment will be made for conducting decontamination of personnel, equipment, and debris. The cost for these activities will be considered incidental to, and included in, the payments made for the applicable bid items for the Project.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Demolishing foam hydrant and piping.

B. Demolishing buildings.

C. Demolishing asphalt pavement.

D. Demolishing concrete slabs and foundations.

E. Demolishing abandoned oil/water separators.

F. Demolishing abandoned stormwater sumps.

G. Demolishing steel tank bases.

H. Excavating and removing product-saturated sand.

I. Site cleanup.

1.02 RELATED SECTIONS

A. Section 01010 – Summary of Work

B. Section 02075 – Lead Controls in Construction and Demolition

C. Section 02081 – PCB-Containing Fluorescent Light Ballasts Removal and Disposal

D. Section 02082 – Removal and Disposal of Fluorescent Lamps

E. Section 02083 – Fugitive and Silica Dust Control Procedures

F. Section 02085 – Asbestos Abatement

G. Section 02211 – Decontamination Procedures

H. Section 02223 – Utility Demolition and Management.

I. Section 02224 – Pipeline Decommissioning.

J. Section 02227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

K. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling

L. Section 02270 – Construction Stormwater Management.

M. Section 02332 – Soil Excavation and Management.

N. Section 02335 – Exploratory Trench Excavation.

O. Section 02339 – Engineered Fill.

P. Section 02405 – Waste Collection Storage Profiling and Disposal.

Q. Section 02629 – Trench Safety and Shoring Systems.

1.03 REFERENCES

A. See various reports listed in Section 01010 Summary of Work.

1.04 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Best Management Practice (BMP): Stormwater best management practices are methods designed to control stormwater runoff incorporating sediment control, and soil stabilization, to prevent or reduce non-point source pollution, or to manage the quantity and improve the quality of stormwater runoff in the most cost-effective manner.

C. Construction Quality Assurance Consultant (CQAC).

D. Decontamination: the process of removing or neutralizing contaminants that have accumulated on personnel, equipment, and demolition debris.

E. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

F. Notice to Proceed (NTP)

G. Pipelines: Formerly active privately owned pipes that carried a product such as fuel, sludge, oil product, residue or water.

H. Tank Farm Area (TFA): The area generally within the limits of the TFLP that includes the cutoff wall and within which the cleanup activities will be performed.

I. Tank Farm Lease Parcel (TFLP): approximately 4 acre parcel within Terminal 91 as shown Exhibit B of Agreed Order DE 8938. The TFLP was the location of the former tank farm, the above ground portions of which were demolished in 2005.

J. Utilities: Utilities are defined as any current or formally active publicly or privately owned and operated system that deliver a service such as water supply, electrical power, or natural gas.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Sheeting and Shoring Plan: As part of the Work Plan provide a Sheeting and Shoring Plan as described in Section 01305.

1.06 SUBMITTALS DURING CONSTRUCTION

A. Provide an inventory of all materials removed from the AOC.

B. Disposal and Recycling Receipts: Submit disposal and recycling receipts for all materials disposed of or recycled offsite as described in Section 02405.

1.07 WORK BY PORT

A. The Port will relocate electrical service currently housed in Substation 11 prior to NTP, and will confirm that existing electrical systems, including Substation 11, are de-energized prior to commencing Contract work.

B. The Port will remove all stored materials, and remove or demolish temporary structures located in TFLP work area not listed in Part 2.01 of this Section prior to NTP. This will include the existing temporary fencing surrounding the former tank farm.

PART 2 PRODUCTS

2.01 ITEMS REQUIRING DEMOLITION OR REMOVAL

A. Abandoned electrical systems.

B. Pipelines per Section 02224.

C. Monitoring wells and vapor probes per Section 02227.

D. Existing stormwater pumping systems including vaults, pumps and above ground piping.

E. Concrete blocks.

F. Former foam hydrants and piping.

G. Buildings M-25, and M-27, and electrical Substation 11.

H. Existing asphalt pavement and gravel subbase.

I. Soil.

J. Former oil/water separator and stormwater sumps backfilled with gravel.

K. Concrete slabs, footings, walls and concrete structures associated with stormwater sumps, oil/water separators, and other structures.

L. Steel components of tank bases.

M. Oil saturated sand within tank bases.

PART 3 EXECUTION

3.01 PREPARATION

A. Locate, identify, and protect from damage manholes, catch basins, utilities, groundwater monitoring wells, and vapor probes that are designated to remain.

B. Protect existing survey bench marks from damage.

C. Verify stormwater BMPs are in place in accordance with Section 02270.

D. Comply with the HASP.

3.02

A.

3.03 FOAM HYDRANT AND PIPING DEMOLITION

A. Locate and demolish former foam spraying equipment including hydrants and buried piping.

B. Decontaminate interior and exterior walls of piping and hydrants per Section 02211.

C. Recycle or dispose of hydrant and piping.

3.04 BUILDING DEMOLITION

A. Verify that regulated materials abatement associated with Buildings M-25 and M-27 and Substation 11 has been completed per Sections 02075, 02081, 02082, 02083, and 02085 prior to demolishing buildings.

B. Completely demolish all components of Buildings M-25 and M-27 and Substation 11.

C. Do not damage existing adjacent structures, roads, and buildings designated to remain.

D. Recycle materials such as wood and metal that lend themselves to being successfully recycled.

E. Decontaminate items that are being salvaged or recycled per Section 02211, if required by the CQAC.

F. Load, haul and dispose of items that cannot be recycled per Section 02405.

G. Load and haul clean broken concrete to the designated processing area within AOC for crushing, screening, and reuse.

H. Backfill excavations inside the AOC as required per Section 02339.

3.05 ASPHALT PAVEMENT DEMOLITION

A. Preparation: Complete building demolition prior to removing asphalt, or sequence work areas so that building demolition precedes asphalt removal.

B. Saw cut existing asphalt along the limits of asphalt removal as shown on the Construction Drawings.

C. Decontaminate demolished materials as required per Section 02211.

D. Completely demolish existing asphalt pavement to the plan area shown on the Construction Drawings.

E. Break up asphalt concrete to a size suitable for loading and hauling.

F. Load and haul to the designated stockpile area.

3.06 CONCRETE SLAB, AND FOUNDATION DEMOLITION

A. Excavate and manage overlying soil as needed to expose concrete as described in Section 02332 prior to beginning concrete demolition.

B. Decontaminate demolished materials per Section 02211.

C. Break up or cut concrete to a size suitable for loading and hauling.

D. Load and haul to the designated stockpile and processing area located inside the AOC for crushing and screening to produce a product suitable for reuse as engineered fill.

E. Take care in removing concrete so that damage does not occur to the existing concrete designated to remain on the east side of Building M-28 by making clean vertical saw cuts at the boundaries.

F. Blasting for the removal of existing structures or obstruction is not permitted.

G. Backfill excavations made to demolish concrete per Section 02339 to surface suitable to excavation of exploratory trench per Section 02335.

3.07 ABANDONED OIL/WATER SEPARATOR DEMOLITION

A. Preparation: Install sheeting and shoring around abandoned oil/water separator(s) vault(s) per approved Sheeting and Shoring plan prior to structure removal to isolate excavation area and control groundwater.

B. Remove gravel backfill from inside the vault, load, haul and stockpile. Manage excavated gravel per Section 02332.

C. Excavate and manage soil surrounding the vault per Section 02332.

D. Control and treat water that develops in the excavation per Section 02405.

E. Demolish concrete structure.

F. Decontaminate removed and demolished materials per Section 02211.

G. Break up concrete structure walls and base to a size suitable for loading and hauling.

H. Load and haul demolished concrete to the designated stockpile and processing area located inside the AOC for crushing and screening to produce a product suitable for reuse as engineered fill.

I. Backfill excavations made to demolish concrete per Section 02339 to prepare a surface suitable for the excavation of exploratory trench per Section 02335.

3.08 ABANDONED STORMWATER SUMP DEMOLITION

A. Preparation: Install sheeting and shoring around abandoned stormwater vaults per approved Sheeting and Shoring plan prior to structure removal to isolate excavation area and control groundwater.

B. Remove gravel backfill from inside the vault(s), load, haul and stockpile. Manage excavated gravel per Section 02332.

C. Excavate and manage soil surrounding the structures per Section 02332.

D. Control and treat water that develops in the excavation per Section 02405.

E. Remove sump components, such as pump support systems.

F. Demolish co ncrete structure.

G. Decontaminate demolished materials as required per Section 02211.

H. Break up concrete structures to a size suitable for loading and hauling.

I. Load and haul concrete to the designated stockpile and processing area located inside the AOC for crushing and screening to produce a product suitable for reuse as engineered fill.

J. Backfill excavations made to demolish concrete per Section 02339 to prepare a surface suitable for excavation of exploratory trench per Section 02335.

3.09 EXISTING TANK BASE DEMOLITION

A. Excavate and manage overlying soil as needed to expose tank bases as described in Section 02332 prior to beginning tank base demolition.

B. Cut exposed metal tank bases to a size suitable for loading and hauling.

C. Decontaminate demolished materials per Section 02211.

D. Load and haul to the designated on site stockpile area as described in Section 02405, or haul decontaminated bases directly off site.

3.10 PRODUCT-SATURATED SAND REMOVAL

A. Excavate and manage product-saturated sand found within the tank bases per Sections 02332, and 02405.

3.11 SALVAGING OR RECYCLING

A. The Port encourages salvage and recycling of materials generated by demolition activities. At Contractor's option, salvage or recycle materials designated for disposal in a manner acceptable to environmental agencies and the Port.

B. Carefully dismantle without unnecessary damage, steel or wooden structures designated for salvage.

C. Carefully crush, and stockpile asphalt and concrete for recycling or re-use on site. Manage all existing materials found at or below surface of the former tank farm within the designated AOC. Manage existing asphalt pavement and underlying soil fill above the former tank farm surface outside of the AOC, if required.

D. Deliver and store material designated for salvage or recycle.

3.12 DISPOSAL OF DEMOLISHED ITEMS

A. Comply with Section 02405.

3.13 CLEANUP

A. Following demolition of structures, buildings and foundations, clean and grade the area and remove debris, rubble, or litter from the site.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for Tank Farm Area Site Preparation.

B. Measurement for Bid Item 15, Decommission and Remove Abandoned Foam Hydrants and Piping will be made by the lump sum (LS).

C. Measurement for, Bid Item 16, Demolish Buildings will be made by the lump sum (LS).

D. Measurement for demolishing asphalt pavement is included in other sections.

E. Measurement for demolishing concrete slabs, foundations and structures is included in other sections.

F. Measurement for Bid Item 17, Demolish Abandoned Oil Water Separator is by the lump sum (LS).

G. Measurement for Bid Item 18, Demolish Abandoned Stormwater Sumps is by the lump sum (LS).

H. Measurement for Bid Item 19, Demolish Existing Oil Water Separator and Former Steam Vault located in the southeast corner of the TFA is by the lump sum (LS).

I. Measurement for Bid Item 20, Demolish and Decontaminate Existing Steel Tank Bases is by the square foot (SF) based on the measured area of the steel tank bases.

J. Measurement for Bid Item 21, Stockpile and Transport Decontaminated Steel Tank Bases is by the ton (TON) based on the measured weight of the steel tank bases at their place of recycling.

K. Measurement for Bid Item 22, Recycling of Decontaminated Steel Tank Bases is by the ton (TON) based on the measured weight of the steel tank bases at their place of recycling.

L. Measurement for excavating and removing product-saturated sand is included in other sections.

4.02 PAYMENT

A. No separate payment will be made for Tank Farm Area Site Preparation.

B. Payment for Bid Item 15, Decommission and Remove Abandoned Foam Hydrants and Piping includes all costs to excavate soil to expose pipelines, cut, clean, remove, and stockpile on site, including all costs for double handling as shown on the Drawings and as described in Sections 02223, 02332, 02339, and 02337.

C. Payment for Bid Item 16, Demolish Buildings includes all costs to demolish buildings and manage debris and regulated building materials as shown on the Drawings and as described in Sections 01305, 01315, 01860, 02075, 02081, 02082, 02083, 02085 and 02337.

D. Payment for demolishing asphalt pavement is included in other sections.

E. Payment for demolishing concrete slabs, foundations and structures is included in other sections.

F. Payment for Bid Item 17, Demolish Abandoned Oil Water Separator includes costs to furnish, install and remove trench safety systems per the accepted Work Plan, and all costs for soil excavation and backfilling of the excavation with engineered fill, including all costs to stockpile, double-handle, and re-load as shown on the Drawings and as described in Sections 02222, 02228, 02332, 02337, 02339, 02405, and 02629. Removal, cutting, cleaning, hauling and stockpiling concrete associated with this bid item is included in Bid item 32 and/or 33. If backfilling is required below the water table, this work will be paid for per Bid Item 43.

G. Payment for Bid Item 18, Demolish Abandoned Stormwater Sumps includes costs to furnish, install and remove trench safety systems per the accepted Work Plan, and all costs for soil excavation and backfilling of the excavation with engineered fill, including all costs to stockpile, double-handle, and re-load as shown on the Drawings and as described in Sections 02222, 02228, 02332, 02337, 02339, 02405, and 02629. 02337. Removal, cutting, cleaning, hauling and stockpiling concrete associated with this bid item is included in Bid item 32 and/or 33. If backfilling is required below the water table, this work will be paid for per Bid Item 43.

H. Payment for Bid Item 19, Demolish Existing Oil Water Separator and Former Steam Vault includes costs to furnish, install and remove trench safety systems per the accepted Work Plan, and all costs for soil excavation and backfilling of the excavation with engineered fill, including all costs to stockpile, double-handle, and re-load as shown on the Drawings and as described in Sections 02222, 02228, 02332, 02337, 02339, 02405, and 02629. Removal, cutting, cleaning, hauling and stockpiling concrete associated with this bid item is included in Bid item 32

and/or 33. If backfilling is required below the water table, this work will be paid for per Bid Item 43.

I. Payment for Bid Item 20, Demolish and Decontaminate Steel Tank Bases includes costs to expose, cut, and decontaminate steel components of tank bases as shown on the Drawings and as described in Sections 02222, 02332, 02337, and 02405.

J. Payment for Bid Item 21, Stockpile and Transport Decontaminated Steel Tank Bases includes costs to stockpile, load, and transport decontaminated steel tank bases to a recycling facility, including all costs to stockpile, double-handle, and re-load as shown on the Drawings and as described in Sections 02222, 02332, 02337, and 02405.

K. Payment for Bid Item 22, Recycling of Decontaminated Steel Tank Bases, includes the cost to recycle the decontaminated tank bases at the accepted facility.

L. Payment for excavating and removing product-saturated sand is included in other sections.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Abandoning, re-routing or removing designated utilities within the TFA including:

1. Existing stormwater catch basins and drain pipes.

1.02 RELATED SECTIONS

A. Section 02085 – Asbestos Abatement

B. Section 02222 – Tank Farm Area Preparation.

C. Section 02224 – Pipeline Decommissioning.

D. Section 02227 – Monitoring Well and Vapor Probe Decommissioning and Protection

E. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

F. Section 02332 – Soil Excavation and Management.

G. Section 02335 – Exploratory Trench Excavation.

H. Section 02339 – Engineered Fill.

I. Section 02405 – Waste Collection Storage Profiling and Disposal.

J. Section 02629 – Trench Safety and Shoring Systems.

1.03 REFERENCES

A. Data Gaps Investigation Technical Memorandum Terminal 91 Tank Farm Affected Area Cleanup (PES Environmental and Vista Consultants, July 2012).

B. Engineering Design Report (EDR), Terminal 91 Tank Farm Cleanup (PES Environmental and Vista Consultants, 2013).

1.04 DEFINITIONS AND ACRONYMS

A. Utilities: Utilities are defined as any current or formerly active publicly or privately owned and operated systems that deliver a service such as water supply, electrical power, or natural gas.

B. Pipelines: Formerly active privately-owned pipes that carried a product such as fuel, sludge, oil product, residue or water.

1.05 SUBMITTALS DURING CONSTRUCTION

A. Copies of permits obtained from public utilities.

B. Documentation: Submit utility record survey documentation within seven (7) days of altering a utility or pipeline to the Engineer.

1.06 WORK BY PORT

A. The Port will relocate electrical service currently housed in Substation 11 prior to NTP, and will confirm that existing electrical systems, including Substation 11, are de-energized prior to commencing Contract work.

B. The Port will remove all stored materials, and remove or demolish temporary structures located in TFLP work area not listed in Part 2.01 of this Section prior to

NTP. This will include the existing temporary fencing surrounding the former tank farm area.

PART 2 PRODUCTS

2.01 UTILITIES THAT REQUIRE ABANDONMENT AND REMOVAL

A. Existing stormwater catch basins and drain pipes.

B. Existing fire water supply lines and hydrants.

C. Former foam hydrants and lines.

2.02 EXISTING UTILITIES THAT REQUIRE PROTECTION (OUTSIDE OF CUTOFF WALL ALIGNMENT)

A. Sanitary sewers.

B. Stormwater catch basins and drain pipes.

C. Electrical distribution lines.

D. Telephone service.

E. Water supply pipelines.

F. Fire water supply lines and hydrants.

G. Natural gas pipelines.

PART 3 EXECUTION

3.01 BONDING REQUIREMENTS

A. Contact the public utility companies for bond requirements, if any, prior to bid.

3.02 PERMITS

A. Apply for and obtain permits from public utility owners prior to executing work.

3.03 SAFETY

A. Comply with accepted HASP, including lock out tag out procedures.

3.04 COORDINATION WITH UTILITY

A. Contact the appropriate utility agency and advise them of the planned demolition and abandonment activities. Contact shall be sufficiently in advance of planned work as to not adversely impact the overall project schedule.

B. Utility companies impacted by this section:

1. Sanitary sewers: (King County Department of Natural Resources and Parks, Wastewater Treatment Division).
2. Existing electrical services: (Port of Seattle).
3. Existing telephone services: (Century Link).
4. Existing natural gas services: (Puget Sound Energy).

C. Arrange for any required coordination activities with the appropriate agencies.

D. Comply with special conditions required by the utility company or permits issued by the utility company.

3.05 PREPARATION FOR DEMOLITION OF UTILITIES

A. Determine the location where existing utilities will be cut and what portion of the utility will be demolished and what will remain.

B. If utility is designated as active and requires re-routing, contact the Port or utility company for instructions.

3.06 STORM CATCH BASINS AND DRAIN PIPES

A. If available, locate and utilize systems that can isolate storm sewers such as isolation valves.

B. Locate, expose, cut and remove storm sewer piping and catch basins designated for demolition on the Construction Drawings.

C. If demolished utility components are contaminated, decontaminate per Section 02211.

D. Load and haul demolished and decontaminated components to the designated stockpile location.

E. Separate items designated for salvage/recycling from those designated for disposal.

3.07 DISPOSAL OF DEMOLISHED UTILITY COMPONENTS

A. Comply with Section 02405.

3.08 AS-BUILT RECORD SURVEYS

A. Where utilities have been altered, perform surveys to document the horizontal and vertical position of the altered utility.

B. Where utilities are exposed, perform surveys to document the horizontal and vertical position of the exposed utility.

3.09 QUALITY CONTROL

A. Comply with all permit conditions.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 23, Abandon Storm Catch Basins and Drain Pipes, will be made by the lump sum (LS).

4.02 PAYMENT

A. Payment for Bid Item 23, Abandon Storm Catch Basins and Drain Pipes, includes all costs to obtain permits from utility Owner, excavate soil to expose utility, cut, remove, cap and backfill abandoned utility as described in Sections 02223, 02332, 02339, and 02337.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removing all fuels, sludges, solids, oil products, residues and water from pipelines within the Tank Farm Affected Area (TFAA).

B. Cutting pipelines at the limits of the Tank Farm Area (TFA), if pipelines enter the TFA.

C. Grouting cleaned pipelines outside the limits of the TFA.

D. Capping grouted pipelines outside the limits of the TFA.

E. Excavating soil to expose the cleaned pipelines inside the TFA limits.

F. Removing and decontaminating pipelines inside the TFA limits.

G. Loading, hauling, stockpiling, and recycling/disposing of decontaminated pipelines from inside the TFA limits.

1.02 RELATED SECTIONS

A. Section 02085 - Asbestos Abatement

B. Section 02211 – Decontamination Procedures.

C. Section 02222 – Tank Farm Area Preparation.

D. Section 02270 – Construction Stormwater Management.

E. Section 02332 – Soil Excavation and Management.

F. Section 02335 – Exploratory Trench Excavation.

G. Section 02339 – Engineered Fill.

H. Section 02405 – Waste Collection Storage Profiling and Disposal.

I. Section 02469 – Cutoff Wall.

J. Section 02629 – Trench Safety and Shoring Systems.

K. Section 02722 – Crushed Base Rock and Base Course.

L. Section 02743 – Asphalt Concrete Pavement.

1.03 REFERENCES

A. Data Gaps Investigation Technical Memorandum Terminal 91 Tank Farm Affected Area Cleanup (PES Environmental and Vista Consultants, July 2012).

B. Historical Site Drawings attached to the Construction Drawings (R016 through R021).

1.04 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Clean (Cleaning): The removal of all products such as fuels, sludges, solids, oil products, residues and water from a pipeline so that no free product remains in the pipeline.

C. Construction Quality Assurance Consultant (CQAC).

D. Decontamination: the process of removing or neutralizing contaminants that have accumulated on personnel, equipment, and demolition debris.

E. Grouting: Filling previously cleaned pipelines with approved cement grout mixture.

F. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

G. Permissible Exposure Limit (PEL): The legal limit in the United States for exposure of an employee to a chemical substance or physical agent. For chemicals, the chemical regulation is usually expressed in parts per million (ppm), or sometimes in milligrams per cubic meter (mg/m3). Units of measure for physical agents such as noise are specific to the agent. Permissible exposure limits are established by the Occupational Safety and Health Administration (OSHA).

H. Pipelines: Formerly active privately-owned pipes that carried a product such as fuel, sludge, oil product, residue or water.

I. Residue: Undesirable (potentially flammable, toxic and/or hazardous) material, including but not limited to, rust, scale, paint scrapings, pyrophoric iron sulfide, etc., removed from the inside of pipelines.

J. Sludge/solid: Undesirable materials that accumulate in fuel pipelines usually consisting of heavy petroleum products, or a mixture of hydrocarbons, residue and water, that may be flammable, hazardous, and/or toxic.

K. Volatile Organic Compound (VOC): An organic compound that has a high vapor pressure at ordinary, room-temperature conditions. The high vapor pressure results from a low boiling point, which causes large numbers of molecules to evaporate or sublimate from the liquid or solid form of the compound and enter the surrounding air.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Pipeline Decommissioning Plan: As part of the Work Plan described in Section 01305, submit procedures for pipeline cleaning, decontamination, and grouting.

1.06 SUBMITTALS DURING CONSTRUCTION

A. Disposal Records: Submit gate receipts for solid and liquid waste generated and disposed at permitted disposal facilities.

B. Submit pipeline decommissioning survey documentation within seven (7) days of completing decommissioning of pipelines.

1.07 REGULATORY REQUIREMENTS

A. Comply with all federal, state and local regulations for the protection of worker safety.

B. Comply with all federal, state and local regulations for prevention of spills, runoff control, environmental abatement and waste disposal in accordance with Sections 02085 and 02405.

C. Obtain all required permits from federal, state, and local regulatory agencies, if any, at least ten (10) days prior to initiating work described in this Section. Immediately notify the Environmental Management Specialist or CQAC and conform to regulatory procedures if suspected hazardous or contaminated materials are encountered.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide all materials, equipment, tools, ancillary equipment and methods required for completing pipeline cleaning, grouting, capping and removal.

B. Any structure fabricated for liquid and/or sludge/solids removal must be designed and stamped by a structural engineer licensed in the State of Washington.

2.02 CEMENT GROUT MIX

A. Consisting of at least 15% Portland cement by volume, mixed to a consistency suitable for pumping.

B. Capable of displacing water and free liquids.

C. Capable of curing in the presence of residual moisture or hydrocarbons.

D. Capable of filling voids to prevent free flow of water or hydrocarbons within the pipe.

E. Does not shrink during curing.

F. Cures to a minimum compressive strength of 50 psi.

2.03 PIPE CAPS

A. Blind flange made of the same material as the pipe being capped.

B. Weldable slip cap made of the same material as the pipe.

C. Threaded screw cap made from the same material as the pipe.

2.04 PRODUCTS BEING REMOVED FROM PIPE LINES

A. Sludge/solid.

B. Residue.

C. Residual gasoline fuel.

D. Residual diesel fuel.

E. Residual heavy fuels (e.g., Bunker C, fuel oil #6)

F. Oil.

G. Water.

PART 3 - EXECUTION

3.01 PREPARATION

A. Outside the TFA, provide, erect and maintain temporary barriers and security devices as necessary as described in Section 01500 - Temporary Facilities and Controls.

B. Inside the TFA establish Secured Zone, Exclusion Zone and Contaminant Reduction Zone, as described in Section 02211

C. Prepare processing area for cleaning, decontaminating and processing pipelines removed inside the TFA as indicated in the Pipeline Decommissioning Plan described in Section 01305.

D. Comply with all environmental, fire prevention and safety regulations, permits or other requirements relating to storage of petroleum products at the site including but not limited to requirements stated in Section 01631 – Hazardous Materials Management Planning and Execution.

E. Schedule activities to assure minimum disruption of the Port's, Port tenant's, and other ongoing operations at Terminal 91.

F. Obtain and comply with the required permit(s) from King County Industrial Waste for management of stormwater in accordance with Section 02270.

3.02 INSPECTION

A. Prior to all work of this section, carefully inspect the work site and the work of all trades and verify that the site is safe and no conflicts exist that will prevent the work from commencing properly.

3.03 SITE ACCESS

A. Do not close or obstruct terminal roadways, sidewalks, or hydrants.

B. Conduct operations with a minimum of interference to Port and tenant access.

C. Provide traffic control and street cleaning services to remove site materials from roadways.

3.04 EXISTING SITE CONDITIONS

A. The locations of pipelines are shown on the Construction Drawings and are based on review of historical construction and as-built drawings provided by the Port dating back to the 1940's when the site was occupied by the Navy, various drawings associated with Port construction and demolition projects, and recently developed as-built drawings prepared by the Port. The historical drawings to establish pipeline locations are included as Reference Drawings in the Construction Drawings. The Construction Drawings also show pipelines that were previously decommissioned during the 2005 Tank Farm Demolition and/or Port Construction activities (Roth Consulting, 2005).

B. The locations and conditions of former fuel pipelines are also identified in the Data Gaps Investigation Technical Memorandum Terminal 91 Tank Farm Affected Area Cleanup (PES Environmental and Vista Consultants, July 2012) including uncertainties related to some of the remaining pipelines. Uncertainties include locations of pipeline terminations, pipeline diameters, number of pipes present in specific pipe runs or corridors, contents of pipes when last used, and whether or not certain pipes have been decommissioned. The available information is presented in the drawings some uncertainties still exist. Review of the historical drawings clarified some of these uncertainties, but not all.

C. It is likely that the actual number and lengths of pipelines that are encountered during the work will vary from the inventory shown on the Construction Drawings, tables and reference drawings. But the inventory provided represents the best

available information about these pipelines, many of which were installed over 60 years ago. The construction contract requires decommissioning of all pipelines discovered during the project.

3.05 EXPOSING PIPELINES

A. Locate buried pipelines designated for decommissioning or for removal.

B. Excavate and manage soil per Section 02332 and demolish overlying structures inside the limits of the TFA per Section 02222 to expose pipelines that require cleaning, grouting, and capping, or cleaning, removal, decontamination and recycling/disposal.

C. Expose both ends of each pipeline segment that is being cleaned and removed or grouted.

D. Do not use any flammable liquids, welding/cutting equipment, or compressed gases to cut and/or remove pipelines and pipeline components.

3.06 PIPELINE CLEANING

A. Remove all fuel liquids, sludges, solids, oil products, residues and water from pipelines shown on the Construction Drawings or otherwise discovered during the work.

B. Start removal at one end of the pipeline or segment of a pipeline working to the opposite end.

C. Conduct removal of fuel liquids, sludges, solids, oil products, residues and water without spreading contaminants.

D. Do not employ a pipe cleaning method that discharges fuel liquids, sludges, solids, oil products, residues and water into the King County stormwater sewer, adjacent soil, or other adjacent stormwater systems.

E. Place fuel liquids, sludges, solids, oil products, residues and water removed from pipelines in secure containers such as drums, tanks, bins, tank cars, etc. and stage them in accordance with the accepted Pipeline Decommissioning Plan.

F. Notify the Engineer if fuel liquids, sludges, solids, oil products, residues or water cannot be removed from identified sections of pipelines.

3.07 PIPELINE GROUTING OUTSIDE LIMITS OF TFA

A. Completely fill and plug all cleaned pipelines located outside the limits of the TFA with cement grout specified in Part 2 of this Section.

B. Pump grout through the entire cleaned portion of the pipe, providing a solid waterproof plug completely bonded to the interior of pipeline walls.

C. Pump grout mixture into the pipelines from the downstream or low end using a grout pump.

D. Measure volume of grout pumped into pipeline and compare with calculated volume of pipeline section. Notify CQAC or Port RE of discrepancies in measured vs. calculated volume.

3.08 PIPELINE CAPPING OUTSIDE LIMITS OF TFA

A. Cap the ends of all cleaned and grouted pipelines with a cap described in Part 2 of this section. Install per manufacturer's instructions.

B. Position cap a minimum of 24 inches below finished grade.

C. Install the cap to prevent soil or liquids from entering the pipeline or grout from exiting the pipeline.

3.09 PIPELINE REMOVAL INSIDE LIMITS OF TFA

A. After cleaning, expose, cut and remove pipelines, valves and other components.

B. Before moving the removed pipeline materials from the TFA, decontaminate the inside and outside surfaces of the pipeline per Section 02211.

C. Load, haul and stockpile decontaminated pipeline materials at the designated stockpile location.

D. Separate items designated for salvage/recycling from those designated for disposal.

3.10 CHARACTERIZING PRODUCTS REMOVED FROM PIPELINES

A. Characterize fuel liquids, sludges, solids, oil products, residues and water removed from pipelines prior to disposal per Section 02405.

3.11 DISPOSAL AND RECYCLING

A. Recycle recoverable fuel liquids and oil products at a licensed and permitted facility approved by the Port per Section 02405.

B. Dispose of fuel liquids, sludges, solids, oil products, residues and water that cannot be recycled. Comply with applicable regulations regarding disposal and Section 02405.

C. Dispose of pipelines that cannot be recycled.

D. Do not dispose of products removed from pipelines in adjoining waterways or in engineered fills.

3.12 BACKFILL

A. Backfill excavations made to expose pipelines per Section 02339.

B. Where required, repair crushed base rock, base course and asphalt per Sections 02722 and 02743.

3.13 QUALITY CONTROL

A. Comply with the accepted HASP.

B. Cease operations immediately if worker or public safety is compromised or suspected of being compromised. Do not resume operations until worker and public safety has been secured.

C. Comply with accepted SPCC Plan.

D. Conduct video inspection of the cleaned pipelines to verify that all free product has been removed per Part 3.14 below.

E. Survey the horizontal and vertical location of each cap installed on a cleaned and grouted pipeline. Provide a description of the location including pipe diameter, pipe type (PVC, HDPE, metal), and product type removed from the pipeline.

3.14 CAMERA VERIFICATION

A. Furnish and operate a video camera to verify that products have been removed from pipelines.

B. Obtain video from a minimum of 10 percent of the pipeline lengths to be left in place, following cleaning with the 10 percent split evenly among the various pipeline diameters.

C. Perform approximately 75 percent of the video work early in the pipeline decommissioning process to verify that the proposed cleaning method meets the requirements of this Section.

D. Notify the CQAC 24 hours in advance of the work so that they may witness the video camera feed.

E. If the video camera feed indicates that the pipelines are not being cleaned as defined in this Section, stop work until a new method has been demonstrated to work.

F. Complete the remaining 25 percent of the video work randomly as the remaining pipelines are cleaned.

3.15 QUALITY ASSURANCE

A. The CQAC will perform observation and testing services on behalf of the Port which may include:

1. Characterization of waste generated during the work.
2. Moisture and density testing of soil, crushed base rock and base course back fill.
3. Density testing of asphalt paving.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 24, Decommission, Clean and Remove TFA Pipelines up to 6-inches Inside Diameter, will be made by the lineal foot (LF) based on the measured length of 6-inch or smaller diameter pipe removed from the TFA.

B. Measurement for Bid Item 25, Decommission, Clean and Remove TFA Pipelines greater than 6-inches Inside Diameter, will be made by the lineal foot (LF) based on the measured length of pipe greater than 6 inches in diameter removed. From the TFA.

C. Measurement for Bid Item 26, Decommission Pipelines In The TFAA up to 6-inch Inside Diameter, will be made by the lineal foot (LF) based on the measured length of cleaning equipment pushed through the exposed ends of the cleaned pipeline.

D. Measurement for Bid Item 27, Decommission Pipelines In The TFAA greater than 6-inch Inside Diameter, will be made by the lineal foot (LF) based on the measured length of cleaning equipment pushed through the exposed ends of the cleaned pipeline.

E. Measurement for Bid Item 28 Camera Verify Cleaned Pipelines will be by the lineal foot (LF) based on the length of cleaned pipeline inspected by camera.

4.02 PAYMENT

A. Payment for Bid Item 24, Decommission, Clean and Remove TFA Pipelines up to 6-inches Inside Diameter includes all costs to expose, cut, clean, remove, load, haul and stockpile pipelines up to 6 inches in inside diameter as shown on the Drawings and as described in Sections 02222, 02224, 02332, and 02405. Also includes costs of on-site stockpiling double-handling and re-loading as described in the accepted Work Plan and also includes onsite management and storage of waste materials generated during decommissioning activities.

B. Payment for Bid Item 25, Decommission, Clean and Remove TFA Pipelines greater than 6-inches Inside Diameter includes all costs to expose, cut, clean, remove, load, haul and stockpile pipelines greater than 6 inches in inside diameter as shown on the Drawings and as described in Sections 02222, 02224, 02332, and 02405. Also includes costs of on-site stockpiling double-handling and re-loading as described in the accepted Work Plan and onsite management and storage of waste materials generated during decommissioning activities.

C. Payment for Measurement for Bid Item 26, Decommission Pipelines In The TFAA up to 6-inch Inside Diameter includes all costs to remove and dispose of asphalt and base rock, and to expose, clean, grout and cap pipelines up to 6 inches in inside diameter as shown on the Drawings and as described in Sections 02224, 02332, and 02405. Also includes cost to backfill excavations and repair base rock and asphalt as described in Sections 02339, 02722 and 02743. and onsite management and storage of waste materials generated during decommissioning activities.

D. Payment for Bid Item 27, Decommission Pipelines In The TFAA greater than 6-inch Inside Diameter includes all costs to remove and dispose of asphalt and base rock, and to expose, clean, grout and cap pipelines greater than 6 inches in inside diameter as shown on the Drawings and as described in Sections 02224, 02332, and 02405. Also includes cost to backfill excavations and repair base rock and asphalt as described in Sections 02339, 02722 and 02743 and onsite management and storage of waste materials generated during decommissioning activities.

E. Payment for transportation and disposal of waste materials generated during decommissioning activities is included in separate bid items.

F. Payment for Bid Item 28 Camera Verify Cleaned Pipelines includes all costs to furnish, operate and report findings of camera verification of pipeline cleaning as shown on the Drawings and as described in Section 02224.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Decommissioning twelve (12) LNAPL monitoring wells (CP_PR-01 through CP_PR-12) and six (6) vapor monitoring probes (VP-1 through VP-6) inside the TFA limits.

B. Decommission one (1) monitoring well (UT_MW39-2) in Coontz Avenue

C. Decommissioning three (3) monitoring wells (PNO_EW01, PNO_MW03, and PNO_MW102) located in the SWMU 30 areas.

D. Protection of existing groundwater monitoring wells and vapor probes shown on the Construction Drawings that are outside the TFA limits and outside the SWMU 30 areas and that are not designated for decommissioning.

1.02 RELATED SECTIONS

A. Section 02222 – Tank Farm Area Preparation.

B. Section 02333 – SWMU 30 Excavation and Backfill.

C. Section 02405 – Waste Collection, Storage Profiling and Disposal.

D. Section 02621 – LNAPL Recovery Trenches.

E. Section 02722 – Crushed Base Rock and Base Course

F. Section 02743 – Asphalt Concrete Pavement.

1.03 REFERENCES

A. Chapter 173-160 WAC, (Minimum Standards for Construction and Maintenance of Wells).

B. Chapter 18.104 RCW (Water Well Construction Act).

1.04 DEFINITIONS AND ACRONYMS

A. Construction Quality Assurance Consultant (CQAC).

1.05 SUBMITTALS FOR REVIEW

A. Submit copies of Notice of Intent Forms to Decommission Wells (start cards) to the CQAC within 24 hours of completing the form.

B. Submit copies of well decommissioning records (well reports) to the CQAC within 24 hours of completing the records.

PART 2 PRODUCTS

2.01 CONCRETE

A. Portland Cement Concrete with a 28-day compressive strength of 3,000 psi.

2.02 BENTONITE:

A. Premium grade, natural, untreated, sodium-cation bentonite, conforming to the requirements of API Specification 13-A, with a minimum yield of 90 barrels per ton when tested in accordance with API RP 13B.

B. Enviroplug® (medium, coarse, tablets, or grout) supplied by Wyoming Bentonite (Wyo-Ben) of Billings, Montana, or approved equal.

PART 3 - EXECUTION

3.01 PROTECTION OF MONITORING WELLS AND VAPOR PROBES

A. Protect existing monitoring wells and vapor probes during construction activities. If damage or contamination occurs, repair to original condition.

B. If damaged monitoring wells or vapor probes cannot be repaired, or if foreign contaminants are introduced into the wells, then decommission and replace at Contractor's expense.

C. Wellhead Protection: Maintain a minimum undisturbed one (1) foot radius around wellheads, or submit alternate protection plan for approval.

3.02 NOTIFICATIONS AND RECORD KEEPING

A. Notify CQAC five (5) working days prior to monitoring well and vapor probe decommissioning.

B. Notify Ecology of intent to decommission a well at least seventy-two hours before starting work. Use Ecology notification forms.

C. Report the decommissioning of all well work on Well Record forms and submit them to Ecology within thirty (30) days following completion of the work.

3.03 COMPONENTS OF EXISTING WELLS THAT REQUIRE DECOMMISIONING

A. All CP_PR wells are constructed of PVC risers and stainless steel screens (4-inch diameter for CP_PR-01 and CP_PR-02 and 2-inch diameter for CP_PR-03 through CP_PR-13).

B. The six vapor probes (VP-1 through VP-6) are constructed of 1-inch PVC.

C. Monitoring well UT_MW39-2 is constructed of 2-inch PVC.

D. Monitoring well PNO_MW-03 is constructed of 2-inch PVC.

E. Monitoring well PNO_MW102 is constructed of 4-inch PVC.

F. Product recovery well PNO_EW-01 includes a 6-inch diameter casing. The screen and casing material is undocumented.

G. The well depths are as follows:

H. CP_PR-01 through CP_PR-13: 13 ft.

I. VP-1 through VP-6: 5 ft.

J. UT_MW39-3: 15 ft.

K. PNO_EW01: 25 ft.

L. PNO_MW03 and PNO_MW102: 17 ft.

3.04 WELL DECOMMISSIONING

A. Decommission monitoring wells and vapor probes in accordance with the Construction Drawings or as approved by the Port and in accordance with chapter 173-160 WAC.

B. Use water well Contractor licensed in the State of Washington to perform all well decommissioning.

C. Decommission monitoring wells and vapor probes located within areas of proposed excavation prior to performing the excavation.

D. Decommission as follows::

1. Remove the surface casing and surface seal, and overdrill to a depth sufficient to be able to pull the well casing (riser and screen) from the ground.
2. Pull the well casing from the ground, and overdrill to the completed depth of the well using a hollow stem auger.
   a. 1- and 2-inch diameter wells: nominal 4-inch inside diameter auger.
   b. 4-inch wells: nominal 6-inch inside diameter auger.
   c. 6-inch wells: nominal 8-inch inside diameter auger.
3. Backfill the boring with bentonite chips, bentonite pellets, or bentonite slurry as the auger is removed from the ground, keeping the bentonite level inside the bottom auger as the augers are removed.
4. Bring the bentonite to within 1 foot of the ground surface.
5. UT_MW39-2: Backfill boring with concrete and level to match existing pavement.

3.05 WASTE DISPOSAL

A. Treat and dispose of all waste materials generated from the decommissioning of monitoring wells and vapor probes per Section 02405.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 29, Decommission Groundwater Monitoring Wells and Vapor Probes will be made on a per Each Well (EA) basis.

4.02 PAYMENT

A. Payment for Bid Item 29, Decommission Groundwater Monitoring Wells includes all costs to decommission groundwater monitoring wells and vapor extraction wells as shown on the Drawings and as described in Sections 02222, and 02227.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Crushing, screening, and stockpiling asphalt and concrete demolished and removed during TFA Preparation, during pipeline decommissioning, during SWMU 30 excavation, and during LNAPL recovery trench work.

1.02 RELATED SECTIONS

A. Section 02222 – Tank Farm Area Preparation.

B. Section 02224 – Pipeline Decommissioning

C. Section 02333 – SWMU 30 Excavation and Backfill

D. Section 02339 – Engineered Fill.

E. Section 02405 – Waste Collection Storage Profiling and Disposal.

F. Section 02621 – LNAPL Recovery Trenches.

1.03 REFERENCES

A. ASTM C-136 - Sieve Analyses of Fine and Course Aggregates.

1.04 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Construction Quality Assurance Consultant (CQAC).

C. Contaminated asphalt and concrete: Concrete or asphalt that has contaminated soil and/or free oily products adhering to the surface that can be removed with pressure washing. Contamination does not include staining that occurred from products that are no longer in contact with the asphalt or concrete.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED.

A. Stockpile Plan: Submit a work plan for cleaning, crushing, and stockpiling concrete and asphalt prior to Notice to Proceed. Prepare a plan having the contents summarized in Section 01305.

PART 2 PRODUCTS

2.01 PRODUCTS HANDLED UNDER THIS SECTION

A. Asphalt demolished within the limits of the AOC, including during installation of LNAPL recovery trenches.

B. Concrete foundations, footings, slabs, or other structures demolished within the limits of the AOC.

C. Asphalt concrete demolished and removed from SWMU 30.

D. Asphalt concrete demolished and removed outside the limits of the AOC to find pipelines that require decommissioning.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that systems to contain wash water are in place and ready to receive wash water generated during the cleaning of contaminated asphalt and concrete per Section 02211.

B. Verify stormwater BMPs are in place per Section 02770.

C. Establish stockpile locations for crushed and screened asphalt and concrete as follows:

D. Asphalt or concrete removed from outside the AOC can be stockpiled at appropriate locations within or outside of the AOC.

E. Existing surface asphalt inside the AOC can be stockpiled at appropriate locations within or outside of the AOC.

F. Concrete removed from within the AOC must remain inside the AOC at all times and be stockpiled and crushed inside the AOC.

3.02 DECONTAMINATING ASPHALT AND CONCRETE

A. Comply with Sections 02211 and 02405.

B. Work with the CQAC to determine which asphalt and concrete requires decontamination.

C. Dispose of collected wash water, liquids, and solids per Section 02405.

3.03 CRUSHING AND SCREENING

A. Mechanically crush or process asphalt and concrete to produce pieces with a maximum size of 1 ½ inches.

B. Screen crushed asphalt and concrete through a 1 ½ -inch screen.

C. Re-crush and re-screen pieces until all pieces pass through the 1 ½ -inch screen.

3.04 STOCKPILING

A. Stockpile crushed and screened asphalt and concrete in an area surrounded by berms that contains runoff water, and prevents run on water from entering the stockpile area.

B. Comply with Section 02337 as it relates to covering, stockpile configurations, and designated areas.

3.05 QUALITY CONTROL

A. Perform gradation tests at a frequency of 1 test per 500 cubic yards of screened product to verify gradation specification is being met.

3.06 QUALITY ASSURANCE

A. The CQAC may perform gradation testing of the crushed and screened asphalt and concrete pieces in accordance with ASTM C-136.

B. Cooperate with CQAC during performance of their work.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 30, Demolish, Process, and Reuse AOC Asphalt Pavement will be made by the ton (TON) based on the weight of processed asphalt passing the 1 ½ -inch diameter screen measured by a belt scale.

B. Measurement for Bid Item 31, Demolish and Remove AOC Asphalt Pavement will be made by the ton (Ton) based on weight tickets from certified scales at the place of offsite asphalt disposal or recycling.

C. Measurement for Bid Item 32, Demolish, Process, and Reuse AOC Concrete will be made by the ton (TON) based on the weight of processed concrete passing the 1 ½ -inch diameter screen measured by a belt scale.

D. Measurement for Bid Item 33, Demolish and Remove AOC Concrete will be made by the ton (TON) based on weight tickets from certified scales at the place of offsite concrete disposal or recycling.

4.02 PAYMENT

A. Payment for Bid Item 30, Demolish. Process, and Reuse AOC Asphalt Pavement includes all costs to cut, remove, clean, crush, screen, stockpile, place, compact, and grade asphalt inside the AOC as shown on the Drawings and as described in Sections 02222, 02228, 02237, 02339, and 02405 and the accepted Work Plan.

B. Payment for Bid Item 31, Demolish and Remove AOC Asphalt Pavement includes all costs to cut, remove, clean, load and haul asphalt from the AOC to a disposal or recycling facility, including all costs to stockpile, double-handle, and re-load as shown on the Drawings and as described in Sections 02222, 02228, 02337, and 02405, and the accepted Work Plan.

C. Payment for Bid Item 32, Demolish, Process, and Reuse AOC Concrete includes all costs to cut, remove, clean, crush, screen, stockpile, place, compact, and grade concrete obtained from inside the AOC as shown on the Drawings and as described in Sections 02222, 02228, 02237, 02339, and 02405 and the accepted Work Plan.

D. Payment for Bid Item 33, Demolish and Remove AOC Concrete includes all costs to cut, remove, clean, load and haul concrete from the AOC to a disposal or recycling facility, including all costs to stockpile, double-handle, and re-load as shown on the Drawings and as described in Sections 02222, 02228, 02337, and 02405, and the accepted Work Plan.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Planning, installing, inspecting, maintaining, upgrading, and removing temporary Best Management Practices (BMPs) as shown on the Construction Drawings or as required by permit to prevent pollution of air and water, and control, respond to, and dispose of eroded sediment and turbid water during the life of the contract.

B. This work applies to all areas associated with contract work including, but not limited to the following areas:

1. The Tank Farm Affected Area (TFAA), which includes the Tank Farm Area (TFA).
2. SWMU 30.
3. Pipeline decommissioning work areas.
4. Areas in and around soil stockpiling and processing areas.
5. Areas in and around haul roads.

1.02 RELATED SECTIONS

A. Section 02211 – Decontamination Procedures.

B. Section 02222 – Tank Farm Area Preparation.

C. Section 02223 – Utility Demolition and Management.

D. Section 02224 – Pipeline Decommissioning.

E. Section 00227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

F. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

G. Section 02332 – Soil Excavation and Management.

H. Section 02333 – SWMU 30 Excavation and Backfill.

I. Section 02335 – Exploratory Trench Excavation.

J. Section 02339 – Engineered Fill.

K. Section 02405 – Waste Collection Storage Profiling and Disposal.

L. Section 02469 – Cutoff Wall.

M. Section 02621 – LNAPL Recovery Trenches.

N. Section 02629 – Trench Safety and Shoring Systems.

O. Section 02630 – Storm Drainage Systems

P. Section 02660 – Concrete Block Gravity Wall System.

Q. Section 02722 – Crushed Base Rock and Base Course.

1.03 REFERENCES

A. Construction Stormwater General Permit (CSWGP). Ecology December, 2010. Project specific permit number to be issued following application for coverage by Contractor.

B. Chapter 173-201 WAC, Water Quality Standards for Surface Waters of the State of Washington.

C. Surface Water Design Manual, King County, Department of Natural Resources and Parks, January 2009.

D. Stormwater Pollution Prevention Manual, King County, Department of Natural Resources and Parks, January 2009.

E. Stormwater Management Manual for the Puget Sound Region, Department of Ecology; 1995 (Current Version).

1.04 DEFINITIONS AND ACRONYMS

A. Erosion and Sediment Control (ESC) Best Management Practices (BMP): These are best management practices intended to prevent erosion and sedimentation, such as mulching, matting, plastic covering, filter fences, sediment traps, and ponds.

B. Certified Erosion and Sediment Control Lead (CESCL). Is a person who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP 160 in the SWMM)

C. Construction Stormwater General Permit (CSWGP).

D. Stormwater Pollution Prevention Plan (SWPPP). The documented plan to implement measures to identify, prevent, control, or treat pollutants in stormwater.

E. Stormwater Management Manual for Western Washington (SWMM).

F. National Pollution Discharge Elimination System (NPDES).

G. Notice of Intent (NOI).

H. Storm Drain System (SDS).

I. Temporary Erosion and Sediment Control (TESC).

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. No later than 60 days prior to beginning construction activities, submit a Notice of Intent (NOI) requesting coverage under the CSWGP.

B. Stormwater Pollution Prevention Plan: Prior to receiving a Notice to Proceed, and before disturbing any part of the site, prepare a Stormwater Pollution Prevention Plan that complies with the requirements of the CSWGP, including Special Condition S9.

1.06 SUBMITTALS FOR REVIEW

A. Submit “cut sheets” for all proposed BMP products.

1.07 ADMINISTRATIVE REQUIREMENTS

A. Provisions of this section apply to the Contractor, subcontractors at all tiers, suppliers and all others who may have access to the work areas by way of the Contractor’s activities.

B. Failure to install, maintain, and/or remove BMPs shown on the Construction Drawings, in the approved SWPPP, and specified herein, or by order of the Engineer; or failure to comply, implement and maintain any provisions and

requirements of this section; or failure to conduct project operations in accordance with Section 02270 will result in the Suspension of Work in accordance with Section 00700, General Conditions, paragraph G-10.04.

C. Contractor is solely responsible for any damages, fines, levies, or judgments incurred as a result of Contractor, subcontractor, or supplier negligence in complying with the requirements of this section.

D. Any damages, fines, levies, or judgments incurred as a result of Contractor, subcontractor, or supplier negligence in complying with the requirements of this section will be deducted from payment due by Contract Modification.

E. Contractor is solely responsible for any schedule impacts from damages, fines, levies, judgments, or Suspension of Work orders incurred as a result of Contractor, subcontractor, or supplier negligence in complying with the requirements of this section. The project schedule will not be changed to accommodate the time lost.

F. Do not perform any work after Notice to Proceed until BMPs are in place per the SWPPP and Construction Drawings.

1.08 AUTHORITY OF ENGINEER

A. The Engineer has the authority to order the Contractor to provide immediate permanent or temporary pollution control measures to minimize contamination of adjacent watercourses, or other areas of water impoundment.

B. In the event that 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 are ordered by the Engineer, such work shall be performed by the Contractor at his/her own expense.

C. 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 situation is rectified.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide products used to construct selected BMPs that are suitable for intended use.

2.02 OIL ABSORBENT PADS

A. Provide oil absorbent pads made of white, 100% polypropylene fabric that absorbs oil-based fluids and repels water-based fluids. Provide pads that are a minimum of 15x19 inches in size and absorb no less than 50 ounces of oil-based liquids.

2.03 SILT FENCE

A. Provide geotextile meeting the requirements of the Washington State Department of Ecology “Stormwater Management Manual for Western Washington”, Current Version.

B. Provide geotextile material backed by 2x4-inch wire mesh and attached to steel “T” posts using wire or zip ties.

C. Provide details for dimensions and spacing in the SWPPP.

2.04 STRAW WATTLES

A. Provide wattles consistent with BMP C235 of the SWMM that consist of cylinders of biodegradable plant material, such as straw, coir, or compost, encased within biodegradable or photodegradable netting.

B. Size: a minimum of 5 inches in diameter, unless otherwise specified.

C. Encasing material: clean; evenly woven; free of debris or any contaminating material, such as preservative; and free of cuts, tears, or damage.

2.05 EROSION CONTROL BLANKET

A. Provide erosion control blanket meeting the requirements BMP C122 of the SWMM.

2.06 CATCH BASIN PROTECTION

A. Catch basin inserts designed and installed for the purpose of preventing sediment from entering the storm system.

B. Product requirements:

1. Be constructed of non-woven geotextile fabric with sewn seams.

2. Contain a built-in lifting strap.

3. Have a built-in, high flow bypass.

4. Be sized such that all water draining to the catch basin flows into the insert and does not flow directly into the storm system

C. Catch basin covers: 30 mil PVC liner material.

2.07 STABILIZED CONSTRUCTION ENTRANCE

A. Constructed of stabilization geotextile fabric consistent with BMP C105 of the SWMM.

B. Geotextile: per Section 02771.

C. Quarry spalls: per Section 9-13 of WSDOT Standard Specifications

2.08 WHEEL WASH

A. Provide a wheel wash system designed consistent with BMP 106 of the SWMM so that truck tires and wheels, undercarriage, suspensions, tracks, loader buckets, excavator buckets, and other parts of the vehicles having contact with site soil and groundwater are cleaned before leaving the site.

2.09 PLASTIC SHEETING

A. Provide plastic sheeting consistent with BMP C123 of the SWMM that is clear, reinforced, and a minimum of 10-mil thick where placed under stockpiles, and 6-mil thick where placed over stockpiles.

B. Provide sandbags or other Engineer-approved ballast to secure the plastic sheeting in place.

C. Black plastic may be used to cover stockpiles.

PART 3 - EXECUTION

3.01 GENERAL

A. Install, inspect, maintain, remove, revise, and repair the BMPs during the life of the contract as needed to keep in compliance with project requirements.

B. Implement BMPs shown on the Construction Drawings and described in the SWPPP in conjunction with all construction activities, and in such a manner as to ensure that sediment laden water does not enter Elliott Bay or adjacent properties, or violate applicable standards.

C. TESC facilities shown on the Construction Drawings are the minimum requirements for anticipated site conditions. During the construction period, upgrade these TESC facilities (e.g. additional sumps, addition of ditches and silt fences, etc.) as needed to maintain site conditions.

D. Provide and maintain temporary sedimentation collection facilities to ensure that sediment-laden water does not enter the natural or public drainage system. As construction progresses and unexpected conditions occur, more siltation water quality facilities may be required to ensure complete siltation control of the project. Therefore, during the course of construction, address any new conditions that may be created and provide additional facilities and BMP's that may be needed to protect the site and adjacent properties.

E. Immediately stabilize with plastic covering any areas of exposed soils that will not be disturbed for two days during the wet season (October 1 to April 30) or seven days during the dry season (May 1 to September 30).

F. Refer to the City of Seattle director's rule 6-93, best management practices in the SWMM Volume II, and all other applicable regulations to accomplish control of potentially hazardous pollutants and sediments.

G. Pass all drainage water from disturbed areas through a sediment trap or other appropriate sediment removal BMP before collecting the water for treatment. Establish sediment controls intended to trap sediment on site before other land disturbing activities take place.

H. Do not allow untreated water that has contacted exposed contaminated or potentially contaminated site soil to leave the site.

I. Minimize erosion from slopes. Design and construct cut and fill slopes in a manner that will minimize erosion. Divert stormwater run-on away from slopes and undisturbed areas.

J. Prevent on-site erosion by stabilizing all exposed and un-worked soils, including stockpiles. Cover stockpiles if rain events are possible, during precipitation events, and during non-working hours. Stabilize soil stockpiles from erosion. Protect with sediment trapping measures and locate away from storm drain inlets, waterways, and drainage channels. Cover non-stockpiled soils from October 1 to April 30. Do not allow soils to remain exposed and un-worked for more than two days. For non-stockpiled soils, from May 1 to September 30, do not allow soils to remain exposed for more than seven days. Stabilize soils at the end of the shift. Before the completion of the project, permanently stabilize all exposed soils that have been disturbed during construction.

K. Perform other work generally shown on the Construction Drawings to implement erosion and sediment control.

L. Facilitate, participate in, and implement directed corrective actions resulting from inspections conducted by others including federal, state, and local agencies, and Port employees/consultants. In the event of conflict between these requirements and pollution control laws, rules, or regulations of other federal, state, or local agencies, follow the more stringent laws, rules, or regulations.

M. Do not allow discharge water volume, velocities or peak flows of stormwater to increase above background conditions.

3.02 EROSION AND SEDIMENT CONTROL PERSONNEL

A. Designate one employee as the responsible representative in charge of erosion and sedimentation control who is responsible for ensuring compliance with all requirements of this section.

B. By NTP, assure that the CESCL has successfully completed the “Storm Water: Construction Best Management Practices (BMPs) Field Training” course offered by the Associated General Contractors Education Foundation (206 284-4500), or other course approved by Ecology.

C. Assure that the CESCL has authority to act on behalf of the Contractor and is available, on call, 24-hours per day throughout the period of construction.

D. Duties and responsibilities of the CESCL include:

1. Maintaining permit file on site at all times, which includes the ESCP, the SWPPP, the site-specific CSWGP, and Construction Drawings.

2. Directing BMP installation, inspection, maintenance, modification, and removal.

3. Directing treatment system operations, testing, discharge, and recordkeeping.

4. Being available 24 hours per day, 7 days per week by telephone.

5. Updating the SWPPP.

6. Keeping daily logs.

7. Preparing and submitting for approval the SWPPP.

8. Identifying points where stormwater runoff, if any, potentially leaves the site, is collected in a surface water conveyance system (i.e., road ditch, storm sewer), and enters receiving waters of the State.

9. Inspecting SWPPP requirements, including BMPs as required to ensure adequacy; and facilitate, participate in, and take corrective actions resulting from inspections performed by outside agencies, Port employees, and Port consultants

3.03 SCHEDULE

A. Include erosion control work activities consistent with the SWPPP in the Project Schedule.

3.04 BMP MAINTENANCE

A. Maintain BMPs for the life of the project.

B. Maintain BMPs during all suspensions of work and all non- work periods.

C. Maintain and repair BMPs as needed to assure continued performance of their intended function in accordance with the SWMM.

D. Permanently stabilize sediments collected during BMP maintenance, and keep them away from natural and constructed stormwater conveyances.

E. If sediment is transported onto any roadway surface, clean thoroughly at the end of each day, or sooner if deemed necessary by the Engineer.

F. Remove sediment from roads by a method approved by the Port and transport to a controlled sediment disposal area. Perform street washing after sediment is removed.

3.05 BMP INSPECTION

A. Inspect the TESC facilities daily and maintain as necessary, or as directed by the Port to ensure their continued functioning and effectiveness.

B. Inspect BMPs weekly and after any measurable rain event (0.25 inch or greater) between April 1st and September 31st.

C. Inspect BMPs daily and after any measurable rain event (0.5 inch or greater) between October 1st and March 31st.

D. Identify required repairs or improvements, and implement improvements within 24 hours.

E. Observe runoff leaving the site during storms, and check for turbid water.

F. Implement additional BMPs, if needed, to address site-specific erosion control.

G. Inspect streets surrounding work area for sediment being tracked away from work areas by vehicles.

H. Inspect for dust during dry periods.

I. If water sheet flows from the site, identify the point at which it becomes concentrated in a collection system.

J. Do not allow more than one foot of sediment to accumulate within a catch basin.

K. Clean all catch basins and conveyance lines prior to paving.

L. Do not flush sediment laden water into the downstream system.

3.06 RECORD KEEPING

A. Comply with TESC requirements and SWPPP conditions, including the requirements of Special Condition S5 of the CSWGP.

B. Prepare and retain reports summarizing the scope and frequency of inspections, the personnel conducting the inspection, the date(s) of the inspection, major observations relating to the implementation of the SWPPP, and actions taken as a result of these inspections.

3.07 EMERGENCY RESPONSE

A. Take appropriate immediate action to protect the work area, private property, and the environment to prevent pollution of state waters. Appropriate action includes but is not limited to the following:

1. Hazard Assessment: Assess the source, extent, and quantity of the discharge.
2. Securement and Personal Protection: If the discharge cannot be safely and effectively controlled, then immediately notify the CESCL and the Port. If the discharge can be safely and effectively controlled, proceed immediately with action to protect the work area, property, and the environment.
3. Containment and Elimination of Source: Contain the discharge with silt fence, pipes, sand bags or a soil berm down slope from the affected area. Eliminate the source of the discharge by pumping turbid water to a controlled area, building berms, piping clean water away from the area or other means necessary.
4. Cleanup: When containment is complete, chemically or otherwise treat turbid water, remove sediment and stabilize on site.
5. Notification: Report all discharges immediately to the Port or its designated representative.

3.08 SAW CUTTING

A. Comply with the requirements of BMPC152 of the SWMM and collect saw cut slurry, dust, and cuttings during cutting operations using a vacuum or similar device.

B. Remove saw cut slurry, dust, and cuttings that remain on permanent concrete or asphalt at the end of each working day.

C. Do not allow saw cut slurry, dust, and cuttings to enter a storm drain system (SDS), or any other natural or constructed drainage conveyance.

D. Dispose of collected slurry, dust and cuttings off site at a permitted solid waste facility in manner that does not violate groundwater or surface water quality standards.

3.09 SOIL AND CONSTRUCTION DEBRIS STOCKPILES

A. Stockpile soils and construction debris, including broken concrete and asphalt paving on site per Section 02337 and accepted Stockpile Plan.

B. Cover stockpiles with 6 mil minimum thick plastic and place ballast over the plastic.

C. Place materials stockpiled on pavement over 10 mil minimum thick plastic and extend the plastic over perimeter berms to provide containment on the plastic.

D. Direct clean stormwater runoff from the plastic covering away from bare soil using pipes, sandbags, or other temporary diversion devices.

3.10 CONSTRUCTION ROADS, ENTRANCES, AND EXITS

A. Comply with “Section 01500-Temporary Facilities and Controls” and BMP C105 (stabilized construction entrance/exit) and BMP C107 (construction road/parking area stabilization) from the SWMM.

B. Inspect all trucks and equipment for mud and debris before they leave a work area in accordance with Section 02211.

C. Sweep or shovel mud and debris to remove from pavement and transport to a controlled sediment disposal area.

D. Wash concrete or asphalt pavement with water only after sediment has been removed by sweeping and shoveling.

E. Prevent any wash water from draining into the SDS or any other natural or constructed stormwater conveyance.

F. Do not permit any construction traffic to track soil off site.

G. Maintain an inspection activity to quickly identify any potential material tracked off the site.

H. In the event that site soil is tracked onto surrounding roadways, clean thoroughly immediately upon discovery including but not limited to adjacent ditches/drainages that may have become contaminated by the activity.

I. Complete this work at no additional cost to the contract (contractor will be responsible for any fines imposed as a result of soil tracked off site).

J. Remove any spilled soil from the road by a method approved by the Port.

K. Place collected soils in the soil stockpiling area and manage for disposal per Section 02405.

3.11 STORM DRAIN INLET PROTECTION

A. Comply with BMP C220 of the SWMM.

B. Protect all catch basins within the project limits with approved catch basin inserts.

C. Protect all catch basins outside the project limits but within the project drainage basin with approved catch basin inserts.

3.12 SILT FENCE

A. Construct silt fence at the locations identified in the approved SWPPP, or otherwise directed by the Engineer.

B. Attach geotextile to the up-slope side of the posts, and the wire mesh using staples, wire rings, or in accordance to the manufacturer’s recommendation.

C. Where seams are required to join two sections of fence material, tape the seams together, with the geotextile wrapped three times around a 2” steel post and the post driven into the ground.

D. Repair all rips, tears, holes, and other damage to silt fences within 24 hours of locating the damage.

3.13 EROSION CONTROL BLANKET

A. Install erosion control blanket in ditches and swales per BMP C122 of the SWMM and WSDOT Standard Plan I-60.20-00 "Erosion Control Blanket Placement in Channel".

B. Install erosion control blanket on slopes per WSDOT Standard Plan I-60.10-00 "Erosion Control Blanket Placement on Slope.”

3.14 CONCRETE TRUCK AND EQUIPMENT WASHING

A. Comply with BMP C151 (concrete handling) and C154 (concrete washout area) from the SWMM.

B. Do not flush concrete by-products from concrete trucks near or into storm drainage system. Concrete truck area shall be approved by the Port. Re-clean or relay downstream storm drainage system if required, as determined by the Port.

C. Wash concrete truck chutes out only into formed areas awaiting concrete pours or asphalt paving

D. Return concrete remaining in the truck to the originating batch plant for recycling.

E. Blow concrete remaining in the pump back into the concrete truck so it can be returned to the batch plant.

F. Wash hand tools including, but not limited to, screeds, shovels, rakes, floats, and trowels into formed areas awaiting concrete pours or asphalt paving.

G. Wash equipment that cannot be easily moved, such as concrete pavers, in areas that do not directly drain to natural or constructed stormwater conveyances.

H. When no formed areas are available, transfer wash water and leftover product into a lined container.

I. Dispose contained concrete off site at a permitted solid waste facility in manner that does not violate groundwater or surface water quality standards.

3.15 STORMWATER TREATMENT

A. Stormwater contacting exposed soils, especially in the TFA, has the potential of becoming contaminated with site-related contamination associated with historical operations at the site. Potential contaminants include, but are not limited to, petroleum hydrocarbons (i.e., gasoline, diesel, oil, and related constituents), volatile organic compounds (e.g., toluene, tetrachloroethene), and polychlorinated biphenyls (PCBs).

B. All runoff that has contacted exposed contaminated or potentially contaminated site soil must be collected and treated prior to leaving the site or be collected and transported to an approved off-site facility for discharge.

C. The need for and design of the treatment facilities must be coordinated with the activities and construction sequencing described in the Contractors Project Work Plan submitted per Section 1305. Considerations include:

1. The amount of soil to be exposed at any one time.
2. Stockpile size and locations.
3. Potential for infiltration of stormwater within work areas.
4. Potential for discharge of contaminated stormwater runoff to the sanitary sewer via the construction water treatment system (see Section 02405).

D. Treatment facilities and systems need to comply with the following BMPS from the SWMM:

1. BMP C250: Construction Stormwater Chemical Treatment
2. BMP C251: Construction Stormwater Filtration

3. BMP C252: High pH neutralization using CO2
4. pH control for high pH water
5. Other treatment requirements and technologies contained in Volume V – Runoff Treatment BMPs of the SWMM.

3.16 CONSTRUCTION WATER

A. Manage all site-generated soil stockpile drainage, decontamination fluids, and water pumped from excavations in accordance with Section 02405, Waste Collection Storage Profiling and Disposal.

3.17 OIL BOOMS

A. Deploy oil boom protection across short fill impoundment, in a north-south direction, prior to initiating work in the north SMWU 30 Area.

B. Inspect the surface of the short fill impoundment and the oil boom weekly for signs of petroleum seeping from SWMU 30, and daily during excavation activities.

3.18 BMP REMOVAL

A. Before project closeout, remove all sediment from temporary and permanent drainage conveyances, ditches, culverts, and channels.

B. Permanently stabilize sediments collected during BMP maintenance, and keep them away from natural and constructed stormwater conveyances.

C. Remove all temporary BMPs following permanent stabilization.

D. Permanently stabilize areas disturbed during removal of temporary BMPs.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 34 Manage Construction Stormwater In and Around the AOC will be made by the lump (LS).

B. Measurement for Bid Item 35 Treat and Discharge Construction Water to Sanitary Sewer will be made by the gallon (GAL).

C. Measurement for Bid Item 36, Manage Construction Stormwater in Pipeline Decommissioning Areas Outside the AOC, will be made by the lump (LS).

D. Measurement for Bid Item 37, Manage Construction Stormwater in and Around Stockpiling Areas Outside the AOC, will be made by the lump (LS).

4.02 PAYMENT

A. Payment for Bid Item 34, Manage Construction Stormwater In and Around the AOC, includes all costs to furnish products, equipment and labor to manage stormwater inside the TFA as described in the accepted Work Plan as shown on the Drawings and as described in Sections 02270 and 02405.

B. Payment for Bid Item 35 Treat and Discharge Construction Water to Sanitary Sewer, includes all costs for consumable products, utilities, labor, and disposal fees associated with the treatment and discharge of construction water to the sanitary sewer.

C. Payment for Bid Item 36, Manage Construction Stormwater in Pipeline Decommissioning Areas Outside the AOC, includes all costs to furnish products, equipment and labor to manage stormwater in and around pipeline decommissioning sites outside the TFA as described in the accepted Work Plan as shown on the Drawings and as described in Sections 02270 and 02405.

D. Payment for Bid Item 37, Manage Construction Stormwater in and Around Stockpiling Areas Outside the AOC, includes all costs to furnish products, equipment and labor to manage stormwater in and around stockpile areas outside the TFA as described in the accepted Work Plan as shown on the Drawings and as described in Sections 02270 and 02405.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating, loading, hauling and stockpiling of any soil that is not designated as highly contaminated, which was historically placed below existing asphalt and over existing concrete slabs, footings, and tank bases in the Area of Contamination (AOC).

B. Excavating, loading, hauling and stockpiling of other soil that is not designated as highly contaminated that is generated by the following activities in the AOC.

1. Excavating the cutoff wall exploratory trench.
2. Exposing pipelines for decommissioning.
3. Exposing utilities.
4. Soil excavation associated with LNAPL recovery trenches.
5. Excavating soil to install new stormwater management systems.
6. Excavating soil contained in abandoned oil water separators and stormwater pumping vaults

C. Excavating, loading and stockpiling highly contaminated soil generated in the AOC.

D. Excavating, loading, hauling and stockpiling of unanticipated highly contaminated soil that may be encountered in the following areas:

1. Exposing pipelines for cleaning outside the AOC.
2. Exposing utilities outside the AOC.

1.02 RELATED SECTIONS

A. Section 02211 – Decontamination Procedures.

B. Section 02222 – Tank Farm Preparation.

C. Section 02223 – Utility Demolition and Management.

D. Section 02224 – Pipeline Decommissioning.

E. Section 00227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

F. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

G. Section 02270 – Construction Stormwater Management.

H. Section 02333 – SWMU 30 Excavation and Backfill.

I. Section 02335 – Exploratory Trench Excavation.

J. Section 02339 – Engineered Fill

K. Section 02405 – Waste Collection Storage Profiling and Disposal.

L. Section 02621 – LNAPL Recovery Trenches.

M. Section 02629 – Trench Safety and Shoring Systems.

N. Section 02630 – Storm Drainage Systems.

O. Section 02722 – Crushed Base Rock and Base Course.

P. Section 02743 – Asphalt Concrete Pavement.

1.03 REFERENCES

A. OSHA Technical Manual, Section V, Chapter 2, Excavations: Hazard Recognition in Trenching and Shoring.

1.04 DEFINITIONS AND ACRONYMS

A. ACM: Asbestos containing material.

B. Area of Contamination (AOC) – The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

C. Construction Quality Assurance Consultant (CQAC).

D. Contamination Reduction Zone (CRZ): The transition area between the Exclusion Zone and the Secured Zone that is used for personnel and equipment decontamination, and storage of material that is not yet verified as clean.

E. Dangerous wastes: Solid wastes designated in WAC 173-303-070 through 173-303-100 as dangerous, or extremely hazardous or mixed waste.

F. Exclusion Zone: The contaminated area with controlled access due to a potential threat to human health.

G. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

H. Light Non-Aqueous Phase Liquid (LNAPL): A LNAPL is one of a group of organic substances that are relatively insoluble in water and are less dense than water. LNAPLs, such as oil, tend to spread across the surface of the water table, forming a layer on top of the water table.

I. Port's Environmental Management Specialist: Port employee/consultant who is responsible for oversight of environmental management activities as part of the Port's construction projects. Provides review of construction plans and specifications, background environmental information, and Contractor and consultant work plans; and provides oversight of the Field Environmental Consultants. Assists the Port's Site Project Manager in selection of remedial options.

J. Seasonal Water Table: Seasonal high and low water tables defined in the Remedial Investigation Summary Report for the Terminal 91 Tank Farm Site in Seattle, Washington (RI Summary Report; Roth Consulting, 2007).

K. Secured Zone: The site area enclosed by a perimeter fence erected during site security activities that is secured and locked during non-work hours

L. Tank Farm Area (TFA).

M. Tank Farm Lease Parcel (TFLP).

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Submit a Stockpile Plan as part of the Project Work Plan. Comply with Section 01305.

B. Submit a Sheeting and Shoring Plan prior to notice to proceed per Section 01305.

1.06 EXISTING SITE CONDITIONS

A. In 2005, as an independent interim remedial action, the Port demolished above ground portions of the former tank farm in the TFLP leaving the majority of the subsurface structures in place. The interim action included:

1. Demolition of aboveground fuel storage tanks, concrete containment walls; buildings; gangways and catwalks; above ground pipelines and other structures;
2. Purging three underground fuel transmission lines that run from the tank farm to the fuel riser station on Pier 90;
3. Cleaning of underground fuel piping in the tank farm; and
4. Demolishing exposed pipelines and valves in four underground vaults and in the fuel riser station at Pier 90.

B. The interim action left the tank bases (with the exception of those in the Small Yard) and the below ground portions of the tank or concrete containment wall foundations and pipe alleys in place. Other activities included removal and disposal of ACM and removal and disposal of petroleum contaminated soil from pipe chases. Once the demolition activities were completed, the TFLP and adjacent previously unpaved areas were backfilled to the current grades with clean soil and the soil was covered with a pavement section consisting of asphalt paving placed over crushed base rock. Based on information from the first phase of the Data Gaps Investigations (PES, 2007), the average thickness of this clean soil fill is approximately 1.25 ft, for a total of approximately 6,250 cy, or 9,400 tons.

C. Based on the available sampling results, a portion of the soil encountered below clean fill and tank bases in the TFA is expected to be identified as highly contaminated soil.

1.07 OTHER EXISTING HIGHLY CONTAMINATED SOIL CONDITIONS

A. It is possible that highly contaminated soil will be encountered during the execution of other work. If this occurs, manage the highly contaminated soil as described in this Section.

PART 2 PRODUCTS

2.01 PRODUCTS BEING EXCAVATED UNDER THIS SECTION

A. Asphalt concrete.

B. Crushed aggregate base rock and base course.

C. Soil that is not designated as highly contaminated.

D. Highly contaminated soil.

PART 3 EXECUTION

3.01 PREPARATION

A. Install stormwater BMPs per Section 02270.

B. Complete removal of designated surface structures, surface materials, existing asphalt and underlying aggregates in the TFA per Section 02222.

C. Complete preparation of stockpile areas for soil and debris that is not designated as highly contaminated.

D. Complete preparation of stockpile areas for soil that is designated as highly contaminated.

E. Locate, identify, and protect utilities and groundwater monitoring wells and vapor probes in the vicinity of the work that are designated to remain.

F. Protect and document the condition of Building M-28.

G. Establish a Secured Zone, CRZ, and Exclusion Zone.

H. Provide for dust control.

I. Establish trucking routes.

J. Perform survey to define limits of work.

3.02 SHORING SYSTEMS

A. Install shoring systems per accepted Sheeting and Shoring Plan and Section 02629, where needed to meet WISHA requirements.

3.03 ASPHALT SECTION REMOVAL

A. Complete asphalt demolition per Sections 02222 and 02228.

3.04 EXCAVATING SOIL THAT IS NOT DESIGNATED AS “HIGHLY CONTAMINATED”

A. The Port’s Environmental Management Specialist, in consultation with Ecology, will determine which soils are designated as highly contaminated soil and which soil is not designated as highly contaminated. Where soil is determined not to be “highly contaminated”, excavate and manage as follows:

1. Excavate existing crushed base rock and base course located beneath existing asphalt but above the surface of the former tank farm; load, haul and stockpile separately from soil debris associated with former tank farm. Stockpile in compliance with the accepted stockpile plan and Section 02337 and use as backfill in the AOC.
2. Stockpiling base rock and base course outside of the AOC is acceptable.
3. Excavate soil in the TFA vertically as required to expose underlying concrete slabs, footings and foundations. Load, haul and stockpile separate from crushed base rock and base course and use as backfill in the portion of the TFA inside of the alignment of the cutoff wall as described in Section 02469 and shown on the Construction Drawings.
4. Soil fill that was placed in 2005 above the former tank farm surface and tank bases, and which is not highly contaminated, can be stockpiled anywhere at the Terminal 91 facility. These materials do not have to stay within the AOC.

5. Soil from inside the AOC that was not placed above tank bases and concrete structures in 2005 must remain inside the AOC at all times.
6. Stockpile in compliance with the accepted stockpile plan and Section 02337.

B. Excavate soil in the LNAPL trenches per Section 02621.

C. Excavate all other soil as shown on the Construction Drawings.

3.05 HIGHLY CONTAMINATED SOIL EXCAVATION IN AOC

A. The Port's Environmental Management Specialist, in consultation with Ecology, will determine which soils are designated as highly contaminated soil and which soils are not designated as highly contaminated.

B. When highly contaminated soil is encountered during the removal of subsurface concrete structures, tank bases, pipelines, and utilities, excavate the highly contaminated soil and place in separate stockpiles.

C. Do not commingle highly contaminated soil with other stockpiled soil and debris.

D. Do not excavate below ground water surface.

E. Load, haul and stockpile highly contaminated soil in a separately designed stockpile area within the AOC.

F. Complete soil profiling per Section 02405 and transport off-site to an approved facility for disposal.

G. Do not use highly contaminated soil as fill or backfill.

3.06 FLOATING LNAPL RECOVERY AND TREATMENT

A. If floating LNPL is encountered, comply with Section 02405.

3.07 EXCAVATION OF UNANTICIPATED HIGHLY CONTAMINATED SOIL

A. If soil is encountered in an un-anticipated area that the contractor suspects may be highly contaminated soil, notify the Port's Environmental Management Specialist and request guidance on handling this material.

B. Excavate unanticipated highly contaminated soil found in areas outside the AOC under the direction of the Port's Environmental Management Specialist or CQAC.

C. Haul highly contaminated soil to the approved stockpile area, or directly to the approved disposal/ treatment facility, depending on the nature of the contamination and the status of the waste characterization profiling.

3.08 PRECAUTIONS

A. Barricade open holes or trenches and other depressions occurring as part of the Work and post warning signs or lights on property adjacent to or with public access.

B. Operate warning lights during hours from dusk to dawn each day that trenches are left open.

C. Use means to control dust.

D. Maintain access to other portions of the Work at all times.

3.09 SHORING OR BRACING

A. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel in accordance with OSHA rules and regulations.

B. Provide shoring in accordance with state and federal requirements and the accepted Sheeting and Shoring Plan.

3.10 TRENCH EXCAVATION FOR UTILITIES AND STORMWATER SYSTEMS

A. If applicable, saw cut existing asphalt pavement where required to begin trenching. Saw cut to the widths indicated on the Construction Drawings or as needed to complete the Work.

B. Remove and manage underlying aggregates as follows:

1. If work occurs within AOC, stockpile aggregates within the AOC and reuse as fill or base course inside the alignment of the cutoff wall per Sections 02339 and 02722.

2. If work occurs outside of the AOC, use aggregates as fill or base course in same excavation from which they were removed.

C. Trench and excavate to the minimum width necessary for proper installation and inspection of the utility, pipe or structure utility, with sides as nearly vertical as possible.

D. Remove water or materials that interfere with Work as approved by the CQAC or Engineer. Handle water per Section 02405.

E. Cut out soft areas of trench bottom in areas where it is not practical to compact in place.

F. Hand trim excavation for bell and spigot pipe joints.

G. Remove loose soil, lumped subsoil, boulders, and rock.

H. Correct areas over excavated by replacing with bedding material and compact to a minimum relative compaction of 85 percent as determined by ASTM D1557.

I. Stockpile excavated highly contaminated soil in accordance with this Section.

J. Stockpile all other designated non-highly contaminated soils adjacent to trench for reuse.

3.11 EXCAVATION FOR EXPOSING PIPELINES

A. If applicable, saw cut existing asphalt pavement where required to begin trenching. Saw cut to the widths indicated on the Construction Drawings or as needed to complete the Work.

B. Remove and manage underlying aggregates as follows:

1. If work occurs within AOC, stockpile aggregates within the AOC and reuse as fill or base course inside the alignment of the cutoff wall per Sections 02339 and 02722.

2. If work occurs outside of the AOC, use aggregates as fill or base course in same excavation from which they were removed.

C. Excavate to the minimum trench width necessary to properly expose, inspect, clean, grout, and cap the pipeline(s).

D. Manage highly contaminated soil in accordance with Section 02405.

E. Stockpile all other designated non-highly contaminated soils adjacent to trench for reuse.

3.12 QUALITY CONTROL

A. Inspect the TESC facilities daily and maintain as necessary, or as directed by the Port, to ensure their continued functioning and effectiveness.

B. Coordinate highly contaminated soil management activities with the Port's Environmental Management Specialist or CQAC.

3.13 QUALITY ASSURANCE

A. The CQAC will observe excavation activities and will consult with the Port's Environmental Management Specialist and Ecology who will make determinations regarding whether or not soil is highly contaminated.

B. The CQAC will observe the Contractor's activities during excavation of highly contaminated soil for disposal or treatment. The CQAC will document in a field log the extent of the area containing highly contaminated soil, the excavation extent, environmental test results, test locations, and the remedial actions taken.

C. The CQAC may perform sampling and grain size analysis of excavated materials as they are stockpiled.

D. Cooperate fully with the CQAC in performance of their sampling and testing.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for soil excavation associated with the following items of work.

1. Exposing pipelines for decommissioning.
2. Exposing utilities.
3. Soil excavation associated with LNAPL recovery trenches.
4. Excavating soil contained in abandoned oil water separators and stormwater pumping vaults.

B. Measurement for Bid Item 38, Management of Non-Highly Contaminated Soil Originating in AOC, will be made by the Lump Sum (LS). This bid item includes replacement and compaction of non-highly contaminated soil per Section 02339.

C. Measurement for Bid Item 39, Excavate, Load, Haul, and Stockpile Highly Contaminated Soil Originating in AOC, will be made by the ton (TON) based on weight tickets from certified scales at the place of offsite disposal. Costs for disposal are covered under other Bid Items.

D. Measurement for Bid Item 40, Remove, Load, Haul, and Stockpile Oil Sand associated with the tank bases, will be made by the ton (TON) based on weight tickets from certified scales at the place of offsite disposal. Costs for disposal are covered under other Bid Items.

E. Measurement for Bid Item 41, Excavate, Load, Haul, and Stockpile Highly Contaminated Soil Originating Outside the AOC, will be made by the ton (TON) based on weight tickets from certified scales at the place of offsite disposal. Costs for disposal are covered under other Bid Items.

4.02 PAYMENT

A. No separate payment will be made for soil excavation associated with the following items of work. Include costs for this work in other bid items:

1. Exposing pipelines for decommissioning.
2. Exposing utilities.
3. Soil excavation associated with LNAPL recovery trenches.
4. Excavating soil contained in abandoned oil water separators and stormwater pumping vaults.

B. Payment for Bid Item 38, Management of Non-Highly Contaminated Soil Originating in AOC includes all costs to manage soil from inside the AOC that is not designated as highly contaminated including excavation, loading, hauling, stockpiling, replacing, grading, and compacting as necessary per the Drawings, as described in Sections 02332, 02337, 02339 and as described in the accepted Work Plan.

C. Payment for Bid Item 39, Excavate, Load, Haul, and Stockpile Highly Contaminated Soil Originating in AOC includes all costs to excavate soil from inside the AOC that is designated as highly contaminated, load, haul and place in stockpiles as shown on the Drawings, as described in Sections 02332, and 02337 and as described in the accepted Work Plan. Payment for disposal is covered under other Bid Items.

D. Payment for Bid Item 40, Excavate, Load, Haul, and Stockpile Oil Sand., includes all costs to remove oil sand from between or under the steel components of the tank bases load, haul and place in stockpiles as shown on the Drawings, as described in Sections 02332, and 02337 and as described in the accepted Work Plan. Payment for disposal is covered under other Bid Items.

E. Payment for Bid Item 41, Excavate, Load, Haul, and Stockpile Highly Contaminated Soil Originating Outside the AOC, includes all costs to excavate soil from outside the AOC that is designated as highly contaminated, load, haul and place in stockpiles as shown on the Drawings, as described in Sections 02332, and 02337 and as described in the accepted Work Plan. Payment for disposal is covered under other Bid Items.

End of Section

NOT IN CONTRACT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating soil from two separate areas, designated as north and south within SMWU 30. A portion of the soil removed from these areas may be designated as highly contaminated.

B. Excavating, loading, hauling, stockpiling and reusing soil from SWMU 30 that is not designated as highly contaminated.

C. Excavating, loading and stockpiling highly contaminated soil generated in SWMU 30.

D. These areas are located on Pier 91 near the short fill area, where LNAPL and elevated concentrations of residual petroleum hydrocarbons have been observed.

1.02 RELATED SECTIONS

A. Section 02211 – Decontamination Procedures.

B. Section 02223 – Utility Demolition and Management.

C. Section 02224 – Pipeline Decommissioning.

D. Section 00227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

E. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

F. Section 02270 – Construction Stormwater Management.

G. Section 02332 – Soil Excavation and Management.

H. Section 02339 – Engineered Fill

I. Section 02405 – Waste Collection Storage Profiling and Disposal.

J. Section 02629 – Trench Safety and Shoring Systems.

K. Section 03310 – Controlled Density Fill.

1.03 REFERENCES

A. OSHA Technical Manual, Section V, Chapter 2, Excavations: Hazard Recognition in Trenching and Shoring.

1.04 DEFINITIONS AND ACRONYMS

A. American Society of Testing Materials (ASTM).

B. Best Management Practice (BMP): Stormwater best management practices are methods designed to control stormwater runoff incorporating sediment control, and soil stabilization, to prevent or reduce non-point source pollution, or to manage the quantity and improve the quality of stormwater runoff in the most cost-effective manner.

C. Construction Quality Assurance Consultant (CQAC).

D. Contamination Reduction Zone (CRZ): The transition area between the Exclusion Zone and the Secured Zone that is used for personnel and equipment decontamination, and storage of material that is not yet verified as clean.

E. Dangerous Wastes: Solid wastes designated in WAC 173-303-070 through 173-303-100 as dangerous, or extremely hazardous or mixed waste.

F. Exclusion Zone: The contaminated area with controlled access due to a potential threat to human health.

G. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

H. Light Non-Aqueous Phase Liquid (LNAPL): A LNAPL is one of a group of organic substances that are relatively insoluble in water and are less dense than water. LNAPLs, such as oil, tend to spread across the surface of the water table, forming a layer on top of the water table.

I. Mean Lower Low Water (MLLW). The mean low groundwater level defined on the SWMU excavation Construction Drawings.

J. Occupational Safety and Health Administration (OSHA): The agency of the federal government that was created to regulate and enforce workplace safety and health.

K. Port's Environmental Management Specialist: Port employee/consultant who is responsible for oversight of environmental management activities as part of the Port's construction projects. Provides review of construction plans and specifications, background environmental information, and Contractor and consultant work plans; and provides oversight of the Field Environmental Consultants. Assists the Port's Site Project Manager in selection of remedial options.

L. Seasonal Water Table: Seasonal high and low water tables defined in the Remedial Investigation Summary Report for the Terminal 91 Tank Farm Site in Seattle, Washington (RI Summary Report; Roth Consulting, 2007).

M. Secured Zone: The site area enclosed by a perimeter fence erected during site security activities that is secured and locked during non-work hours.

N. Smear Zone: Soil located between the seasonal high and seasonal low groundwater elevations.

O. Soil: Soil that is not designated as highly contaminated.

P. Solid Waste Management Unit (SWMU) 30: An area of a historical fuel pipeline break that occurred in 1989 near the north end of Pier 91:

Q. Vadose Zone Soil: Soil in the SMWU 30 excavation area above elevation 10.5 ft MLLW.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Submit a Stockpile Plan as part of the Project Work Plan. Comply with Section 01305.

B. Submit a Traffic Plan as part of the Project Work Plan to detour traffic around the SWMU 30 area.

C. Submit a Sheeting and Shoring Plan prepared by a Washington State P.E. prior to Notice to Proceed per Section 01305.

1.06 SUBMITTALS DURING CONSTRUCTION

A. No less than 14 days prior to scheduled installation, submit a sample of gravel backfill.

B. No less than 14 days prior to scheduled use, submit mix design for controlled density fill per Section 03310.

1.07 EXISTING SITE CONDITIONS

A. SWMU 30 is an area of a historical fuel pipeline break that occurred in 1989 near the north end of Pier 91: An estimated 340 to 1,370 gallons of product were released before the pipeline was repaired. A product recovery system was installed and operated between 1991 and 1994 and recovered a total of 76 gallons of product. Passive product recovery (i.e., bailing) continued after 1994 with limited amounts of recovered product.

B. Historical groundwater level data indicates groundwater elevations fluctuate between approximately 7.4 and 10.5 ft MLLW, or between 7.5 to 10 ft bgs based on the ground surface in the area of SWMU 30 of approximately 18 ft MLLW.

PART 2 PRODUCTS

2.01 PRODUCTS BEING DEMOLISHED OR REMOVED UNDER THIS SECTION

A. Asphalt concrete.

B. Crushed aggregate base rock and base course.

C. Soil that is not designated as highly contaminated.

D. Vadose zone soil. Soil, crushed base rock and base course gravel located above elevation 10.5 ft (high groundwater elevation).

E. Highly contaminated soil (all soil below elevation 10.5 ft and any highly contaminated soil present above elevation 10.5 ft.

F. Impacted water.

G. Creosote treated anchor piles and lagging.

H. Tieback rods.

2.02 BACKFILL PRODUCTS

A. Gravel Fill for Below Water: per Section 02339.

B. Controlled density fill: per Section 03310.

C. Engineered Fill: per Section 02339.

PART 3 EXECUTION

3.01 PREPARATION

A. Assure stormwater BMPs are installed.

B. Deploy oil-boom protection across the short fill impoundment as shown on the Construction Drawings.

C. Complete preparation of stockpile areas for soil that is not designated as highly contaminated.

D. Complete preparation of stockpile areas for soil that is designated as highly contaminated.

E. Locate, identify, and protect utilities and groundwater monitoring wells and vapor probes designated to remain.

F. Provide for dust control.

G. Perform surveys necessary to define excavation limits.

H. Provide for bulkhead protection.

I. Provide for tieback protection.

3.02 SEQUENCE / SCHEDULE OF WORK

A. Perform work described in this section between October 1, and April 18.

B. Complete decommissioning of groundwater monitoring wells and vapor probes per Section 02227 prior to beginning asphalt removal or soil excavation and management.

C. Support and protect in place utilities that cross the excavations as the excavation progresses below these utilities.

3.03 UTILITY PROTECTION

A. Perform a utility locate.

B. Physically locate utilities that cross the excavation by performing excavations to locate them.

C. Furnish and install systems to support these utilities in place while the excavation progresses.

3.04 PROTECTION

A. Protect existing bulkheads designated to remain.

3.05 SHEETING AND SHORING

A. Install sheeting and shoring per accepted shoring plan as the excavation progresses per Section 02629.

3.06 ASPHALT SECTION REMOVAL

A. Complete asphalt demolition per Section 02228.

B. Saw cut asphalt at excavation limits.

C. Remove, load, haul and stockpile crushed base rock and base course per Sections 02332 and 02339.

3.07 CLEAN VADOSE ZONE SOIL EXCAVATION

A. Excavate vadose zone soil (soil above elevation 10.5 ft MLLW) to the lines and grades shown on the Construction Drawings and manage as soil that is not highly contaminated unless directed otherwise by the CQAC. The lines and grades shown on the Construction Drawings are subject to change by the Engineer if the excavation conflicts with north-south running utilities and the western most bulkhead.

B. Load, haul and place excavated vadose zone soil that is highly contaminated in its designated stockpile area.

C. Load, haul and place excavated vadose zone soil that is not highly contaminated in its designated stockpile area, and re-use this soil as engineered fill as described in Section 02339.

3.08 HIGHLY CONTAMINATED SOIL EXCAVATION BELOW WATER TABLE

A. Excavate soil below elevation 10.5 ft to the lines and grades shown on the Construction Drawings and manage as highly contaminated soil per Section 02405.

B. Load, haul and place soil excavated from below the water table that is highly contaminated in its designated stockpile area.

C. Profile and dispose highly contaminated soil per Section 02405.

3.09 WATER MANAGEMENT

A. Manage water that develops in the excavations or drains from soil stockpiles to minimize collection, treatment and off-site disposal per Section 02405.

B. If collection is necessary, collect, haul, treat, and dispose per Section 02405.

3.10 FLOATING LNAPL RECOVERY AND TREATMENT

A. Collect, load, haul and treat floating LNAPL per Section 02405.

3.11 WOOD ANCHOR PILE REMOVAL

A. Remove wood anchor piles, tie-back rods, and associated lagging where indicated on Construction Drawings.

3.12 BACKFILL

A. Backfill excavation with Gravel Fill to the lines and grades shown on the Construction Drawings.

B. Controlled density fill: Place controlled density fills to the lines and grades shown on the Construction Drawings and in accordance with Section 03310.

C. Place all other backfill per Section 02339.

3.13 CRUSHED BASE ROCK, BASE COURSE AND ASPHALT

A. Install crushed base rock to the lines and grades shown on the Construction Drawings and in accordance with Section 02722.

B. Install base course to the lines and grades shown on the Construction Drawings and in accordance with Section 02722.

C. Install asphalt to the lines and grades shown on the Construction Drawings and in accordance with Section 02743.

3.14 QUALITY CONTROL

A. Coordinate Soil Excavation and Management activities with the Port's Environmental Management Specialist, and the CQAC.

B. Comply with the Port's Environmental Management Specialist, and the CQAC regarding their determination as to whether or not soil is highly contaminated or not.

C. Excavation tolerances:

1. Vertical: + or – 0.5 ft.
2. Horizontal: As determined by the CQAC during the work, as but not greater than the plan area shown on the Construction Drawings.

3.15 QUALITY ASSURANCE

A. The Port's Environmental Management Specialist and the CQAC will observe excavation activities and make determinations regarding whether or not soil is clean or impacted.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement . Not In Contract

4.02 PAYMENT

A. Payment. Not In Contract

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Excavating an exploratory trench along the cutoff wall alignment to explore for man-made objects and obstructions.

B. Backfilling the exploratory trench.

C. Sequencing work of this section with the decommissioning and removal of buildings, asphalt, soil, utilities, pipelines, tank bases, and subsurface structures per Section 02222 - Tank Farm Area Site Preparation.

1.02 RELATED SECTIONS

A. Section 02211 – Decontamination Procedures.

B. Section 02222 – Tank Farm Area Preparation.

C. Section 02223 – Utility Demolition and Management.

D. Section 02224 – Pipeline Decommissioning.

E. Section 02270 – Construction Stormwater Management.

F. Section 02332 – Soil Excavation and Management.

G. Section 02339 – Engineered Fill.

H. Section 02405 – Waste Collection Storage Profiling and Disposal

I. Section 02469 – Cutoff Wall.

1.03 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Construction Quality Assurance Consultant (CQAC).

C. Cutoff Wall: A vertical cutoff wall constructed by continuous trenching method that mixes existing soil, imported soil, bentonite, and water to construct a vertical barrier wall that is at least 24 inches wide and has an in-place hydraulic conductivity of no greater than 1 x 10-7 cm/sec.

D. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

E. Pipelines: Formerly active privately owned pipes that carried a product such as fuel, sludge, oil product, residue or water.

F. Soil-bentonite backfill: A homogeneous mixture of specified site soil, off-site soil, bentonite, and water with a minimum of 30 percent by dry weight passing the No. 200 sieve, and a specified minimum percentage, by dry weight of bentonite. .

G. Tank Farm Area (TFA): The area generally within the limits of the TFLP that includes the cutoff wall and within which the cleanup activities will be performed.

H. Tank Farm Affected Area (TFAA).

I. Utility: A utility is defined as a publicly or privately owned and operated system that delivers a service such as water supply, electrical power, or natural gas.

1.04 SUBMITTALS FOR REVIEW

A. As part of the Project Work Plan, per Section 01300, submit proposed equipment and method to be used to excavate and backfill the exploratory trench

PART 2 . - PRODUCTS

2.01 SOIL TYPE BEING EXCAVATED

A. Primarily silty sand with gravel, some of which could be designated as highly contaminated soil.

PART 3 - EXECUTION

3.01 PREPARATION

A. Assure stormwater BMPs are installed per Section 02270.

B. Complete Tank Farm Area preparation, in accordance with Section 02222, including:

1. Decommissioning of existing structures including tank bases, concrete foundations, pits, vaults, and other below grade structures (Section 02222, Tank Farm Area Preparation).

2. Decommissioning of existing utilities. (Section 02223, Utility Demolition and Management).

3. Decommissioning of existing fuel pipelines (Section 02224, Pipeline Decommissioning).

4. Excavating and managing soil, including highly contaminated soil (Section 02332, Soil Excavation and Management).

C. Complete preparation of stockpile areas for soil that is not designated as highly contaminated per Section 02337.

D. Complete preparation of stockpile areas for soil that is designated as highly contaminated per Section 02337.

E. Locate, identify, and protect utilities and groundwater monitoring wells and vapor probes designated to remain.

F. Provide for dust control.

G. Perform surveys necessary to define exploratory trench alignment and establish elevation control along the trench alignment.

3.02 EXECUTION

A. Complete demolition work prior to excavating exploratory trench.

B. Excavate exploratory trench along the cutoff wall center line alignment as shown on the Construction Drawings.

C. Excavate to the minimum depth indicated on the Construction Drawings.

D. Notify Port immediately if any man-made objects are encountered in the exploratory trench. Port will determine appropriate course of action depending on material encountered.

E. Excavate and backfill in segments along the alignment provided segments are overlapped to ensure continuity of excavation.

F. Comply with the Port's Environmental Management Specialist designation of highly contaminated soil generated in the excavation.

G. Manage excavated highly contaminated soil from the exploratory trench in accordance with Section 02332.

H. Stockpile soils that are not designated as highly contaminated within the AOC for reuse as backfill.

I. If manmade objects are not encountered, backfill exploratory trench with excavated soils that are not designated as highly contaminated. Obtain supplemental soil from adjacent to trench if additional soil is needed to complete backfilling.

J. There is no compaction requirement for backfilling the exploratory trench.

3.03 COORDINATION

A. Coordinate with other tank farm area activities.

3.04 QUALITY CONTROL

A. Coordinate excavation activities with the CQAC.

B. Comply with the Port Environmental Management Specialist's designation of highly contaminated soil.

C. Notify the Port immediately if any man-made objects are encountered.

D. Excavation tolerances:

1. Vertical: + or – 0.5 ft.

2. Horizontal: + or – 0.5 ft.

3.05 QUALITY ASSURANCE

A. The CQAC will observe excavation activities and designate highly contaminated soil.

B. Document the location of any highly contaminated soil.

C. Document the location of any man-made objects encountered.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 42, Excavate Cutoff Wall Exploratory Trench, will be by the lineal foot (LF) based on the field measured length of the trench and will not take into account variable depths, or overlap if trench is excavated in sections.

4.02 PAYMENT

A. Payment for Bid Item 42, Excavate Cutoff Wall Exploratory Trench, includes all costs to excavate and backfill the cut off wall exploratory trench as described in the accepted Work Plan, as shown on the Drawings and as described in Section 02335.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Soil, asphalt and concrete stockpiling.

1.02 RELATED SECTIONS

A. Section 02222 – Tank Farm Area Preparation.

B. Section 02223 – Utility Demolition and Management.

C. Section 02224 – Pipeline Decommissioning.

D. Section 02228 – Asphalt and Concrete Cleaning, Crushing, Screening and Stockpiling.

E. Section 02270 – Construction Stormwater Management.

F. Section 02332 – Soil Excavation and Management.

G. Section 02333 – SWMU 30 Excavation and Backfill.

H. Section 02335 – Exploratory Trench Excavation.

I. Section 02722 – Crushed Base Rock and Base Course.

1.03 REFERENCES

A. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft3 (2,700 kN-m/m3)].

B. ASTM D2216 — Standard Test Method for determining water content of soil aggregate mixtures.

C. ASTM D6938 - 08a Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

D. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

E. Engineering Design Report (EDR), Terminal 91 Tank Farm Cleanup (PES Environmental and Vista Consultants, 2013).

1.04 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Base Course: Crushed rock placed under asphalt paving manufactured from ledge rock, talus, gravel or crushed clean concrete.

C. Best Management Practice (BMP): Stormwater best management practices are methods designed to control stormwater runoff incorporating sediment control, and soil stabilization, to prevent or reduce non-point source pollution, or to manage the quantity and improve the quality of stormwater runoff in the most cost-effective manner.

D. Dangerous Waste: any solid waste designated under procedures of WAC 173-303-070 through 100 as dangerous, extremely hazardous or mixed waste. Dangerous wastes are hazardous substances under RCW 70.105D020(10).

E. Engineered Fill: Soil, aggregate, or crushed concrete or asphalt obtained from on□site excavations and sources within the AOC that are not highly contaminated and can be utilized to construct stable engineered earthfills.

F. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Stockpile Plan: As part of the Project Work Plan, submit a drawing and brief written description of proposed procedures for on-site stockpiling, per Section 01305.

B. Include in the Stockpile Plan locations of access routes, containment systems and stormwater BMP's.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.01 PREPARATION

A. Provide dust control per Section 02083.

3.02 STOCKPILING SOIL

A. Stockpile soil materials in piles that have a maximum slope of 2 horizontal to 1 vertical (2H:1V).

B. Segregate the following soil materials into separate stockpiles:

1. Base course aggregate.
2. Soil from SWMU 30 that is not designated as highly contaminated.
3. Soil fill that was placed in 2005 above the former tank farm surface and tank bases, and which is not highly contaminated.
4. Soil from TFA and below the tank bases and concrete structures remaining after demolition activities in 2005.
5. Highly Contaminated Soil.

3.03 STOCKPILING ASPHALT AND CONCRETE

A. Stockpile asphalt and concrete in piles that have a maximum slope of 2 horizontal to 1 vertical (2H:1V).

B. Segregate the following materials from one another into separate stockpiles:

1. Uncrushed asphalt concrete (existing site paving).
2. Crushed asphalt concrete (existing site paving).
3. Uncrushed concrete from within AOC.
4. Crushed concrete from within the AOC.

3.04 STOCKPILE LOCATIONS

A. Coordinate and receive Port approval for all stockpile locations. Stockpile locations will not disrupt tenant activities, restrict access to Port and tenant facilities, nor block routine traffic flow at the Terminal 91 facility without approval by the Port.

B. Stockpiles associated with the SMWU 30 excavations and excavations associated with pipeline decommissioning outside of the AOC can be located at Port approved locations within Terminal 91.

C. Stockpiles for materials removed or excavated from within the AOC are to be located as follows:

1. Existing asphalt paving and underlying base course, and soil fill that was placed in 2005 above the former tank farm surface and tank bases, and which is not highly contaminated, can be stockpiled outside of the AOC at Port approved locations within Terminal 91. These materials do not have to stay within the AOC.

2. Concrete, soil, and other materials not associated with Part 3.04.C.1, demolished within the limits of the AOC must be stockpiled and managed inside the AOC. These materials must remain inside the AOC at all times.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for stockpiling

4.02 PAYMENT

A. No separate payment will be made for stockpiling. Include costs for stockpiling in other Bid Items.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing, loading, hauling, placing, compacting and grading gravel backfill in excavations below groundwater including the SWMU 30 excavation, and excavations completed as part of the TFA site preparation, and excavations made to expose pipelines.

B. Placing, compacting and grading engineered fill in SWMU 30 above the gravel backfill placed below groundwater.

C. Placing, compacting and grading engineered fill above groundwater as part of the TFA site preparation work.

D. Placing, compacting and grading engineered fill in areas excavated as part of pipeline decommissioning.

E. Placing, compacting and grading engineered fill in utility and other trenches.

F. Furnishing, loading, hauling, placing, and compacting select gravel over geogrid along the completed cutoff wall alignment.

G. Placing, compacting and grading engineered fill in Tank Farm Area to final design grades below the final cover, following construction of the cutoff wall.

H. Relative compaction requirements.

I. Field quality assurance and quality control.

J. Monitoring of adjacent structures.

1.02 RELATED SECTIONS

A. Section 02222 – Tank Farm Area Preparation.

B. Section 02223 – Utility Demolition and Management.

C. Section 02224 – Pipeline Decommissioning.

D. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

E. Section 02332 – Soil Excavation and Management.

F. Section 02333 – SMWU 30 Excavation and Backfill.

G. Section 02335 – Exploratory Trench Excavation.

H. Section 02469 – Cutoff Wall.

I. Section 02722 – Crushed Base Rock and Base Course.

J. Section 02743 – Asphalt Concrete Pavement.

1.03 REFERENCES

A. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.

C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft3 (2,700 kN-m/m3)].

D. ASTM D2216 — Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

E. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (United Soil Classification System).

F. ASTM D 4318. Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

G. ASTM D4643 - Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Heating.

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

I. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

J. Engineering Design Report (EDR), Terminal 91 Tank Farm Cleanup (PES Environmental and Vista Consultants, 2013).

1.04 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Construction Quality Assurance Consultant (CQAC).

C. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

D. Imported Engineered Fill: Soil or aggregate imported from off-site sources that is placed to specified densities and moisture contents.

E. On-Site Engineered Fill: Soil, aggregate or crushed concrete or asphalt obtained from on□site excavations and sources within the AOC that is not highly contaminated and that is placed to specified densities and moisture contents.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Submit, as a part of the Project Work Plan per Section 01305, proposed equipment and methods to ensure soil stability in the base of the SWMU 30 excavation during placement of geotextile, and gravel backfill below the water surface.

1.06 SUBMITTALS FOR REVIEW DURING CONSTRUCTION

A. No less than 14 days prior to scheduled installation, submit a 40-pound sample of each proposed gravel backfill product.

B. Provide a 40-pound sample of proposed imported off-site soil or aggregate that will be used to construct engineered fills. Provide sample 14 days prior to scheduled installation.

C. Provide moisture-density (Proctor) curves obtained in accordance with ASTM D1557 for all materials to be used as earthfill a minimum of 7 days prior to scheduled placement.

PART 2 PRODUCTS

2.01 ENGINEERED FILL

A. Soil or aggregate obtained from on-site excavations within the TFAA that is not designated as highly contaminated soil that can be placed to specified densities and moisture contents, and that is free from organic materials and other objectionable materials that might be highly compressible, too wet, or that cannot be properly compacted.

B. Soil or aggregate obtained from off-site sources that can be placed to specified densities and moisture contents, and that is free from organic materials and other objectionable materials that might be highly compressible, too wet, or that cannot be properly compacted.

C. Asphalt or concrete obtained from the TFAA, which has been crushed and screened.

D. Maximum particle size of 1 ½ inches in the largest dimension.

E. No more than 50 percent passing the #200 U.S. sieve.

F. Free of organic material, frozen material, ice, snow, and excessive moisture.

2.02 GRAVEL PRODUCTS

A. Free of organic material, frozen material, ice, snow or other deleterious material.

B. Gravel fill for below water uses to consist of crushed rock meeting the following gradation.

SIEVE SIZE	PERCENT PASSING
1½ inch (37.5 mm)	95 to 100
¾ inch (25mm)	90 to 100
½ inch (12.5 mm)	0 to 5

2.01 BEDDING

A. Bedding: HPDE pipe bedding: Type 9 or 22.

B. Bedding for all other utilities: Mineral Aggregate Type 10.

PART 3 EXECUTION

3.01 PREPARATION

A. Provide dust control.

B. Begin engineered fill placement only when underlying subgrade has been accepted by the CQAC.

C. Prior to placement of engineered fill, verify that no loose, pumping, or poorly compacted soil is present in the fill area, unless this area is saturated by groundwater.

D. Perform necessary surveys (slope staking) to define the final cover grading.

3.02 PLACING GRAVEL FILL BELOW GROUNDWATER

A. Monitor groundwater elevation outside the SWMU 30 excavation area during placement of gravel fill.

B. Control groundwater elevation inside the SWMU 30 excavation area consistent with the accepted SWMU 30 Work Plan.

C. Verify that geotextile installation is completed and all MQC, and CQA documentations verifies its installation in accordance with Section 02771.

D. Place gravel fill only after geotextile has been installed below and to the side of the gravel in accordance with Construction Drawings and Section 02771.

E. Immediately repair any damage to the geotextile; report damage to CQAC and Engineer.

F. Place gravel fill to the lines and grades shown on the drawings and a minimum of 1 foot above the existing groundwater level.

G. Compact surface of gravel fill before placing geotextile over top of gravel fill. Gravel fill must not yield under equipment loading.

3.03 PLACING ENGINEERED FILL IN SWMU 30 ABOVE GROUNDWATER. (NIC)

A. In areas above groundwater elevations place engineered fill to the lines and grades shown on the Construction Drawings.

B. Place and spread engineered fill in horizontal lifts of uniform thickness, and in a manner that avoids segregation.

C. Place in loose lift thickness not exceeding 8 inches.

D. Moisture condition as needed to attain specified relative compaction.

E. Compact to a minimum relative compaction of 92 percent as determined by ASTM D1557.

F. Provide compacted engineered fill that does not yield under equipment loads

3.04 PLACING ENGINEERED FILL FOR SITE PREPARATION IN THE TFA

A. In areas below groundwater:

1. Deploy geotextile separator over the area in accordance with Section 02771.
2. Place gravel fill above the geotextile.
3. Immediately repair any damage to the geotextile.
4. Place gravel fill to a minimum of 1 foot above the groundwater surface.
5. Compact surface of gravel fill before placing geotextile over top of gravel fill. Gravel fill must not yield under equipment loading.

B. In areas above groundwater elevations place engineered fill to the lines and grades shown on the Construction Drawings.

C. Do not place crushed concrete or asphalt along the cutoff wall alignment following excavation of exploratory trench.

D. Place and spread engineered fill in horizontal lifts of uniform thickness, in a manner that avoids segregation.

E. Place in loose lift thickness not exceeding 8 inches.

F. Moisture condition as needed to attain specified relative compaction.

G. From elevation 15 ft and below compact to a minimum relative compaction of 90 percent as determined by ASTM D1557.

H. Above elevation 15 ft compact to a minimum relative compaction of 92 percent as determined by ASTM D1557.

I. Provide compacted soil fill that does not yield under equipment loads

3.05 PLACING ENGINEERED FILL TO BACKFILL PIPELINE EXCAVATIONS

A. Do not begin backfilling operations until all pipeline decommissioning inspections have been completed and approved by the CQAC.

B. Do not compact or consolidate trench backfill by jetting with water.

C. Hand compact bedding around haunches of remaining pipelines and to a depth at least six inches above the top of the capped pipeline.

D. Backfill remaining excavation with engineered fill materials or soil removed from the trench if approved by the Engineer.

E. Place and compact backfill in equal continuous layers not exceeding 12 inches to the thickness and dimensions indicated on the Construction Drawings or to completely backfill the excavation up to the elevation of the removed base course.

F. Moisture condition as needed to attain specified relative compaction.

G. Compact to a minimum relative compaction of 92 percent as determined by ASTM D1557.

H. Employ a placement method that does not disturb or damage the capped pipelines.

I. Install warning tape 12 inches above each capped pipeline.

J. Where crushed base rock and or base course is removed, replace to its original thickness and finished grade as described in Section 02772.

3.06 PLACING ENGINEERED FILL TO BACKFILL UTILITY TRENCHES

A. Do not begin backfilling operations until all pressure testing, and other utility inspections have been completed and approved by the CQAC.

B. Do not compact or consolidate trench backfill by jetting with water.

C. Hand compact bedding around haunches of pipes and to a depth at least six inches above the top of the utility.

D. Backfill remaining excavation with engineered fill materials or soil removed from the trench if approved by the Engineer.

E. Place and compact backfill in equal continuous layers not exceeding 12 inches to the thickness and dimensions indicated on the Construction Drawings or to completely backfill the excavation up to the elevation of the removed base course.

F. Moisture condition as needed to attain specified relative compaction.

G. Compact to a minimum relative compaction of 92 percent as determined by ASTM D1557.

H. Employ a placement method that does not disturb or damage the utility.

I. Install warning tape 12 inches above each utility.

J. Where crushed base rock and or base course is removed, replace to its original thickness and finished grade as described in Section 02772.

3.07 PLACING ENGINEERED FILL FOR FINAL COVER SUBGRADE

A. Place and spread engineered fill in horizontal lifts of uniform thickness, in a manner that avoids segregation.

B. Place in loose lift thickness not exceeding 8 inches.

C. From elevation 15 and below compact to a minimum relative compaction of 90 percent as determined by ASTM D1557.

D. Above elevation 15 compact to a minimum relative compaction of 92 percent as determined by ASTM D1557.

E. Provide compacted soil fill that does not yield under equipment loads

3.08 COMPACTING CRUSHED ASPHALT AND CONCRETE:

A. Place and spread in lifts of uniform thickness not exceeding 12 inches prior to compaction in a manner that avoids segregation.

B. Moisture condition and compact each lift making a minimum of 3 one-way passes over each lift with a smooth-drum roller having a minimum drum diameter of 5 ft, a minimum drum width of 5 ft, and a minimum drum weight of 4,000 pounds per foot of drum width.

C. Following compaction drive a loaded dump truck or equipment with equivalent ground pressure over each compacted lift. If yielding of greater than 2 inches occurs, scarify, moisture condition and re-compact the yielding area. Repeat until yielding no longer occurs.

D. Moisture condition as needed to attain specified compaction criteria.

3.09 QUALITY CONTROL

A. Grading Tolerances:

1. Removed structure backfill: Place engineered fill to the lines and grades shown on the Construction Drawings, or if none are shown to the top of the excavation made to remove the structure.
2. Final cover: Grade final surface to a vertical tolerance of plus or minus 0.1 ft and a line of plus or minus 1.0 ft.

B. Monitor crushed gravel placement to ensure placement technique does not damage the underlying geotextile or geogrid.

3.10 QUALITY ASSURANCE

A. The CQAC will determine optimum moisture content and maximum density for engineered fill materials in accordance with ASTM D1557.

B. In-place density and moisture content will be determined by the following method: ASTM D6938.

C. Cooperate fully with the CQAC in their performance of sampling and gradation testing and in-place density and moisture testing.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No measurement will be made to place, compact and grade engineered fill above the groundwater table. This includes reuse of non-highly contaminated soil, concrete, and asphalt.

B. Measurement for Bid Item 43, Place, Compact and Grade Engineered Fill Below Groundwater will be by the ton (TON) based on weight tickets from certified scales from the supplier. This item includes furnishing and placing geotextile.

4.02 PAYMENT

A. Payment to place, compact and grade engineered fill above the groundwater table is included in Bid Items 26, 27, 30, 32, 38.

B. Payment for Bid Item 43, Place, Compact and Grade Engineered Fill Below Groundwater includes all costs to place gravel as an engineered fill below the groundwater table, including furnishing and placing geotextile, as described in Section 02339

: End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing all labor, tools, equipment and incidentals required for collection, on site transfer, storage, profiling, packaging, off site transportation recycling or disposal, and paying all disposal fees for waste generated as part of the work. Waste types may include, but are not limited to:

1. Liquid wastes including:
   a. Residual fuel products removed from inside pipelines.
   b. LNAPL recovered from excavations or wastewater treatment units.
   c. Sludges generated during decontamination activities or pipeline decommissioning work.
2. Construction water generated by the following activities:
   a. Excavation dewatering.
   b. Decontamination of debris, pipeline exteriors, equipment, and personnel.
   c. Wheel wash water.
   d. Certain contaminated stormwater runoff not otherwise addressed under Section 02770.
3. Soil, including:
   a. Highly Contaminated Soil.
   b. Soil not suitable or intended for reuse.
4. Debris, including:
   a. Concrete and asphalt not intended for reuse as engineered fill.
   b. Wood, including treated and untreated materials.
   c. Steel including tank bases, rebar, steel associated with building demolition, steel pipelines and steel utility conduits.
   d. Miscellaneous solid waste including non-regulated building materials, and plastic.

B. Chemical sampling and analysis for disposal characterization. Use existing site characterization information to the extent possible, for this characterization. Perform additional characterization of waste as needed for soil, treated timber, or other debris or waste products.

1.02 RELATED SECTIONS

A. Management of regulated building materials (e.g., asbestos, lead based paint) is described in the relevant sections of these specifications including Section 02075 (Lead Controls in Construction and Demolition), Section 02081 (PCB-Containing Fluorescent Light Ballasts Removal and Disposal), Section 02082 (Removal and Disposal of Fluorescent Lamps), Section 02083 (Fugitive and Silica Dust Control Procedures), and Section 02085 (Asbestos Abatement).

B. Management of soil and debris intended for processing and reuse as engineered fill is described in Section 02222 (Tank Farm Area Preparation), Section 02228 (Asphalt and Concrete Crushing Screening and Stockpiling), Section 02332 (Soil Excavation and Management), and Section 02333 (SWMU 30 Excavation and Backfill).

C. Section 02211 – Decontamination Procedures.

D. Section 02223 – Utility Demolition and Management.

E. Section 02224 – Pipeline Decommissioning.

F. Section 02270 – Construction Stormwater Management.

G. Section 02469 - Cutoff Wall.

H. Section 02621 – LNAPL Recovery Trenches.

1.03 REFERENCES

A. The overall framework for managing construction-generated materials is described in Section 11 of the *Terminal 91 Tank Farm Cleanup Engineering Design Report* (EDR; PES 2013). As described in that document, the management of materials is divided into two broad categories based on whether the material is generated either inside or outside the Area of Contamination (AOC), which is defined in the EDR and the Construction Drawings.

B. 40 CFR 136, "Guidelines Establishing Procedures for the Analysis of Pollutants."

C. 40 CFR 261, "Identification and Listing of Hazardous Wastes."

D. 40 CFR 262, "Standards Applicable to Generators of Hazardous Waste."

E. 40 CFR 268, "Land Disposal Restrictions"

F. 40 CFR 300, "National Oil and Hazardous Substances Contingency Plan."

G. 49 CFR 172, “Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plans.”

H. 49 CFR 173, “Shippers - General Requirements for Shipments and Packagings.”

I. 49 CFR 178, “Specifications for Packagings.”

J. King County Code Title 28, Sections 28.81 through 28.84 related to industrial wastewater treatment.

K. King County Department of Natural Resources, Industrial Waste Program. Public Rules PUT 8-12-1 through PUT 8-16 related to industrial waste discharge including construction dewatering and contaminated groundwater.

L. Chapter 173-303 WAC, Dangerous Waste Regulations.

M. Chapter 173-304 WAC, Minimum Functional Standards for Solid Waste Handling.

N. WAC 296-843-150, “Worker and Equipment Decontamination.

O. Section 11 of Engineering Design Report (PES Environmental, 2013) – Management Framework for Environmental Media and Debris.

P. Contamination Contingency Work Plan. Exhibit E to Agreed Order No. DE 8938. Prepared by Roth Consulting.

Q. Guidance for Waste Designation Procedures at Terminal. Appendix B of the Contamination Contingency Work Plan. Prepared by Roth Consulting.

R. Agreed Order, No. DE 8938. Washington Department of Ecology. April 10, 2012.

S. Guidance for Clean Closure of Dangerous Waste Units and Facilities (Publication #94-111). Washington Department of Ecology. May 2005.

1.04 DEFINITIONS AND ACRONYMS

A. Area of Contamination (AOC): The designated, contiguous area from which contaminated soil and debris can be excavated, handled, processed for re-use as fill, stockpiled, or consolidated as fill within the designated AOC area. Materials excavated from the AOC must not leave the AOC, even temporarily, or they could become subject to dangerous waste classification and as such be prohibited from re-use as fill within the AOC. The AOC for this project is defined on the Construction Drawings.

B. Construction Water: Water generated during construction activities that requires treatment and/or disposal or discharge including: (1) groundwater removed during excavation dewatering, (2) decontamination water, (3) wheel wash water, (4) certain contaminated stormwater runoff not otherwise addressed under Section 02770.

C. Construction Quality Assurance Consultant (CQAC): The CQAC is a third party organization, independent from the Port and Contractor, that is responsible for observing and documenting activities related to the quality of product manufacturing, product installation, and other construction activities related to the project.

D. Dangerous Waste: Any solid waste designated under procedures of WAC 173-303-070 through 100 as dangerous, extremely hazardous or mixed waste. Dangerous waste is a hazardous substance under RCW 70.105D.020(10).

E. Decontamination: The process of removing or neutralizing contaminants that have accumulated on personnel, equipment, and demolition debris.

F. Port Environmental Management Specialist (Port EMS): Port employee responsible for overseeing Port employees and consultants who are responsible for environmental management activities as part of the Port's construction projects. Port EMS will be responsible for reviewing Construction Drawings and Technical Specifications, background environmental information, and Contractor and consultant work plans; and assisting the Port's PM and Port's RE in waste designation and profiling decisions.

G. Port Resident Engineer (Port RE): The Port's Resident Engineer (Port's RE) will be the primary contact with the Contractor and will be the only individual to direct the Contractor or modify Contractor activities on the Port's behalf. All communications regarding design and CQA elements that may modify Contractor activities or CQA activities will go through the Port's RE.

H. Profiling: The process of sampling, analysis, and characterization of waste to determine its designation for disposal. Includes application of knowledge of the waste by the generator (Port).

I. Hazardous Substances: Has the meaning provided in RCW 70.105D.020(10).

J. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product saturated soil.

K. Light Non-Aqueous Phase Liquid (LNAPL): A LNAPL is one of a group of organic substances that are relatively insoluble in water and are less dense than water. LNAPLs, such as oil, tend to spread across the surface of the water table, forming a layer on top of the water table.

L. National Pollution Discharge Elimination System (NPDES).

M. Petroleum Products: Complex mixtures of organic compounds that are refined from crude oil including gasoline, diesel fuel, jet fuel, kerosene, fuel oils, middle distillates, lubricating oils, and heavy fuel oil (e.g., bunker C). These products, or mixtures thereof, may be encountered during pipeline decommissioning or demolition activities.

N. Pipelines: Formerly active privately-owned pipes that carried a product such as fuel, sludge, oil product, residue or water.

O. Screening and Field Screening: Screening of contaminated areas using visual observations, olfactory clues, and/or photoionization detector ("PID") measurements.

P. Sludge/solid: Undesirable materials that accumulate in fuel pipelines usually consisting of heavy petroleum products, or a mixture of hydrocarbons, residue and water, that may be flammable, hazardous, and/or toxic.

Q. Solid Waste: Useless or discarded putrescible and non-putrescible materials, including but not limited to garbage, rubbish, refuse, ashes, paper and cardboard, sewage sludge, septic tank and cesspool pumpings or other sludge, useless or discarded commercial, industrial, demolition and construction materials, discarded or abandoned vehicles or parts thereof, discarded home and industrial appliances, manure, vegetable or animal solid and semi-solid materials, dead animals and infectious waste.

R. Tank Farm Area (TFA): Consists of approximately 3.4 acres and represents that portion of the Tank Farm Affected Area, including the former storage tanks, which will be disturbed to construct the cutoff wall.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED.

A. As part of the Project Work Plan described in Section 01305, include a Transportation and Disposal Plan for waste collection, storage, profiling, transportation, and disposal or recycling that includes the following:

1. A list of Wastes that will be generated during the work.
2. Identify a proposed recycling or disposal facility for each waste stream. This includes, but is not limited to, the materials listed in Part 1.01.A of this Section.
3. On-site management practices for non-dangerous and dangerous wastes that comply with the general and specific requirements of this Section.
4. Procedures for packaging, labeling, and manifesting of waste streams generated and managed during the work, including dangerous and non-dangerous waste and materials to be recycled.
5. Procedures for shipping materials determined to be a non-dangerous waste, using a non-dangerous waste manifest or standard bill of lading provided by the transporting company or generator.

6. Procedures for shipping materials determined to be a dangerous waste using a uniform hazardous waste manifest and other required documentation.
7. A list of all subcontractors to be employed in transportation, types of trucks, containers and liners to be used, inspection procedures prior to transport, and best management practices to prevent any leakage, spillage, or tracking of wastes from the site on trucks or vehicles.
8. A description of all sampling and analysis procedures for characterization of any waste materials that may be required by the disposal or recycling facility.

B. As part of the Project Work Plan described in Section 01305, include a Construction Water Management Plan for managing Construction Water generated during the work that includes the following:

1. A list of Construction Water types generated during the work.
2. Diagrams/specification sheets and basic design data for wastewater treatment system components (for example, pumps, tanks, mixers).
3. Schematic flow diagram of the treatment process, illustrating the system piping, tanks, and control features.
4. Maximum flow rate for wastewater treatment system.
5. A wastewater discharge schedule indicating when each process can be expected to generate wastewater for the duration of the project. For each process and discharge period, indicate the projected maximum daily discharge volume.
6. Identify a proposed recycling or disposal facility for each waste water type including but not limited to, the construction generated liquids listed in Part 1.01.A of this Section.
7. Procedures for assuring compliance with waste discharge permits.
8. Procedures for packaging, labeling, and manifesting of Construction Water generated and managed during the work.
9. Procedures for shipping materials determined to be a non-dangerous waste, using a non-dangerous waste manifest or standard bill of lading provided by the transporting company or generator.
10. A list of all subcontractors to be employed in transportation, types of containers, types of trucks, inspection procedures prior to transport, and best management practices to prevent any leakage or spillage.
11. A description of all sampling and analysis procedures for characterization of any waste materials that may be required by the disposal or recycling facility.

C. Select disposal and recycling facilities from the list of Port-approved facilities provided below unless the Contractor proposes an alternate facility and receives Port approval for this alternate facility. Port-approved Disposal and Recycling facilities include:

Asphalt & Concrete	Renton Concrete Recyclers Renton, WA
Asphalt & Concrete	Cadman, Inc. Black Diamond, Monroe, and Redmond, WA
Demolition Debris, including Creosoted Timbers	Allied Waste/Regional Disposal Roosevelt Regional Landfill Roosevelt, WA
Demolition Debris, including Creosoted Timbers	Waste Management Northwest Columbia Ridge, Arlington, OR
Demolition Debris, including Creosoted Timbers	US Ecology Grand View, ID
Demolition Debris, including Creosoted Timbers	Clean Harbors Grassy Mountain Landfill, Grantsville, UT
Water – non-dangerous waste	Emerald Services, Inc. Seattle, WA
Water –dangerous waste	Emerald Services, Inc. Seattle, WA
LNAPL and Recovered Fuel Products	Clean Harbors Aragonite Grantsville, UT
LNAPL and Recovered Fuel Products	Emerald Services, Inc. Seattle, WA
Regulated Building Materials	Allied Waste/Regional Disposal Roosevelt Regional Landfill Roosevelt, WA
Regulated Building Materials	Waste Management Northwest Columbia Ridge, Arlington, OR
Regulated Building Materials	US Ecology Grand View, ID
Regulated Building Materials	Clean Harbors Grassy Mountain Landfill, Grantsville, UT
Soil – solid waste	Allied Waste/Regional Disposal Roosevelt Regional Landfill Roosevelt, WA
Soil – solid waste	Waste Management Northwest Columbia Ridge, Arlington, OR
Soil – dangerous waste	Chemical Waste Management Arlington, OR

Soil – dangerous waste	US Ecology Grand View, ID
Soil – dangerous waste	Clean Harbors Grassy Mountain Landfill, Grantsville, UT
Universal Wastes	Total Reclaim Environmental Services, Seattle, WA
Universal Wastes	Clean Harbors Grassy Mountain Landfill, Grantsville, UT
Steel	Pacific Iron and Metal Seattle, WA
Steel	Seattle Iron and Metals Corporation, Seattle, WA
Steel	Independent Metals Recycling Seattle, WA

1.06 SUBMITTALS FOR REVIEW DURING CONSTRUCTION

A. Submit weekly disposal reports to the Port Resident Engineer (Port RE) and CQAC for all materials, waste, and debris transferred to approved disposal or recycling facilities. Include the total number of truckloads, total estimated volume, total tons of material delivered to the disposal facilities and a copy of the completed waste disposal tracking sheets.

B. Submit all transportation-related shipping documents to the Port RE and CQAC for review a minimum of 7 days prior to anticipated shipment. Documents to be submitted for review include draft manifests for waste; draft bills of lading; lists of proposed labels, packages, markings, and placards to be used for shipment; and any waste profiles and/or supporting waste analysis documents.

C. Furnish to the Port RE and CQAC generator copies of manifests used for initiating shipments of waste, bill of ladings, and supporting waste analysis documents when shipments are originated. Do not allow any dangerous waste to leave the project site until shipping documents have been approved and signed by an authorized Port representative (signer). The Port RE can sign nondangerous shipping papers and manifests.

D. Furnish copies of waste shipment records from the designated disposal facility no later than 35 days after acceptance of the shipment. When required by law, return waste shipping papers to the Port within the legally specified time.

E. Before disposal to the sanitary sewer, submit documentation to the Port RE and CQAC that the quality of all wastewater proposed for discharge to the King County sewer system complies with the appropriate Waste Discharge permit(s).

F. On a daily basis, submit to records to the Port RE and CQAC that document the total daily quantity of Construction Water discharged and the results of any testing conducted pursuant to the discharge authorization or permit.

G. On a weekly basis, submit records to the Port RE and CQAC that document the total quantity of water transported off-site for disposal and the results of any testing required by the disposal facility.

H. Submit nondangerous material shipment documents to the Port RE for review and approval.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Provide all of the materials and labor required for the packaging, labeling, marking, placarding, and transportation of dangerous or nondangerous wastes and hazardous and nonhazardous materials in conformance with DOT standards.

B. Packaging - Provide bulk and non-bulk containers for packaging dangerous materials/wastes consistent with the authorizations referenced in the Hazardous Materials Table in 49 CFR 172.101(i), Column 8.

C. Markings - Provide markings for each dangerous material/waste package, freight container, and transport vehicle consistent with the requirements of 49 CFR 172, Subpart D, 40 CFR 262.32 (for dangerous waste), and 40 CFR 761.45 (for PCBs).

D. Labeling - Provide primary and subsidiary labels for dangerous materials/wastes consistent with the requirements in the Hazardous Materials Table in 49 CFR 172.101(g), Column 6.

E. Placards - For each off-site shipment of dangerous material/waste, provide primary and subsidiary placards consistent with the requirements of 49 CFR 172, Subpart F. Placards shall be provided for each side and each end of bulk packaging, freight containers, transport vehicles, and rail cars requiring such placarding.

F. Container Liners – Provide new intact 6-mil thick plastic liners for each container of waste material.

G. Storage Area Liners - Provide new intact 10-mil thick plastic sheeting for bermed storage areas.

H. Submit proper shipping names to the Port RE in the form of draft shipping documents for review and approval.

2.02 CONTAINMENT AND TRANSFER EQUIPMENT

A. Provide water-tight containment vessels, sumps, sump pumps, delivery systems and all appurtenances required for transferring of decontamination water, LNAPL, fuels, sludges, oil products, and impacted water to storage containers and or treatment units.

PART 3 EXECUTION

3.01 NOTIFICATIONS

A. Notify the Port RE at least five working days in advance of any proposed changes to the operations outlined in the approved Transportation and Disposal Plan.

3.02 RELATED WORK PERFORMED BY THE PORT

A. The Port will be responsible for applying for and obtaining the appropriate discharge authorization or permit from King County that provides for the discharge of Construction Water to the sanitary sewer.

B. The Contractor will coordinate with the Port in support of the Port's application regarding the types and characteristics of Construction Water that will be generated during the Project. Prepare a Construction Water Management Plan per Part 1.05.B above.

3.03 GENERAL REQUIREMENTS

A. Transport soil and debris in sealed containers in accordance with all requirements of 49 CFR 173 and other applicable requirements.

B. Soils excavated from below the water table, or soil saturated due to rainfall, may generate free liquid during haul due to separation and settling. Provide transfer equipment and methods appropriate to this condition. Transport waste in containers lined with a minimum 6 mil new intact plastic liner. Cover containers stored on site to prevent accumulation of precipitation. Do not haul waste materials in standard dump trucks and pups without the 6 mil liner. Do not spill waste or allow liquid drainage from containers at any time during on site or off site transportation. Do not overload transfer vehicles. Meet applicable weight restrictions, and provide adequate free-board so as to prevent spillage during transit. Cover waste in accordance with applicable regulations.

C. Dispose of all materials generated during the work that are not intended for reuse as engineered fill or recycled in accordance with all applicable local, state, and federal regulations.

D. Manage waste materials (primarily soil and debris) that are generated outside the AOC consistent with the *Contamination Contingency Work Plan.* Coordinate with the Port EMS and CQAC regarding generator (Port) knowledge of waste streams and application of *Contamination Contingency Work Plan.* Stockpile soils determined to be highly contaminated separately and profile them for off-site disposal at an approved facility. Specific areas outside the AOC where highly contaminated soil may be found include the SWMU 30 excavations and excavations associated with decommissioning pipelines outside of the AOC.

E. Maximize waste materials (soil not classified as highly contaminated) and certain debris (asphalt and concrete) generated inside the AOC in a manner that maximizes their reuse for engineered fill during the excavation, backfilling and final grading in the TFA. Except for fill/base course materials associated with seeps in the existing paving, the existing site paving and crushed base rock, base course, and fill located beneath existing asphalt but above the surface of the former tank farm may be stockpiled either inside or outside the AOC and reused for engineered fill. Manage, stockpile, clean, process (e.g., crush), and place other soil and debris generated from within the AOC, including contaminated materials associated with the seeps, without removing them from the AOC. If these materials are removed from the AOC, do not bring them back into the AOC. Manage other materials not intended for reuse as described in this Section in coordination with the Port EMS and CQAC.

F. Perform all required sampling and analysis for disposal characterization of waste materials generated during the work. Sequence all sampling and analysis to avoid delays to the Work. Furnish copies of analytical results to Port RE and CQAC profiling and shipping documentation.

3.04 ON-SITE DANGEROUS WASTE MANAGEMENT

A. Comply with all federal, state, and local hazardous waste laws and regulations if dangerous wastes be encountered during work activities.

B. Identify dangerous materials using criteria in 40 CFR 261 and WAC 173-303 and other applicable state and local laws, regulations, and ordinances.

C. Comply with generator requirements in 40 CFR 262 and WAC 173-303 when accumulating dangerous waste or hazardous materials on Site,

D. Inspect all dangerous waste areas daily and document the inspection in an inspection log that to contains, at a minimum, date and time of inspection, name of individual conducting the inspection, problems noted, and corrective actions taken. Provide inspection logs to Port RE upon request.

3.05 OFF-SITE WASTE MANAGEMENT

A. Use Port-approved disposal and recycling facilities for all materials transported from the site.

B. Packaging Certification - Prior to shipment of any material off-site, provide written certification to the Port RE that dangerous and nondangerous wastes have been properly packaged, labeled, and marked in accordance with Department of Transportation and Ecology requirements.

C. Manifesting and Transportation – Prepare and use manifests for transporting dangerous wastes as required by 40 CFR 263 or any applicable state or local law or regulation. Comply with all requirements in the Department of Transportation referenced regulations in the 49 CFR series. Acquire manifests in accordance with the hierarchy established in 40 CFR 262.21. Prepare dangerous waste manifests for each shipment of dangerous waste shipped off-site. Complete manifests using instructions in 40 CFR 262, Subpart B, and any applicable state or local law or regulation. Submit manifests and waste profiles to Engineer for review and signature by an authorized representative of the Port RE. Prepare land disposal restriction notifications as required by 40 CFR 268 or any applicable state or local law or regulation for each shipment of dangerous waste. Submit notifications with the manifests to the authorized representative of the Port RE for review and approval.

D. Transport all dangerous waste to an approved dangerous waste treatment, storage, or disposal facility within 90 days of the accumulation start date on each container. Ensure wastes are treated to meet land disposal treatment standards in 40 CFR 268 prior to land disposal.

3.06 RECOVERY OF FREE PRODUCT (LNAPL) FROM WATER IN EXCAVATIONS

A. If free product (LNAPL) collects in a standing body of water at the bottom of an excavation, implement a plan that includes the use of sorbent pads or booms to extract the free product, and pumping systems to move excavation water and/or product to an approved container.

B. Transport and store collected LNAPL and/or excavation water as described in this Section.

3.07 COLLECTION, TRANSFER, AND STORAGE OF LIQUID WASTE

A. Collect all liquid waste at the point as near as possible to its source.

B. Transfer collected liquid waste from its source to its storage areas in water-tight containers.

C. Prevent spillage of products during loading, hauling, transfer and storage.

D. Provide containers complying with Part 2 of this Section for transferring and storing the following waste types:

1. Petroleum Products collected during pipeline decommissioning activities including:

a. Gasoline.

b. Diesel fuel.

c. Heavy fuel oil (e.g., Bunker C).

2. Sludges that may contain one or more of the petroleum products listed above.

3. LNAPL removed from excavations, removed from wastewater treatment units, or draining for product saturated soils.

E. Construct a bermed storage area for liquid waste containers that:

1. Prevents run on water from entering the bermed area and prevents runoff water from exiting the bermed area.

2. Is lined with 10-mil thick plastic sheeting.

3. Provides secondary containment that has a containment volume at least double the capacity of the largest liquid storage container that will be placed inside the bermed area.

F. Store wastes in containers that will allow access for waste sampling and profiling.

G. Provide adequate stabilization of all sludges as required by the receiving disposal facility.

H. Characterize liquid wastes pursuant to the *Guidance for Waste Designation Procedures at Terminal* 91 and as required by the approved disposal facility.

I. Prepare shipping documents per the requirements of this Section.

J. Transport liquid wastes to a Port-approved disposal facility per the requirements of this Section.

3.08 CONSTRUCTION WATER MANAGEMENT

A. Manage Construction Water generated during the work as described in the accepted Construction Water Management Plan.

B. Manage Construction Water generated during the project either by:

1. Collection, storage, treatment, and discharge to the King County sanitary sewer pursuant to the conditions of the Waste Discharge Permit or authorization obtained for the project by the Port.

2. Collection, storage, and transport to an off-site treatment or disposal facility.
3. In general, discharge to the King County sanitary sewer is the preferred method of Construction Water management as long as the conditions and requirements of the Port-obtained discharge authorization or permit are complied with, including any numerical discharge limits or flow restrictions.

C. Protect existing site stormwater drainage systems to prevent discharge of wastewater, sediment, and associated contaminants to stormwater drainage systems.

D. For Construction Water that is to be discharged to sanitary sewer:

1. Provide all equipment, materials, tools, labor, and incidentals required to construct, operate, and maintain the wastewater treatment system described in the Construction Water Management Plan.
2. Comply with all conditions and requirements of the Port-obtained discharge authorization or permit.

E. For Construction Water being transported off-site for discharge or disposal:

1. Transfer collected Construction Water from its source to its storage areas in water-tight containers.
2. Prevent spillage of Construction Water during loading, hauling, transfer and storage.
3. Store Construction Water in containers that will allow access for sampling and profiling.
4. Characterize Construction Water pursuant to the *Guidance for Waste Designation Procedures at Terminal* 91 and as required by the approved disposal facility.
5. Prepare shipping documents per the requirements of this section.
6. Transport Construction Water to a Port-approved discharge or disposal facility per the requirements of this Section.

3.09 MANAGING SOIL NOT INTENDED OR SUITABLE FOR REUSE

A. Stockpile soils not intended for reuse per Section 02337.

B. Characterize soils not intended for reuse pursuant to the *Guidance for Waste Designation Procedures at Terminal* 91 and as required by the approved disposal facility.

C. Prepare shipping documents per the requirements of this section.

D. Transport soil to a Port-approved disposal facility per the requirements of this section.

E. Dispose of soils not intended for or suitable for reuse off-site in accordance with this Section These soils include:

1. Highly Contaminated Soil, including product-saturated sand found within tank bases.
2. Excess soil from excavations located outside the AOC, including the SMWU 30 excavations.

3. Soil whose physical or geotechnical characteristics make it unsuitable for reuse as fill materials.

3.10 MANAGING DEBRIS NOT INTENDED FOR REUSE

A. Dispose of debris not intended for reuse off site in accordance with this Section. These debris include:

1. Concrete and asphalt not intended for reuse, including material generated from outside the AOC. In general, asphalt and concrete generated from within the AOC will be processed and reused as engineered fill per Section 02228.

2. Steel including tank bottoms, rebar recovered from demolition and crushing of concrete, steel building components, and steel pipelines or utilities removed as part of the Work.

3. Wood, including treated and untreated materials.

4. Miscellaneous demolition debris including non-regulated building materials, plastic, and fiber glass.

B. Decontaminate debris as necessary per Section 02211.

C. Stockpile debris not intended for reuse per Section 02337.

D. Characterize debris not intended for reuse pursuant to the *Guidance for Waste Designation Procedures at Terminal* 91 and as required by the Port-approved disposal or recycling facility.

E. Prepare shipping documents per the requirements of this Section.

F. Transport debris to a Port-approved disposal or recycling facility per the requirements of this Section.

3.11 SHIPPING DOCUMENTS

A. Evaluate in consultation with the Port RE and CQAC, prior to shipment of material regulated as a dangerous waste or hazardous material for the purpose of determining proper shipping descriptions, and marking requirements. These procedures include:

B. Identification of Proper Shipping Names - Use 49 CFR 172.101 to identify proper shipping names for each hazardous material (including dangerous wastes) to be shipped off-site. Submit proper shipping names to the Port RE in the form of draft shipping documents for review and approval.

C. Packaging, Labeling, and Marking - Package, label, and mark dangerous materials/wastes using the specified materials and in accordance with the referenced regulations.

D. Hazardous Material Shipping Documents - Ensure that each off-site shipment of hazardous material or dangerous waste is accompanied by properly completed uniform hazardous waste manifest (EPA Form 8700-22, Rev. 3-05).

E. Nonhazardous Material Shipment Documents - Prepare a bill of lading for each shipment of nonhazardous material which fulfills the shipping paper requirements and satisfies the requirements of 49 CFR 172, Subpart C, (and 40 CFR 279 if shipping used oil) and any applicable state or local law or regulation. Submit nonhazardous material shipment documents to the Port RE for review and

approval. For laboratory samples, prepare bills of lading and other documentation as necessary to satisfy conditions of the sample exclusions in 40 CFR 261.4(d) and (e), and any applicable state or local law or regulation. Assure that bills of lading requiring shipper's certifications are signed by an authorized representative of the Port.

3.12 EMERGENCY CONTACTS

A. Comply with the emergency contact provisions in 49 CFR 172.604. Whenever shipping hazardous materials provide a 24-hour emergency response contact and phone number of a person knowledgeable about the hazardous materials being shipped and who has comprehensive emergency response and incident mitigation information for that material, or has immediate access to a person who possesses such knowledge and information.

B. Monitor the phone on a 24-hour basis at all times when the hazardous materials are in transportation including during storage incidental to transportation.

C. Ensure that information regarding this emergency contact and phone number is placed on all hazardous materials shipping documents. Designate an emergency coordinator and post the following information at areas in which hazardous wastes are managed:

1. The name of the emergency coordinator.
2. Phone number through which the emergency coordinator can be contacted on a 24-hour basis.
3. The telephone number of the local fire department.
4. The location of fire extinguishers and spill control material.

3.13 SITE MAINTENANCE

A. Keep work area, site, and adjacent properties free from accumulations of waste materials, rubbish, and windblown debris resulting from Contractor’s operations.

B. Provide on-site containers for collection of waste materials, debris, and rubbish. Periodically remove waste from the site.

C. Dispose of trash and debris in compliance with governing codes, ordinances, regulations, and anti-pollution laws.

D. Locate dumpster(s) or other waste containers or stockpiles at a location designated or approved by the Port RE.

3.14 QUALITY CONTROL

A. Waste Profiling: Perform the necessary screening, sampling, testing and analysis of waste to classify per the requirements of this Section. Coordinate with the Port RE, Port EMS, and CQAC in performance of waste profiling, inspection, documentation and manifest preparation.

B. Inspect and document inspection of each truck bound for disposal or recycling facilities.

C. Confirm the adequate stabilization of all sludges/solids as required by the receiving disposal facility.

3.15 QUALITY ASSURANCE

A. The CQAC may chose to perform independent sampling and analysis of waste materials to confirm characterization.

B. Cooperate with the CQAC in performance of their work.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 44 Sample Waste and Analyze for Total Petroleum Hydrocarbons by Methods NWTPH-Gx and NWTPH-Dx will be made on a per sample (PS) basis based on analytical reports provided to the Port.

B. Measurement for Bid Item 45 Sample Waste and Analyze for Total RCRA 8 Metals will be made on a per sample (PS) basis based on analytical reports provided to the Port.

C. Measurement for Bid Item 46 Sample Waste and Analyze for VOCs by Method 8260B will be made on a per sample (PS) basis based on analytical reports provided to the Port.

D. Measurement for Bid Item 47 Sample Waste and Analyze for PCBs by Method 8082 will be made on a per sample (PS) basis based on analytical reports provided to the Port.

E. Measurement for Bid Item 48 Sample Waste and Analyze for SVOCs by Method 8270D will be made on a per sample (PS) basis based on analytical reports provided to the Port.

F. No separate measurement payment will be made for preparing the waste profiles based in the analytical results and in coordination with the Port. The cost for these activities will be considered incidental to, and included in, the payments made for the applicable bid items for the Project.

G. Measurement for Bid Item 49 Waste Fuel Transportation will be based on the gallon (GAL) as documented on the manifest or bill of lading.

H. Measurement for Bid Item 50 Oil/Water Mixture Transportation will be based on the gallon (GAL) as documented on the manifest of bill of lading.

I. Measurement for Bid Item 51 Nonhazardous Sludge Transportation will be based on the per drum (DRUM) basis as documented on gate fee receipts.

J. Measurement for Bid Item 52 Petroleum Contaminated Soil Transportation will be based on the tonnage of waste (TON) measured at the disposal facility and documented on gate fee receipts.

K. Measurement for Bid Item 53 “Contained Out” Soil Transportation will be based on the tonnage of waste (TON) measured at the disposal facility and documented on gate fee receipts.

L. Measurement for Bid Item 54 Steel Transportation will be based on the tonnage of waste (TON) measured at the recycling facility and documented on gate fee receipts.

M. Measurement for Bid Inter 55 Waste Fuel Disposal will be based on gate fee receipts (Rcpts).

N. Measurement for Bid Item 56 Oil/Water Mixture Disposal will be based on gate fee receipts (Rcpts).

O. Measurement for Bid Item 57 Nonhazardous Sludge Disposal will be based on gate fee receipts (Rcpts).

P. Measurement for Bid Item 58 Petroleum Contaminated Soil Disposal will be based on gate fee receipts (Rcpts).

Q. Measurement for Bid Item 59 “Contained Out” Soil Disposal will be based on gate fee receipts (Rcpts).

R. Measurement for Bid Item 60 Steel Disposal or Recycling will be based on gate fee receipts (Rcpts).

S. No separate measurement payment will be made for the transportation or disposal of general trash and nonhazardous debris not covered in other bid items. The cost for these activities will be considered incidental to, and included in, other bid items for the Project.

4.02 PAYMENT

A. Payment for Bid Item 44 Sample Waste and Analyze for Total Petroleum Hydrocarbons by Methods NWTPH-Gx and NWTPH-Dx includes all costs to provide the necessary sampling equipment, labor and materials to obtain, and analyze each sample of solid material for the specified method.

B. Payment for Bid Item 45 Sample Waste and Analyze for Total RCRA 8 Metals includes all costs to provide the necessary sampling equipment, labor and materials to obtain, and analyze each sample of solid material for the specified method.

C. Payment for Bid Item 46 Sample Waste and Analyze for VOCs by Method 8260B includes all costs to provide the necessary sampling equipment, labor and materials to obtain, and analyze each sample of solid material for the specified method.

D. Payment for Bid Item 47 Sample Waste and Analyze for PCBs by Method 8082 includes all costs to provide the necessary sampling equipment, labor and materials to obtain, and analyze each sample of solid material for the specified method.

E. Payment for Bid Item 48 Sample Waste and Analyze for SVOCs by Method 8270D includes all costs to provide the necessary sampling equipment, labor and materials to obtain, and analyze each sample of solid material for the specified method.

F. No separate payment will be made for preparing the waste profiles based in the analytical results and in coordination with the Port. The cost for these activities will be considered incidental to, and included in, the payments made for the applicable bid items for the Project.

G. Payment for Bid Item 49, Waste Fuel Transportation, includes all costs to load and transport the waste at an accepted disposal facility.

H. Payment for Bid Item 50, Oil/Water Mixture Transportation, includes all costs to load and transport the waste at an accepted disposal facility.

I. Payment for Bid Item 51, Nonhazardous Sludge Transportation, includes all costs to load and transport the waste at an accepted disposal facility.

J. Payment for Bid Item 52, Petroleum Contaminated Soil Transportation, includes all costs to load and transport the waste at an accepted disposal facility.

K. Payment for Bid Item 53, “Contained Out” Soil Transportation, includes all costs to load and transport the waste at an accepted disposal facility.

L. Payment for Bid Item 54, Steel Debris Transportation, includes all costs to load and transport the waste at an accepted disposal or recycling facility.

M. Payment for Bid Item 55 Waste Fuel Disposal will be based on gate fee receipts plus the allowable contract mark up.

N. Payment for Bid Item 56 Oil/Water Mixture Disposal will be based on gate fee receipts plus the allowable contract mark up.

O. Payment for Bid Item 57 Nonhazardous Sludge Disposal will be based on gate fee receipts plus the allowable contract mark up.

P. Payment for Bid Item 58 Petroleum Contaminated Soil Disposal will be based on gate fee receipts plus the allowable contract mark up.

Q. Payment for Bid Item 59 “Contained Out” Soil Disposal will be based on gate fee receipts plus the allowable contract mark up.

R. Payment for Bid Item 60 Steel Debris Disposal will be based on gate fee receipts plus the allowable contract mark up.

S. No separate payment will be made for the transportation or disposal of general trash and nonhazardous debris not covered in other bid items. The cost for these activities will be considered incidental to, and included in, other bid items for the Project.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Constructing a cutoff wall by continuous trenching and mixing using one-pass trenching method.

B. The upper 2 ft section made from soil-cement-bentonite with a minimum width of 6 ft.

C. The lower section made from soil-bentonite with a minimum width of 24 inches and a hydraulic conductivity no greater than 1 x 10-7 cm/sec.

1.02 RELATED SECTIONS

A. Section 02211 - Decontamination Procedures.

B. Section 02222 – Tank Farm Area Preparation.

C. Section 02223 – Utility Demolition and Management.

D. Section 02270 – Construction Stormwater Management.

E. Section 02332 – Soil Excavation and Management.

F. Section 02335 – Exploratory Trench Excavation.

G. Section 02339 – Engineered Fill.

H. Section 02405 – Waste Collection Storage Profiling and Disposal.

I. Section 02773 – Geogrid.

1.03 REFERENCES

A. API RP 13A – API Specification for Oil-Well Drilling-Fluid Materials.

B. API RP 13B – API Recommended Practice Standard Procedure for Field Testing Drilling Fluids.

C. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

D. ASTM C138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete.

E. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete.

F. ASTM C150 – Standard Specification for Portland Cement.

G. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.

H. ASTM D1126 - Standard Test Method for Hardness in Water.

I. ASTM D1140 – Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75-µm) Sieve.

J. ASTM D1293 - Standard Test Methods for pH of Water.

K. ASTM D1633 - Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders.

L. ASTM D2166 - Standard Test Method for Unconfined Compressive Strength of Cohesive Soil

M. ASTM D2216 – Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

N. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

O. ASTM D4380 - Standard Test Method for Density of Bentonitic Slurries.

P. ASTM D4381 - Standard Test Method for Sand Content by Volume of Bentonitic Slurries.

Q. ASTM D4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

R. ASTM D5084 – Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter.

1.04 DEFINITIONS AND ACRONYMS

A. City water: Seattle city water obtained from on-site fire supply system.

B. Construction Quality Assurance Consultant (CQAC).

C. Off-site soil: Soil imported from off-site borrow source at Quality Aggregates, Maple Valley, Washington, or approved equivalent, that will be incorporated into the cutoff wall soil-bentonite backfill.

D. Site soil: Soil from the alignment of the cutoff wall that will be incorporated into the cutoff wall soil-bentonite backfill.

E. Soil-bentonite backfill: A homogeneous mixture of specified site soil, off-site soil, bentonite, and water.

F. Soil-cement-bentonite: A homogeneous mixture of specified site soil, off-site soil, cement, bentonite, and water.

1.05 SUBMITTALS WITH BID

A. Submit evidence of qualifications and a Project Work Plan per Section 01304.

B. Evidence that the Bidder, his proposed subcontractor, or his proposed consulting advisor, have experience and competency constructing soil-bentonite cutoff walls. Provide documentation of at least five years of prior experience in constructing cutoff walls, with at least three cutoff walls of similar scope, method of installation and magnitude.

C. Evidence that the cutoff wall specialist supervising the construction has at least five years of experience and/or five projects in successful construction of cutoff walls, with at least two cutoff walls of similar scope, method of installation and magnitude.

D. The company name, key contact, and qualifications of the Contractor's off-site laboratory documenting they have previous experience with cutoff wall backfill materials, experienced laboratory technicians, and flexible wall permeability testing capability. (ASTM D 5084).

1.06 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Cutoff Wall Construction Work Plan, including drawings, that at a minimum addresses:

1. Description of proposed construction equipment and method of operation, including equipment dimensions, weight, effective operating depth and turning capabilities, including minimum radius.
2. Bentonite hydration method using city water, not groundwater from the alignment of the cutoff wall.
3. Approach and methods for mixing on-site soil from the cutoff wall alignment, off-site soil, bentonite and city water to achieve the desired homogeneous soil-bentonite material, and adding cement to the upper 6-ft wide and 2-ft deep section of the cutoff wall to achieve a homogeneous soil-cement-bentonite material.
4. Methods to execute changes in the cutoff wall alignment as shown on the Construction Drawings.
5. Methods to assure continuity of cutoff wall at locations associated with right-angle change of direction.
6. Method of controlling depth of the cutoff wall.
7. Proposed construction sequence and schedule.

B. Prior to Notice Proceed Submit a Cutoff Wall Operating Plan with drawings per Section 01305, that describes or shows pertinent information, including:

1. Construction equipment, procedures, laydown area, mixing location, material stockpile location, and access.
2. Coordinating the construction, maintenance, and removal of working platforms, mixing pads, and haul roads with the Port or other Contractors onsite.
3. Equipment setup and site use layout including storage areas, haul roads, and work platform dimensions.
4. Equipment specifications including: maximum depth capability of excavator; number and type of backfill mixing equipment; and specifications of slurry mixing equipment.
5. Procedure for water-bentonite slurry mixing, hydration, transportation, and use.
6. Procedure for mixing on-site, off-site soils, bentonite and water in correct proportions.
7. Procedure for trench excavation and backfilling.
8. Procedure for mixing and constructing the upper 2-ft deep and 6-ft wide soil-cement-bentonite section of the cutoff wall.
9. Material properties, sources, and certificates of quality.
10. Control of drainage, spills, wastes, etc.
11. Clean-up, spoils disposal, and slurry disposal.
12. Monitoring completed cutoff wall for settlement and managing any noted settlement.
13. Control of material to prevent discharge of materials off site.

C. A quality control plan with details on personnel, responsibilities, inspections, the organization for ensuring the quality of construction required by these specifications, and the quality control tests, frequencies and forms to be used for the work.

D. A detailed schedule and sequence of operations in bar chart format, with typical work hours and days; sequence of operations; maintenance schedule, and operations required by the quality control plan.

1.07 SUBMITTALS FOR REVIEW DURING CONSTRUCTION

A. Provide a sample of imported soil for soil/bentonite mix per Section 01300.

1.08 POST CONSTRUCTION SUBMITTALS

A. Submit no later than 21 days after completing the cutoff wall a Final Report that clearly and concisely summarizes all quality control testing and measurements, includes plan and profile drawings showing completed trench profile (elevations for top and bottom of soil/bentonite mix in the cutoff wall) and locations of samples taken for quality control purposes.

PART 2 - PRODUCTS

2.01 BENTONITE

A. Hydrogel® supplied by Wyoming Bentonite (Wyo-Ben) of Billings, Montana, or approved equivalent, a premium grade, natural, untreated, sodium-cation bentonite, conforming to the requirements of API Specification 13-A, with a minimum yield of 90 barrels per ton when tested in accordance with API RP 13B.

B. Additives, diluents, or adulterants of any kind, such as but not limited to, silicon dioxide, silica fume, and the like are prohibited, except for:

1. Trace amounts of polymers customarily used to aid in the manufacturing process.

2. Trace amounts of natural mineral matter customarily present in commercial processed bentonite.

C. Do not use any admixture or any plugging or bridging agent unless its use has been demonstrated to be acceptable during mix design testing.

2.02 CEMENT

A. Commercially available Type II Portland cement.

2.03 WATER

A. Use Seattle city water obtained from the on-site fire water supply.

2.04 SLURRY

A. Prior to incorporating slurry into the cutoff wall, produce a bentonite slurry with city water that meets the following requirements as determined by API RP 13B:

B. Viscosity: Minimum of 40 sec. Marsh.

C. Notify CQAC 24-hours prior to testing to allow CQA Monitor to observe testing.

2.05 SLURRY MIXING FACILITIES

A. Provide slurry mixing tanks or other systems as required to produce the soil-bentonite batches.

B. Locate mixing facilities within the TFA at a location agreed to by the Port.

2.06 PORT PROVIDED SOIL-BENTONITE MIX

A. Based on Port performed laboratory testing, prepare a soil-bentonite mix with following constituents:

1. Blended on-site soil from the cutoff wall alignment, and off-site soil from Quality Aggregates with a combined fines content (particles finer than the #200 sieve) of 30 percent by dry unit weight,
2. A minimum bentonite content of 5 percent by dry weight of soil,
3. City water added to provide a soil-bentonite water content of 30 percent.

2.07 PORT PROVIDED SOIL-CEMENT-BENTONITE MIX

A. Based on Port performed laboratory testing, prepare a soil-cement-bentonite mix with following constituents.

1. Soil-bentonite proportioned in accordance with Part 2.06.A of this Section.
2. A minimum cement content of 8 percent by dry unit weight of soil.
3. Additional City water to provide a water content of 45 percent.

2.08 ALTERNATIVE MIX DESIGNS

A. Contractor may propose alternate mix designs and materials to those specified by the Port's testing.

B. Submit for Port approval proposed work plan for performing independent mix design testing to develop:

1. An alternate soil-bentonite mix that has an in-place permeability no greater than 1 x 10-7 cm/sec, as determined by ASTM D5084, tested at a net confining stress of 10 psi.
2. An alternate soil-cement-bentonite mix that has a minimum unconfined compressive strength at 28 days of 70 psi (10,000 psf) and an in-place permeability no greater than 1 x 10-6 cm/sec, as determined by ASTM D5084, tested at a net confining stress of 10 psi. greater

C. Perform the following tests on each trial soil-bentonite mix design.

1. Grain size distribution; D422.
2. Moisture content; ASTM D2216.
3. Unit weight; ASTM C138.

D. Hydraulic conductivity testing of soil-bentonite mix:

1. Use fixed-ring permeability tests and site water in accordance with ASTM D5084.
2. Perform tests on a minimum of two specimens.
3. Confirm long-term performance of mix design using LNAPL as a permeant.

E. Perform the following tests on each trial soil-cement-bentonite mix design.

1. Grain size distribution; D422.
2. Moisture content; ASTM D2216.
3. Unit weight; ASTM C138.
4. Slump; ASTM C143.
5. Unconfined compressive strength at 7, 14 and 28 days; ASTM D2166.

F. Hydraulic conductivity testing of soil-cement-bentonite mix:

1. Use fixed-ring permeability tests and site water in accordance with ASTM D5084.
2. Perform tests on a minimum of two specimens.

G. Submit complete alternative mix design test report and supporting data within 7 calendar days after completing each series of tests and at least 4 weeks prior to the beginning of cutoff wall construction (site soil testing and mix design testing). Include the following in the test report:

1. Identification of all testing procedures.
2. Tables summarizing all laboratory results.
3. Recommendation for the bentonite percentage to be used for construction, and the complete rationale for this recommendation.
4. Recommendation for the cement percentage to be used for construction, and the complete rationale for this recommendation.
5. Recommendation for soils to be used in construction.
6. All test results and test data sheets.

2.09 MIXING AND PLACING EQUIPMENT

A. Provide suitable equipment for mixing and placing soil-bentonite and soil-cement-bentonite materials, capable of achieving thorough and complete mixing and hydration.

B. Provide a cutting tool that is at least as wide as the design width of the cutoff wall.

C. Provide trenching equipment with the cutting tool attached to a track-mounted device.

D. Provide equipment with cutting tool depth controls capable of adjusting depths in 0.1 foot increments.

PART 3 - EXECUTION

3.01 PREPARATION

A. Notifications: Notify CQAC 72-hours prior to initiating slurry wall construction.

B. Use extreme care to maintain, isolate, and protect all groundwater monitoring wells, manholes, streets, utilities, and other facilities whether surface or subsurface.

3.02 SLURRY MIXING (IF INCLUDED IN SOIL-BENTONITE MIX PROCEDURES)

A. Produce bentonite slurry by gradually adding dry bentonite to city water and thoroughly mixing in a high shear mixer until a complete dispersion of bentonite is achieved.

3.03 SOIL-BENTONITE MIXING

A. Provide a means for thoroughly mixing imported soil with on-site soil, which is excavated from the cutoff wall alignment, and bentonite slurry to produce a homogeneous soil-bentonite backfill material meeting the designated mix-design performance requirements.

B. Provide a soil-bentonite backfill with a slump of 3 to 6 inches.

3.04 SOIL-CEMENT-BENTONITE MIXING

A. Provide a means for thoroughly mixing cement with soil-bentonite material to produce a homogeneous soil-bentonite backfill material meeting the designated mix-design performance requirements.

B. Provide a soil-cement-bentonite backfill with a slump of 4 to 6 inches.

3.05 CUTOFF WALL EXECUTION

A. Perform cutoff wall installation following completion of exploratory trench in accordance with the Construction Drawings and Section 02335.

B. Excavate in a safe and legal manner.

C. Provide appropriate measures to retain excavation side slopes, to prevent slope failures, and to ensure that persons at or near any excavation are protected.

D. Construct the cutoff wall trench using a continuous one-pass trenching method.

E. Unless otherwise approved by the Engineer, keep the cutoff wall within 1 foot of the design alignment.

F. Execute the work in accordance with the accepted Cutoff Wall Operation Plan to construct a uniformly homogenized cutoff wall backfill.

G. Excavate the cutoff wall trench to the horizontal and vertical lines and grades shown on the Construction Drawings.

H. Keep construction surcharges including, but not limited to, excavated material, slurry mixing operations, and pumping equipment away from the trench. Only equipment required for excavation and backfilling is allowed adjacent to the trench.

I. Do not place any frozen material into the trench.

J. Do not place ice or snow, or backfill containing ice or snow into the trench.

K. Do not mix or place backfill when the ambient air temperature is less than 35 degrees F.

3.06 CUTOFF WALL COMPLETION

A. Complete installation of soil-bentonite backfill to elevations shown on the Construction Drawings, such that a minimum of 24 inches exist between the top of the cutoff wall and the final cover grade.

B. Keep sufficient soil-bentonite backfill available to compensate for settlement/consolidation of soil-bentonite backfill in the cutoff wall. Place additional soil-bentonite backfill as needed to complete the soil-bentonite backfill to the designed finished elevation following settlement/consolidation.

C. After confirming for a minimum period of 5 days that no further settlement/consolidation is occurring in the cutoff wall backfill, add cement along alignment as shown on Construction Drawings to create a soil-cement-bentonite upper cutoff wall section having a minimum width of 6 ft and depth of 2 ft.

D. Cover the soil-cement-bentonite with plastic to facilitate curing.

E. After completing soil-cement-bentonite mixing, wait a minimum of 14 days, and document the soil-cement-bentonite achieves a strength of 8,000 psf, before placing materials over the soil-cement-bentonite,

3.07 SURPLUS SOIL BENTONITE

A. Remove surplus soil-bentonite from the TFA for off-site disposal at contractor's expense, or;

B. Thoroughly mix excess soil-bentonite with ordinary Portland cement at a minimum ratio of 6 percent, by dry unit weight, and place as backfill over subgrade soil inside the cutoff wall alignment, and allow the soil-bentonite/cement mix to cure for a minimum of 48 hours before continuing any other backfill or final cover construction above the material.

3.08 ACCEPTANCE CRITERIA

A. The basis of acceptance for the cutoff wall is:

1. Achieving a minimum 24-inch wide soil-bentonite cutoff wall section with a permeability no greater than of 1 x 10-7 cm/sec as determined by ASTM D5084 tested at a net confining stress of 10 psi.

2. Achieving an upper 2-ft thick, minimum 6-ft wide soil-cement-bentonite section with a minimum 28-day strength of 70 psi (10,000 psf), and a permeability no greater than of 1 x 10-6 cm/sec as determined by ASTM D5084 tested at a net confining stress of 10 psi.

B. Should any portion of the soil-bentonite cutoff wall not achieve the acceptance criteria, rework cutoff wall backfill by adding additional dry granular bentonite until the cutoff wall achieves this criterion.

C. Should any portion of the soil-cement-bentonite cutoff wall not achieve the acceptance criteria, propose method to rework cutoff wall backfill to achieve the specified criterion.

D. Extend rework from the failing test location in both directions along the trench to locations of passing tests.

E. Both quality control testing performed by the Contractor and quality assurance testing performed by the CQAC will be used for acceptance. Both sets of tests must indicate passing results.

3.09 QUALITY CONTROL

A. Following site preparation work (Section 02222) survey the ground elevation along the cutoff wall centerline at 25-foot intervals and at any break in alignment.

B. Determine depth of excavation from the prepared surface elevation to the bottom of the cutoff wall backfill and confirm these depths with the CQAC prior to initiating cutoff wall construction.

C. Control the cutoff wall depth by a laser guided control system that raises or lowers the cutting boom and provides a continuous record of the cutting boom tip elevation.

D. Provide quality control procedures that allow the Contractor and CQAC to easily and accurately measure the elevation at the bottom of the soil-bentonite backfill.

E. Provide quality control procedures that allow the Contractor and CQAC to accurately measure and document site soil, imported soil, bentonite, cement, and water quantities as follows

1. Imported soil to site soil ratio.
2. Bentonite to soil ratio on a dry weight basis per lineal foot of completed cutoff wall.
3. Volume of water added in gallons per lineal foot of completed soil-bentonite cutoff wall.
4. Cement to soil ratio on a dry weight basis per lineal foot of completed cutoff wall.
5. Volume of water added in gallons per lineal foot of completed soil-cement-bentonite cutoff wall.

F. On a daily basis submit to the CQAC a copy of the continuous cutting boom tip elevation record and results of QC tests performed per paragraph 3.08.

3.10 QUALITY CONTROL SAMPLING AND TESTING

A. Perform quality control sampling, and testing as listed in Table 1.

B. Quality Control Equipment: Provide all equipment necessary for quality control testing described in Table 1.

C. Provide any additional equipment necessary for any additional testing the Contractor elects to perform.

D. Provide equipment in good working order and calibrated to meet requirements of the specified test standards.

E. Use personnel experienced in the type of sampling and testing required.

F. Take samples representative of the overall volume of material from which the sample is taken.

G. Set up equipment for onsite slump and unit waste testing, and perform tests onsite unless otherwise specified.

H. Perform tests in a timely manner and submit them to the Port in writing within 24 hours of completing the tests.

I. Peer review and check all mathematical calculations.

J. Perform quality control tests in accordance with the following standards:

TABLE 1 – QUALITY CONTROL SAMPLING AND TESTING			
MATERIAL	**TEST DESCRIPTION**	**TEST STANDARD**	**MINIMUM FREQUENCY**
Field Random Sampling and Testing			
City water	Hardness	ASTM D1126	1 test
	pH	ASTM D1293	1 test
Bentonite slurry	Viscosity – Marsh Funnel	API RP 13B-1	2 per shift
	Unit Weight	ASTM D4380	2 per shift
Soil-bentonite backfill (immediately after mixing and placement in the trench)	Slump	ASTM C143	Every 75 linear ft of cutoff wall
	Unit Weight	ASTM C138	Every 75 linear ft of cutoff wall
Soil-cement-bentonite backfill (immediately after mixing and placement)	Slump	ASTM C143	Every 150 linear ft of cutoff wall
	Unit Weight	ASTM C138	Every 150 linear ft of cutoff wall
Field Random Sampling and Laboratory Testing			
Soil-bentonite backfill	Hydraulic Conductivity	ASTM D5084	Every 150 linear ft of cutoff wall
	Atterberg Limits	ASTM D4318	Every 150 linear ft of cutoff wall
	Grain size distribution with hydrometer	ASTM D422	Every 150 linear ft of cutoff wall
	Dry unit weight	ASTM C138	Every 150 linear ft of cutoff wall
	Moisture Content	ASTM D2216	Every 150 linear ft of cutoff wall
Soil-cement-bentonite backfill	Hydraulic Conductivity	ASTM D5084	Every 300 linear ft of cutoff wall
	Grain size distribution with hydrometer	ASTM D422	Every 300 linear ft of cutoff wall
	Moisture Content	ASTM D2216	Every 300 linear ft of cutoff wall
	Unconfined compressive strength	ASTM D2166	Every 300 linear ft of cutoff wall

3.11 QUALITY ASSURANCE

A. The CQAC may perform independent tests.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 61, Cutoff Wall Mobilization, will be by the lump sum (LS).

B. Measurement for Bid Item 62, Furnish Low Permeability Soil, will be by the ton (TON) based on certified weight tickets provided with each load of low permeability soil delivered to the site and incorporated into the cutoff wall.

C. Measurement for Bid Item 63, Install Cutoff Wall, will be by the lineal foot (LF) based on an as-built survey documenting the installed centerline of the wall.

4.02 PAYMENT

A. Payment for Bid Item 61, Cutoff Wall Mobilization, includes all costs to mobilize and demobilize equipment and personnel necessary to complete the cut off wall installation as shown on the Drawings and as described in Section 02469.

B. Payment for Bid Item 62, Furnish Low Permeability Soil, includes all costs for purchasing and transporting low permeability off site soil to the project site as described in Section 02469.

C. Payment for Bid Item 63, Install Cutoff Wall, includes all costs to furnish bentonite and cement products, install the cut off wall, and perform QC testing as described in the accepted Work Plan, as shown on the Drawings and as described in Section 02469.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Installing trench systems for recovery of LNAPL.

B. Furnishing, loading, hauling, placing, compacting and grading gravel to construct the LNAPL recovery trenches.

1.02 REFERENCES

A. ASTM C136 - ASTM C136 - 06 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.

C. ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures.

D. ASTM C891 Standard Practice for Installation of Underground Precast Concrete Utility Structures.

E. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compound and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

F. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

G. ASTM D 2434 – ASTM D2434 - 68(2006) Standard Test Method for Permeability of Granular Soils (Constant Head).

H. ASTM D2654 - Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

I. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.

J. ASTM D4491 - Standard Test Method for Water Permeability of Geotextiles by Permittivity.

K. ASTM D4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles.

L. ASTM D4716 – Standard Test Method for Constant Head Hydraulic Transmissivity of Geotextiles and Geotextile Related Products.

M. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile.

N. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

O. ASTM D4884 – Standard Test method for Strength of Sewn or Thermally Bonded Seams of Geotextiles

P. ASTM D5261 - Standard Test Method for Mass Per Unit Area.

Q. ASTM D6241 - Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.

R. ASTM F402 - Safe Handling of Solvent Cements, Primers, and Cleaners Used for Joining Thermoplastic Pipe and Fittings.

S. ASTM F480 - Standard Specification for Thermoplastic Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), SCH 40 and SCH 80.

T. ASTM F656 - Primers for Use in Solvent Cement Joints of (PVC) Plastic Pipe and Fittings.

U. AASHTO M55 – Welded Steel Wire Fabric for Concrete Reinforcement.

V. Engineering Design Report (EDR), Terminal 91 Tank Farm Cleanup.

1.03 RELATED SECTIONS

A. Section 02224 – Pipeline Decommissioning.

B. Section 00227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

C. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling.

D. Section 02270 – Construction Stormwater Management.

E. Section 02332 – Soil Excavation and Management.

F. Section 02339 – Engineered Fill.

G. Section 02405 – Waste Collection Storage Profiling and Disposal.

H. Section 02629 – Trench Safety and Shoring Systems.

I. Section 02722 – Crushed Base Rock and Base Course.

J. Section 02771 – Geotextile.

1.04 DEFINITIONS AND ACRONYMS

A. LNAPL: A LNAPL is one of a group of organic substances that are relatively insoluble in water and are less dense than water. LNAPLs, such as oil, tend to spread across the surface of the water table, forming a layer on top of the water table.

B. Highly Contaminated Soil: Soil that is visibly and highly contaminated with petroleum product; i.e., product-saturated soil.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED

A. Submit as part of the Project Work Plan an LNAPL Recovery Trench Work Plan that provides a description of proposed method for constructing the LNAPL recovery trenches.

B. Sheeting and Shoring Plan per Section 01305.

1.06 SUBMITTALS FOR REVIEW 14 DAYS PRIOR TO SCHEDULED INSTALLATION

A. 40 pound sample of proposed gravel fill in accordance with Section 02339.

B. Product data and manufacturer's quality control data demonstrating collector pipe and fittings comply with Part 2 of this Section.

C. Catalog cut for geotextile separator.

D. Precast concrete vaults for the sump riser pipe and the cleanout pipe. Catalog page including vault dimensions, thickness of walls, and lids.

1.07 WARRANTEES

A. Provide product warrantee for collector pipe and sump products at Contract closeout.

PART 2 PRODUCTS

2.01 LNAPL TRENCH GRAVEL

A. Free of organic material, frozen material, ice, snow or other deleterious material.

B. Meeting following gradation.

SIEVE SIZE	PERCENT PASSING
1½-inch (37.5 mm)	100
1 inch (25mm)	90 to 100
½ inch (12.5 mm)	70 to 90
No 4 (4.75 mm)	15 to 60
No. 8 (2.36 mm)	0 to 30
No 20 (0.85 mm)	0 to 3

2.02 PVC COLLECTOR PIPE AND SUMP

A. All pipe sizes indicated on the Construction Drawings and specified in this Section reference nominal diameter, unless otherwise indicated on the Construction Drawings or in this Section.

B. Horizontal collector slotted pipe - Provide 12-inch diameter PVC well screen.

1. Trenches 1 – 4: Schedule 40 PVC.
2. Trench 5: Schedule 80 PVC.
3. Flush threaded with O-ring.
4. Slotted – Factory 0.125-inch width slots at 0.25-inch or 0.375-inch spacing (standard spacing).

C. Vertical riser pipe – Provide 12-inch diameter Schedule 40 PVC well casing.

1. Flush threaded with O-ring, plain end, or bell end.

D. Vertical riser collector screen– Provide 12-inch diameter Schedule 40 PVC well casing.

1. Flush threaded with O-ring, plain end, or bell end.
2. Slotted – Factory 0.125-inch width slots at 0.25-inch spacing (standard spacing).

E. Vertical riser access pipe – Provide 6-inch diameter Schedule 40 PVC well casing or pipe. Plain end.

F. Provide pipe, well casing, and slotted screen conforming to the requirements of ASTM D1784 and ASTM D1875 and ASTM F480.:

G. Homogeneous throughout and free of visible cracks, holes, foreign inclusions, or other injurious defects. Being uniform in color, capacity, density, and other physical properties.

H. Provide the following information continuously marked on the pipe or spaced at intervals not exceeding 5 ft.

1. Name and/or trademark of the pipe manufacturer.
2. Nominal pipe size.
3. Pipe Schedule
4. Manufacturers Standard Reference.
5. A production code from which the date and place of manufacturer can be determined.

2.03 GEOTEXTILE SEPARATOR

A. Provide non-woven geotextile at the top of the LNAPL trench gravel per Section 02771.

2.04 ENGINEERED FILL

A. For LNAPL trench located outside the cutoff wall alignment use imported off-site material in accordance with Section 02339 or crushed base rock in accordance with Section 02722.

B. For LNAPL trenches located inside the cutoff wall alignment use either soil that is not designated as highly contaminated soil, in accordance with Section 02339, or imported off-site soil in accordance with Part 2.04.A, above.

2.05 CRUSHED AGGREGATE BACKFILL

A. Use base course as described in Section 02722:

2.06 ASPHALT MIX FOR REPAIR

A. Use asphalt mix per Section 02743:

2.07 PRE-CAST CONCRETE ACCESS VAULTS AND COVERS

A. Provide precast concrete vaults for the sump riser pipes and the cleanout pipes on 5 LNAPL trenches. Precast concrete vaults shall be designed and constructed in accordance with applicable ASTM standards, and manufactured in a plant specifically designed for that purpose.

B. Vault and Cover Manufacturers: Subject to compliance with the requirements, provide vaults by one of the following:

1. Oldcastle Precast, Inc.,
2. Granite Precastings & Concrete, Inc.,
3. H2 Precast Inc.,
4. Or Equal.

C. Vaults and covers constructed to meet AASHTO H20 wheel loads for occasional traffic locations.

D. Sump riser vaults: inside dimensions nominal 2 ft by 2 ft by 2 ft deep with nominal 2 ft by 2 ft cover.

E. Covers: The diamond plate lids shall have two 180-degree flush hinges, lifting ring handle, and concealed locking device. A Penta head bolt in a recessed, non-rotating cup is to be part of the required locking device. (See Figure 1, ANSI C57.12.28.1988, for typical installation). The lid shall be manufactured from a skid resistant surface, hot-dipped galvanized steel and be provided with spring-assisted opening and closing requiring a 55-pound maximum effort to open and close it. Use non-shrink cement sand grout for filling all annular spaces (riser and cleanout pipes).

2.08 CONCRETE SURROUND

A. Portland Cement Concrete with a 28-day compressive strength of 3,000 psi.

B. Reinforcing: 2-inch by 2-inch galvanized steel welded wire mesh with cross sectional area of 0.0029 square inches (2x2 W2.9/2.9), no closer than 2-1/2 inches from any concrete surface or joint, and shall conform to the requirements of AASHTO M 55.

2.09 PVC FITTINGS

A. All fitting sizes indicated on the Construction Drawings and specified in this Section reference nominal diameter, unless otherwise indicated on the Construction Drawings or in this Section.

B. Provide PVC fittings. Match fittings with the pipe schedule and diameter.

1. Coupling: 12-inch slip.

2. Tee: 12-inch slip.

3. Reducing bushing: 12-inch to 6-inch slip.

4. End cap: 12-inch slip.

C. PVC solvent cement – comply with ASTM D2564.

D. Primer – comply with ASTM F656.

2.10 WELL CAP

A. Provide 6-inch expandable locking well cap to fit 6-inch diameter Schedule 40 PVC pipe. Constructed with petroleum resistant plastic top and bottom plates, nitrile O-ring, stainless steel carriage bolt, and corrosion resistant metal locking clasp.

B. Padlock provided by others.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify stormwater BMP's are in place per Section 02770.

B. Verify soil stockpile and profiling areas are prepared and ready to receive excavated soil and asphalt per Section 02337.

C. Perform surveys to locate horizontal and vertical position of trenches and pipe collectors.

D. Locate underground and overhead piping and utilities.

E. Locate former fuel pipelines for trench located outside of the cutoff wall alignment.

F. Protect other utilities, and other features designated to remain.

G. Provide traffic controls as needed to maintain commercial traffic in the area.

H. Protect bench marks, groundwater monitoring wells, vapor probes, existing structures, fences, paving, and stormwater control systems from excavating equipment and vehicular traffic.

3.02 PRECAUTIONS

A. Barricade open holes or trenches and other depressions occurring as part of the Work and post warning signs or lights on property adjacent to or with public access.

B. Use means to control dust.

C. Maintain access to other portions of the Work at all times.

3.03 SHORING AND BRACING

A. Provide sheeting and shoring necessary for protection of the Work and for the safety of personnel in accordance with OSHA rules and regulations and per Section 02629.

B. Provide shoring in accordance with accepted Sheeting and Shoring Plan.

3.04 TRENCH EXCAVATION

A. Saw cut existing asphalt pavement where required to begin trenching. Saw cut as indicated on the Construction Drawings.

B. Remove and save underlying crushed base rock, and base course aggregates.

C. For LNAPL trench located outside of the cutoff wall alignment:

1. Expose the upper 4 ft of the trench with a backhoe to physically identify utilities and fuel pipelines.

2. Cut, decommission, and cap former fuel pipeline from the trench alignment per Section 02224.

3. Support or temporarily remove the railroad tracks during excavation.

D. Trench and excavate to the minimum width necessary for proper installation and inspection of the LNAPL trench gravel and collector pipe installation, with sides as nearly vertical as possible.

E. Remove water or materials that interfere with Work and handle in accordance with Section 02270.

F. Do not interfere with bearing splay of building foundations.

G. Minimum setback from cutoff wall is 15 ft in all directions.

H. Observe safe and appropriate setbacks from overhead piping and utilities.

I. Stockpile excavated highly contaminated soil per Section 02232.

3.05 LNAPL TRENCH BACKFILL

A. Do not compact or consolidate trench backfill by jetting with water or other means.

B. Place gravel backfill to the dimensions, thickness and elevations indicated on the Construction Drawings.

C. Employ a placement method that does not disturb or damage collector pipe and sump.

3.06 PLACING GRAVEL IN LNAPL TRENCHES

A. Gravel for LNAPL trenches is not required to be compacted.

B. Place gravel in such a way to completely surround the perforated pipes.

3.07 COLLECTOR PIPE AND SUMP INSTALLATION

A. Place collector pipes and sumps at the locations and positions shown on the Construction Drawings.

B. General requirements.

1. Verify that pipe, casing, and fitting diameters and schedules match those shown on the Construction Drawings and Specifications.

2. Inspect all materials and verify clean and new condition.'

3. Keep water out of the trench until joining is completed.

4. Secure open ends of pipe when work is not in progress, so that no water, earth, or other substance will enter the pipe or fittings.

5. Plug or cap pipe ends left for future connections. Keep the site free of rocks, stumps, and debris that could cut, scar, or gouge the pipe.

6. Take care not to drop or otherwise damage PVC pipe, well casing, and fittings.

7. Keep connecting surfaces clean, and free of burrs and debris.

8. Handle slotted well screen with clean gloves and prevent debris from blocking the slots.

C. PVC Solvent Welding.

1. Select proper solvent cement and primer.

2. Condition pipe and fittings at the same temperature before starting assembly.

3. Assemble pipes and fittings above grond where possible or in areas of good air circulation.

4. Cut the pipe square to desired length, remove burrs, and chamfer the pipe end using a factory bevel as a guide to the length and taper.

5. Clean and dry the pipe and fitting to remove all dirt, moisture, and grease using a clean and dry rag.

6. Check dry fit by inserting pipe into half depth of the socket.

7. Apply primer to the inside of the socket and to the spigot following manufactures instructions. Select an applicator that is at least ½ the size of the socket.

8. Apply solvent cement while the primer is still wet following manufacturers instructions. Select and applicator that is at least ½ the size of the socket.

9. Assemble the socket and spigot while cement is still wet. Push and twist the socket onto the spigot until it bottoms out, and hold together until the cement sets to avoid pushout. Additional holding or restraint of pipe may be required for the larger sizes.

10. Remove all excess cement from the outside of the joint using a clean dry rag. Avoid disturbing the joint. Excess cement may cause weakening of the joint and additional cure time.

11. Allow joint to set before disturbing.

12. Do not pressurize or test until the appropriate cure time has been achieved. Refer to manufacturers cure time recommendations.

D. Flush Threaded Pipe Assembly.

1. Clean and dry the pipe and fitting to remove all dirt, moisture, and grease using a clean and dry rag.

2. Install O-ring if not supplied with the pipe or casing.

3. Thread pipes together firmly to make a watertight seal. Take precautions to prevent cross threading and do not overtighten.

3.08 VAULT INSTALLATION

A. Prepare an excavation large enough to accommodate the vault and permit grouting of openings and backfilling.

B. The bottom of the structure shall be placed on 6 inches of compacted, crushed rock subbase, and graded level.

C. Set and level vault inside the excavation.

D. Drill holes in the vault walls and bottoms to accommodate the sump riser pipe and cleanout riser pipe. Following pipe installation, seal the drilled holes with waterproof cement sand grout.

E. Access covers shall be installed such that the hatch is ½-inches above the surrounding final grade shown on the drawings.

F. Install concrete surround around each vault a shown on the drawings. Slope the surround from the cover to match final grade.

3.09 RISER PIPE COMPLETION

A. Complete the sump riser pipe so that the locking expandable well cap is within 6 inches of the access cover bottom, and does not interfere with the access cover operation.

1. Cut the 12-inch 40 PVC riser pipe flush.

2. Install the 12-inch PVC coupling onto the PVC riser pipe to the full depth of the slip fitting. Solvent weld the joint per Section 3.07C.

3. Insert the 12-inch by 6-inch PVC reducer bushing into the top of the 12-inch PVC coupling.

4. Secure the PVC reducer bushing to the 12-inch coupling pipe with four (4) 1-inch long galvanized lag screws (90 degree separation), and seal the exposed end of the PVC coupling to the reducer bushing using clear waterproof silicone caulk. Drill pilot holes prior to installing the lag screws to protect from cracking the coupling and reducer bushing.

5. Install the 6-inch PVC access riser pipe into the reducer bushing. Solvent weld the joint per Section 3.07C.

6. Install well cap into the 6-inch access riser and secure.

3.10 GEOTEXTILE SEPARATOR

A. Install geotextile separator over the top of the LNAPL Trench Gravel as shown on the Construction Drawings.

B. Comply with applicable installation requirements described in Section 02771.

3.11 ENGINEERED FILL BACKFILL

A. Place engineered fill to the dimensions, thickness and elevations indicated on the Construction Drawings.

B. Place and compact engineered fill in continuous layers not exceeding 12 inches to a minimum relative compaction of 92 percent as determined by ASTM 1557:

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Employ a placement method that does not disturb or damage collector pipe or riser in trench.

3.12 CRUSHED BASE ROCK AND BASE COURSE BACKFILL

A. Place to the dimensions, thickness and elevations indicated on the Construction Drawings.

B. Place and compact aggregate backfill in continuous layers not exceeding 8 inches to a minimum relative compaction of 95 percent as determined by ASTM D698:

C. Maintain optimum moisture content of fill materials to attain required compaction density.

D. Employ a placement method that does not disturb or damage collector pipe or riser in trench.

E. Place aggregates to a compacted thickness equal to the thickness removed.

3.13 ASPHALT PAVEMENT REPAIR

A. Repair per Section 02743.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 64 LNAPL Recovery Trench Outside the TFA will be by the each (EA).

B. Measurement for Bid Item 65 LNAPL Recovery Trench Inside the TFA will be by the each (EA).

4.02 PAYMENT

A. Payment for Bid Item 64 LNAPL Recovery Trench Outside the TFA includes all costs to furnish pipe, gravel, vault, and geotextile products, and to install the LNAPL trenches as described in the accepted Work Plans, as shown on the Drawings and as described in Sections 02621, and 02771. Also includes costs to furnish and install crushed base rock, base course, and asphalt pavement to repair the pavement areas.

B. Payment for Bid Item 65 LNAPL Recovery Trench Inside the AOC includes all costs to furnish pipe, gravel, vault, and geotextile products, and to install the LNAPL trenches as described in the accepted Work Plans, as shown on the Drawings and as described in Sections 02621, and 02771. Costs to furnish and install crushed base rock, base course, and asphalt pavement areas are covered under Bid Items 73 through 75.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Requirements for the safety systems used in the excavation of trenches.

1.02 RELATED SECTIONS

A. Section 02211 – Decontamination Procedures.

B. Section 02222 – Tank Farm Area Preparation.

C. Section 02223 – Utility Demolition and Management.

D. Section 02224 – Pipeline Decommissioning.

E. Section 02332 – Soil Excavation and Management.

F. Section 02333 – SWMU 30 Excavation and Backfill.

G. Section 02335 – Exploratory Trench Excavation.

H. Section 02469 – Cutoff Wall.

I. Section 02621 – LNAPL Recovery Trenches.

1.03 REFERENCES

A. R.C.W. Chapter 49.17 WISHA.

B. Chapter 296-155 WAC, Safety Standards for Construction Work.

C. Chapter 296-155-660 WAC.

D. R.C.W. Chapter 39.04.180 Public Works/Trench Excavations - Safety Systems Required.

1.04 DEFINITIONS AND ACRONYMS

A. Light Non-Aqueous Phase Liquid (LNAPL): A LNAPL is one of a group of organic substances that are relatively insoluble in water and are less dense than water. LNAPLs, such as oil, tend to spread across the surface of the water table, forming a layer on top of the water table.

B. Tank Farm Area (TFA): The area generally within the limits of the TFLP that includes the cutoff wall and within which the cleanup activities will be performed.

C. Tank Farm Lease Parcel (TFLP): approximately 4 acre parcel within Terminal 91 as shown Exhibit B of Agreed Order DE 8938. The TFLP was the location of the former tank farm, the above ground portions of which were demolished in 2005.

1.05 SUBMITTALS PRIOR TO NOTICE TO PROCEED.

A. Submit a Sheeting and Shoring Plan to stabilize excavations greater than four ft in depth. Submit per Section 01305.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.01 TRENCH EXCAVATION SAFETY SYSTEMS

A. Protect all utility trench excavations in excess of 4 ft in depth with a safety system conforming to the referenced requirements.

B. Have a qualified person design the trench safety systems to meet the referenced regulations.

3.02 SHEETING AND SHORING SAFETY SYSTEMS

A. Install sheeting and shoring and water management systems in the following excavations:

1. Excavations necessary to demolish oil/water separator and stormwater sumps in the TFA.
2. SWMU 30 excavation.
3. LNAPL recovery trenches.
4. Excavations greater than 4 ft deep that are required to expose and decommission pipelines.

3.03 WATER MANAGEMENT AND TREATMENT

A. Treat collected water per Sections 02270 and 02405, or manage water in the excavation without removing it.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No separate measurement will be made for Trench Safety and Shoring Systems.

4.02 PAYMENT

A. No separate payment will be made for Trench Safety and Shoring Systems. Include costs for furnishing, installing and maintaining Trench Safety and Shoring Systems and other Bid Items.

End of Section

PART 1 GENERAL

1.01 SUMMARY OF WORK

A. Furnishing and installing storm drainage systems associated with final cover in the TFA.

1.02 RELATED SECTIONS

A. Section 02339 – Engineered Fill.

B. Section 02722 – Crushed Base Rock and Base Course.

C. Section 02743 – Asphalt Concrete Pavement.

1.03 REFERENCES

A. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft3 (2,700 kN-m/m3)].

C. ASTM D2216 — Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

D. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (United Soil Classification System).

E. ASTM D 4318. Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

F. ASTM D4643 - Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Heating.

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

H. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

PART 2 PRODUCTS

2.01 CORRUGATED HDPE STORM DRAIN PIPE

A. Drain pipe with smooth walled interior and exterior annular corrugations of high density polyethylene (HDPE) meeting the requirements of AASHTO M252 8” diam. pipe) and AASHTO M294, Type S (12” diam. and larger pipe). Joints shall be made with a bell/bell or bell and spigot coupling conforming to ASTM D 3212 and use elastomeric gaskets conforming to ASTM F 477. All gaskets shall be factory installed on the pipe in accordance with the manufacturer’s recommendations.

2.02 DUCTILE IRON STORM DRAIN PIPE

A. Ductile iron pipe: Class 50 conforming to ANSI A21.51 or AWWA C151 and cement mortar lined, push-on joint or mechanical joint. .

B. Joints for ductile iron pipe: rubber gasketed conforming to the requirements of ANSI A21.11 or AWWA C111.

2.03 MANHOLES AND CATCH BASINS

A. Precast concrete units made from components indicated on the Construction Drawings.

B. Manhole Rings and Covers: cast-iron or ductile iron castings of the size and style indicated on the Construction Drawings.

C. Metal Frame and Grate for Catch Basins or Inlets: cast steel or ductile iron of the size and style indicated on the Construction Drawings.

D. Mortar: mixed 1:1; Type I Cement and Sand.

2.04 BEDDING AND COVER MATERIALS.

A. Bedding: HPDE pipe bedding shall be Type 9 or 22. Bedding for ductile iron pipe shall be Mineral Aggregate Type 10.

B. Trench Backfill: Comply with Section 02339, Engineered Fill for final cover.

2.05 OIL/WATER SEPARATORS.

A. Oil/Water separator shall be a coalescing plate type with a nominal capacity of 290 gpm and enclosed in a precast concrete vault as indicated.

B. Oil/Water Separator shall be Contech Model VCL90-1 or Oldcastle Precast Model 816-1 CPS or equivalent.

C. Vault hatches shall be sized as indicated and rated for HS-20 loading.

2.06 WATER QUALITY VAULTS.

A. The water quality vault shall be a cartridge type filter with a nominal capacity of 0.55 cfs (248 gpm) enclosed in a precast concrete vault as indicated.

B. Cartridges shall be “low drop” type and rated for treatment of 5gpm per cartridge.

C. Vault hatches shall be sized as indicated and rated for HS-20 loading.

PART 3 EXECUTION

3.01 PREPARATION

A. Perform surveys to establish line and grade of storm drains and structures.

B. Protect monitoring systems and utilities designated to remain.

3.02 TRENCHING AND BEDDING

A. Excavate storm drain trench to 6 inches below pipe invert. Hand trim excavation for accurate placement of pipe to design elevations.

B. Manage excavated soils per Section 02332.

C. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth.

D. Backfill around sides and to three inches over the top of the pipe with bedding materials tamped in place and compacted to a minimum of 90 percent relative compaction as determined by ASTM D698.

E. Maintain optimum moisture content of bedding material to attain required compaction density.

3.03 STORM DRAIN PIPE INSTALLATION

A. Install pipe and accessories in accordance with manufacturer's instructions.

B. Lift or roll pipe into position. Do not drop or drag pipe over prepared bedding.

C. Shore pipe to required position; retain in place until after compaction of adjacent fill materials.

D. Ensure pipe remains in correct lateral position and at the designed slope.

E. Place the pipe in appropriate bedding graded to conform to the grades and alignment indicated on the Construction Drawings.

F. Ensure that the pipe has a full, solid bearing along its entire length.

G. Provide small depressions for pipe bells when utilized.

H. Make minor adjustments to line and grade by scraping away, or filling in with, bedding material.

I. Do not support pipes on blocks or mounds of any nature

3.04 STORM DRAIN PIPE BACKFILL

A. Install soil backfill materials the pipe bedding, and compact to a minimum relative compaction of 90 percent as determined by ASTM D1557.

B. Install base course backfill materials and compact to a minimum relative compaction of 95 percent as determined by ASTM D1557.

C. Provide top cover to minimum compacted thickness of 12 inches.

3.05 INSTALLATION OF CATCH BASINS AND INLETS

A. Place catch basins and inlets at the elevation and location indicated on the Construction Drawings and on bedding.

B. The inlet frame may be either cast into a concrete collar or set flange down on concrete adjustment blocks and mortared. Do not, in any case, grout to final grade until the final elevation of the pavement, gutter, ditch, or sidewalk in which it is to be placed has been established.

C. Grout pipe inserts tightly in place at openings in catch basin or manhole walls after storm drain pipe has been placed to its final position.

D. Place the socket end of the pipe through catch basin wall so that it is backed against the outside surface of the catch basin as closely as practicable for the angle of entrance.

E. Square cut the spigot end of the pipe flush with the inside wall surface.

F. Pack bank-run gravel or crushed rock around the openings in the catch basin inlets to provide uninterrupted drainage from the adjacent roadway subgrade into the catch basin.

3.06 ASPHALT PAVEMENT REPAIR

A. Repair per Section 02743.

3.07 QUALITY CONTROL

A. 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 resulting level or back sloping length of pipe does not occur; and, no more than one-half of the permissible variation accumulates between successive joints.

B. Pipe laid within these tolerances is not subject to any further adjustment.

C. Measure grade at the pipe invert, not top of pipe.

3.08 QUALITY ASSURANCE

A. The Port may perform independent tests.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 66, Furnish and Install Ductile Iron Storm Drain Pipe will be by the lineal foot (LF) based on an as-built survey of the installed pipeline.

B. Measurement for Bid Item 67 Furnish and Install Storm Drain Manholes will be by the per each (EA) basis.

C. Measurement for Bid Item 68 Furnish and Install Storm System Catch Basins will be by the per each (EA) basis.

D. Measurement for Bid Item 69, Furnish and Install Stormwater System Oil/Water Separator, will be by the per each (EA) basis.

E. Measurement for Bid Item 70, Furnish and Install Water Quality Vaults, will be by the per each (EA) basis.

4.02 PAYMENT

A. Payment for Bid Item 66, Furnish and Install Ductile Iron Storm Drain Pipe includes all costs to furnish and install ductile iron stormwater drainage pipes and bedding as shown on the drawings and as described in Section 02630.

B. Payment for Bid Item 67 Furnish and Install Storm Drain Manholes includes all costs to furnish and install storm drain manholes, geotextile, and bedding as shown on the Drawings and as described in Sections 02630 and 02771.

C. Payment for Bid Item 68 Furnish and Install Storm System Catch Basins includes all costs to furnish and install ductile iron storm system catch basins, geotextile, and bedding as shown on the Drawings and as described in Sections 02630 and 02771.

D. Payment for Bid Item 69, Furnish and Install Stormwater System Oil/Water Separator, includes all costs to furnish and install oil/water separators, geotextile, and bedding as shown on the Drawings, and as described in Sections 02630 and 02771.

E. Payment for Bid Item 70, Furnish and Install Water Quality Vaults, includes all costs to furnish and install water quality vaults, geotextile, and bedding as shown on the Drawings, and as described in Sections 02630 and 02771.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing all materials, labor, equipment, field supervision, and installing a segmental concrete block gravity retaining wall system on the north side of Building M-28 in conjunction with the construction of the final cover system.

B. Install 4-ft high safety fencing along top of wall.

C. Conform with Construction Drawings.

1.02 RELATED SECTIONS

A. Section 02222 – Tank Farm Area Preparation.

B. Section 02223 – Utility Demolition and Management.

C. Section 02332 – Soil Excavation and Management.

D. Section 02339 – Engineered Fill.

E. Section 02469 – Cutoff Wall.

F. Section 02630 – Storm Drainage Systems.

G. Section 02722 – Crushed Base Rock and Base Course.

H. Section 02743 – Asphalt Concrete Pavement.

I. Section 02771 – Geotextile.

1.03 REFERENCES

A. AASHTO - LRFD Bridge Design Specifications. 2012.

B. AASHTO - Standard Specifications for Transportation Materials and Methods of Sampling and Testing, Washington, D. C. 2012.

C. ASTM D422 – Standard Test Method for Gradation of Soils.

D. ASTM D424 – Standard Test Method for Determination of Atterberg Limits of Soils.

E. ASTM D698, D1557 – Standard Specification for Moisture Density Relationship for Soils, Standard Proctor and Modified Proctor Methods.

F. ASTM C33 - Standard Specification for Concrete Aggregates.

G. ASTM C150 – Use of Cement in Concrete Blocks.

H. ASTM C260 – Use of Air-Entraining Admixtures in Concrete.

I. ASTM C494 – Use of Chemical Admixtures in Concrete.

J. ASTM C805 – Schmidt Hammer Test for the determination of Compressive Strength of Concrete.

K. ASTM G51 – Standard Test Method for Determination of Soil pH.

L. National Concrete Masonry Association (NCMA) TEK 2-4A - Specification for Segmental Retaining Wall Units.

1.04 DEFINITIONS AND ACRONYMS

A. ASTM – ASTM International.

B. Concrete Block Unit – A segmental concrete unit with shear keys generally made in the yard of a ready-mix concrete supplier.

C. Drainage Gravel - Free-draining, well-graded and coarse-grained aggregates placed immediately behind the blocks to relieve hydrostatic pressures or seepage.

D. Retained Soil - compacted engineered fill placed immediately behind drainage fill. The primary function of the gravity wall is to retain this soil mass and provide pedestrian access along the north side of Building M-28.

E. Leveling Pad / Wall Foundation - Compacted crushed rock pad for distributing the weight of block wall over a wider area and for providing a working surface during construction.

F. Foundation Subgrade - Compacted engineered fill subgrade for supporting the block wall structure.

G. Geotextile Separator – A filter fabric (with adequate permittivity or porosity) placed between drainage media and retained soil mass to minimize clogging of drainage media.

1.05 SUBMITTALS

A. Following submittals shall be made 30 days prior to the start of construction.

1. List of successfully completed projects with related project references.

2. Product Data – Manufacturer's materials specifications, installation instructions, and general recommendations.

1.06 QUALITY CONTROL

A. Pre-Construction Meeting – A meeting between the Design Engineer, Contractor, and the Port at the site in order to review the retaining wall design and construction requirements.

B. A notification shall be sent to all the parties at least three 3 days in advance of the time of the meeting.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Inspect and confirm proper type and grade of materials are delivered.

B. Avoid mud, wet concrete, epoxy, or other deleterious materials from coming in contact with and affixing to materials.

C. Segregate and do not use in wall construction any damaged materials.

PART 2 PRODUCTS

2.01 CONCRETE BLOCK SEGMENTAL UNITS

A. The units shall be intended for gravity retaining wall applications.

B. The units shall be made from concrete having a have 28-day compressive strength of at least 2,200 psi.

C. The units shall have a minimum width of 2.5 feet and lengths of at least 2.5 ft.

D. The units shall have integrated interlocking shear keys that enable blocks to be staggered and stacked.

E. All individual units shall be free of cracks and other defects that would interfere with the placement and locking of units. All shear keys shall be free of damage.

F. A tolerance of 1/2 inch for all dimensions except the height may be used. A tolerance of 1/4 inch shall be used for height.

2.02 LEVELING PAD GRAVEL

A. Leveling pad ¾-inch minus crushed gravel.

B. Meeting the following gradation.

SIEVE SIZE	PERCENT PASSING
1-inch	100
3/4 inch	90 to 100
3/8-inch	20 to 50
No 4	0 to 10
No. 8	0 to 5

2.03 DRAINAGE GRAVEL

A. Drainage gravel shall consist of free draining, all-weather, coarse-grained materials.

B. Meeting the following gradation.

SIEVE SIZE	PERCENT PASSING
1-inch	75 to 100
3/4 inch	50 to 75
No 4	0 to 60
No 40	0 to 50
No. 200	0 to 5

2.04 COLLECTION PIPE

A. The drainage collection pipe shall be placed as shown on the plans. The pipe shall be a perforated or slotted, PVC or corrugated HDPE pipe. The pipe shall be wrapped in filter fabric. The pipe shall be manufactured in accordance with ASTM D3034.

2.05 GEOTEXTILE

A. Geotextile separator meeting requirements of Section 02771.

PART 3 EXECUTION

3.01 FOUNDATION PREPARATION

A. Excavate foundation trench to the dimensions indicated on the Construction Drawings.

B. Compact foundation subgrade soils to a minimum of 95 percent standard Proctor dry density in accordance with ASTM D698 before placing the leveling pad.

3.02 LEVELING PAD INSTALLATION

A. Place and compact minimum 6-inch thick layer leveling pad gravel, meeting the requirements of Part 2.03, to 95% of ASTM D 1557 modified Proctor density.

B. Surface of leveling pad to be consistent with required batter of wall.

3.03 UNIT/BLOCK INSTALLATION

A. Installation shall be in accordance with manufacturer guidelines.

B. A track-mounted excavator is the ideal equipment for block installation. A wire attached to the excavator and used for lifting, moving, and placing the blocks.

C. Place the first course of units only after the leveling pad has been approved for adequate batter.

D. Block placement should start at the lowest elevation. At the start of the wall, make a line perpendicular to the face of the wall so the first block can be placed square to the wall face. Set blocks at the back of the wall first, i. e. if the width of the wall base is larger than the block width, then the first block shall be place at the back followed by the front block.

E. All units shall be placed together and parallel to the line of the wall face.

F. The units shall be installed free of all protrusions, debris before installing the next course of units.

G. Do not place any more than 5 to 6 blocks along the first course before starting on the second course.

H. At the completion of the placement of each course, a string line shall be pulled to confirm that the walls geometry is being maintained.

I. Wall corners shall be installed and locked per the block manufacturer's recommendation.

J. The toe of the wall shall be filled and compacted as the wall is being constructed.

3.04 DRAINAGE GRAVEL

A. Place the drainage gravel, consistent with Part 2.04, within an envelope of 12 inches behind the wall.

3.05 RETAINED BACKFILL PLACEMENT

A. Only hand-operated compaction equipment shall be used within 5 ft of the back face of units. This area shall be compacted to a minimum 90 percent of Standard Proctor Dry Density in accordance with ASTM D698-98.

3.06 TOLERANCE

A. Wall batter tolerance of 1/8 in. per ft. maximum shall be allowed.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 71, Furnish and Install Segmental Concrete Block Gravity Retaining Wall, will be by the square foot (SF) based on a field measurement of the installed face of the wall.

B. Measurement for Bid Item 72, Furnish and Install Safety Fencing, will be by the lineal foot (LF) based on a field measurement made along the alignment of the installed fence.

4.02 PAYMENT

A. Payment for Bid Item 71, Furnish and Install Segmental Concrete Block Gravity Retaining Wall, includes all costs to furnish and install segmental concrete block gravity retaining wall, including leveling pad, drainage gravel, and collection pipe as shown on the Drawings and as described in Section 02660.

B. Payment for Bid Item 72, Furnish and Install Safety Fencing Along Top of Segmented Retaining Wall, includes all costs to furnish and install OSHA-approved safety fencing along the top of the segmented retaining wall.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing, transporting, placing, shaping and compacting crushed base rock and base course to construct the new asphalt final cover within the TFA.

B. Furnishing, transporting, placing, shaping and compacting crushed base rock and base course to repair asphalt pavement in the following areas:

1. SWMU 30.
2. LNAPL Recovery Trenches.
3. Exposed pipelines.
4. Stormwater systems.
5. Decommissioned monitoring wells and vapor probes.

1.02 RELATED SECTIONS

A. Section 02222 – Tank Farm Area Preparation

B. Section 02223 – Utility Demolition and Management

C. Section 02224 – Pipeline Decommissioning

D. Section 02227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

E. Section 02228 – Asphalt and Concrete Crushing, Screening and Stockpiling

F. Section 02332 – Soil Excavation and Management

G. Section 02333 – SWMU 30 Excavation and Backfill.

H. Section 02339 – Engineered Fill

I. Section 02630 – Storm Drainage Systems.

1.03 REFERENCES

A. Washington State Department of Transportation (WSDOT): WSDOT - Standard Specifications for Road, Bridge, and Municipal Construction; and Amendments (current edition).

B. ASTM D422 - Standard Test Method for Particle-Size Analysis of Soils.

C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)].

D. ASTM D2216 — Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

E. ASTM D2487 - Standard Classification of soils for engineering purposes (United Soil Classification System).

F. ASTM D 4318. Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

G. ASTM D4643 - Standard Test Method for Determination of Water (Moisture) Content of Soil by the Microwave Oven Heating.

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

I. ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

1.04 DEFINITIONS AND ACRONYMS

A. Construction Quality Assurance Consultant (CQAC).

1.05 SUBMITTALS FOR REVIEW DURING CONSTRUCTION

A. Provide a 40-pound sample of proposed crushed base rock and base course material 14 days prior to scheduled installation.

1.06 POST CONSTRUCTION SUBMITTALS

A. Provide base course installation quality control test reports within 14 days of completing final cover installation.

PART 2 PRODUCTS

2.01 BASE COURSE

A. Manufactured from ledge rock, talus, or gravel.

B. Provide aggregate of uniform quality, free from wood, roots, bark and other extraneous material, and meeting the following test requirements:

Los Angeles Wear, 500 Rev.	35% max.
Degradation Factor - Base Course	15 min.

C. Meeting the following requirements for grading and quality when placed in the hauling vehicle for delivery to the site:

U.S. SIEVE SIZE	PERCENT PASSING
1-1/4" sq. sieve	95 - 100
5/8" sq. sieve	50 to 80
1/4" sq. sieve	30 to 50
U.S. No. 40 sieve	3 to 18
U.S. No. 200 sieve	7.5 max.
Sand Equivalent	40 min.

D. Not less than 75 percent of Crushed Base Course retained on a U.S. No. 10 sieve must have at least one fractured face produced by mechanical crushing.

2.02 CRUSHED BASE ROCK

A. Manufactured from ledge rock, talus, or gravel.

B. Provide aggregate of uniform quality, free from wood, roots, bark and other extraneous material, and meeting the following test requirements:

Los Angeles Wear, 500 Rev.	35% max.
Degradation Factor – Crushed Base Rock	25 min.

C. Meeting the following requirements for grading and quality when placed in the hauling vehicle for delivery to the site:

U.S. SIEVE SIZE	PERCENT PASSING
1-1/4" sq. sieve	100
5/8" sq. sieve	100
1/4" sq. sieve	55 to 75
U.S. No. 40 sieve	8 to 24
U.S. No. 200 sieve	10 max.
Sand Equivalent	40 min.

D. Not less than 75 percent of Crushed Base Rock retained on a U.S. No. 10 sieve must have at least one fractured face produced by mechanical crushing.

PART 3 EXECUTION

3.01 EQUIPMENT

A. Provide equipment necessary for satisfactory installation of crushed base rock and base courses.

B. 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. Provide a bubble or indicator with movement no less than 1/8 inch for each 0.1% change in transverse slope.

3.02 PREPARATION

A. Proof roll subgrade surfaces to assure there are no areas where the surface is yielding under equipment loading.

3.03 PLACEMENT OF BASE COURSE AND CRUSHED BASE ROCK AGGREGATES

A. Mix each layer of material after placement by motor graders or other approved equipment until the mixture is uniform throughout.

B. Add water as needed to facilitate mixing and compacting.

C. Use approved equipment to place and spread each layer of crushed base rock and base course such as bottom-dump hauling equipment with transverse spreading facilities; self-propelled spreading and leveling machines; or spreader boxes equipped with wheels.

D. Spread each layer in loose lifts not exceeding 8 inches.

E. Immediately following spreading and shaping, compact each layer to a minimum relative compaction of 95% as determined by ASTM D698.

F. Use vibratory compactors or rollers adequate in design and number to provide compaction and obtain the specified density for each layer while still moist.

G. Apply a mist spray of water as needed to replace moisture lost by evaporation.

H. 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.

I. Should irregularities develop in any surface during or after compaction, remedy by loosening the surface and correcting the defects, and then thoroughly re-compact the entire area.

3.04 SURFACE FINISH

A. Provide a completed surface that is uniform smooth, tight, surface true to the lines, grades and cross sections shown on the Construction Drawings.

B. Surface variations: a maximum of 1/4 inch in 10 ft.

C. Shave off or fill in variations greater than the allowable and re-compact that area.

3.05 QUALITY CONTROL

A. Perform inspection and tests described below and, based upon the results of these inspections and tests, take the action required and submit specified reports.

1. Sampling and Testing of Materials:

2. Base Course and Crushed Base Rock Density:

3. Base Course and Crushed Base Rock Thickness:

4. Crushed Base Rock Smoothness:

3.06 QUALITY ASSURANCE

A. The CQAC may perform independent testing including:

1. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort [56,000 ft-lbf/ft3 (2,700 kN-m/m3)].

2. ASTM D2216 — Standard Test Method for determining water content of soil aggregate mixtures.

3. ASTM D6938 - 08a Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 73, Furnish and Place Crushed Base Rock for Final Cover, will be by the cubic yard (CY) based on a survey of the installed Crushed Base Rock area multiplied by the designed neat line thickness shown on the drawings.

B. Measurement for Bid Item 74, Furnish and Place Base Course for Final Cover, will be by the cubic yard (CY) based on a survey of the installed Base Course area multiplied by the designed neat line thickness shown on the drawings.

C. No measurement will be made for furnishing and placing crushed base rock and base course to repair asphalt pavement outside of the TFA.

4.02 PAYMENT

A. Payment for Bid Item 73, Furnish and Place Crushed Base Rock for Final Cover includes all costs to furnish, place, shape and compact base rock as described in Section 02722.

B. Payment for Bid Item 74, Furnish and Place Base Course for Final Cover includes all costs to furnish, place, shape and compact base course as described in Section 02722.

C. No payment will be made for furnishing and placing crushed base rock and base course to repair asphalt pavement outside of the TFA. Include costs for this work in other Bid Items.

End of Section

PART 1 GENERAL

1.01 SUMMARY

A. Producing, transporting, placing, shaping and compacting plant mixed hot mix asphalt (HMA) to construct the TFA final cover.

B. Producing, transporting, placing, shaping and compacting HMA to repair asphalt pavement removed from the following areas:

1. SWMU 30.
2. LNAPL Recovery Trenches.
3. Exposed pipelines.
4. Stormwater systems.
5. Decommissioned monitoring wells and vapor probes.
6. Any other area where existing pavement is demolished and removed as part of the work.

1.02 RELATED SECTIONS:

A. Section 02222 – Tank Farm Area Preparation

B. Section 02223 – Utility Demolition and Management

C. Section 02224 – Pipeline Decommissioning

D. Section 02227 – Monitoring Well and Vapor Probe Decommissioning and Protection.

E. Section 02228 - Asphalt and Concrete Crushing, Screening and Stockpiling

F. Section 02332 – Soil Excavation and Management

G. Section 02333 – SWMU 30 Excavation and Backfill.

H. Section 02630 – Storm Drainage Systems.

I. Section 02722 – Crushed Base Rock and Base Course.

1.03 REFERENCES

A. Washington State Department of Transportation (WSDOT) Standard Specifications For Road Bridge and Municipal Construction, M 41-10, 2012

B. Washington State Department of Transportation (WSDOT) Standard Specifications For Road Bridge and Municipal Construction, M 41-10, 2012, and Sections 5-04 Hot Mix Asphalt, 9-02 Bituminous Materials, and 9−03.8, Aggregates for Hot Mix Asphalt, HMA Class 3/4-Inch.

C. AASHTO T 230 - Standard Method of Test for Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures.

D. AASHTO M-17.

1.04 DEFINITIONS AND ACRONYMS

A. Hot Mix Asphalt: HMA.

B. Combined Aggregate: All mineral constituents of asphalt concrete mix, including mineral filter and separately sized aggregates.

C. Construction Quality Assurance Consultant (CQAC).

D. Standard Specifications: Washington State Department of Transportation (WSDOT) Standard Specifications for Road, Bridges, current edition.

1.05 SUBMITTALS FOR REVIEW 14 DAYS PRIOR TO INSTALLATION

A. Asphalt Concrete Mix Design per paragraph 2.01.

B. Proposed Tack Coat Product.

C. Proposed Crack Sealant Product.

D. Proposed Batch Plant.

E. Proposed paving subcontractor and evidence that the subcontractor has experience and competency in placing HMA on a project of similar size and complexity.

F. Provide documentration that aggregate for HMA meets the following test requirements

1. The fracture requirements for the combined coarse aggregate shall apply to the material retained on the No.4 sieve and above. when tested in accordance with FOP for AASHTO T 335.

ESAL's	#Fractured Faces	% Fracture
<10	1 or more	90
>or =	2 or more	90

2. The uncompacted void content for the combined fine aggregate is tested in accordance with WSDOT Test Method for AASHTO T 304. Method A. The minimum percent voids shall be as required in the following table:

Traffic	HMA Evaluation	
ESAL's (millions)	Statistical and Nonstatistical	Commercial
<3	40	40
>or = 3	44	40

3. The minimum sand equivalent for the aggregate shall be 45.
The mix design shall produce HMA mixtures when combined within the limits set forth in Section 9-03.8(6) od WSDOT and mixed in the laboratory with the designated grade of asphalt binder using the Superpave gyratory compactor in accordance with WSDOT SOP for AASHTO T 312, and at the required gyrations for N initial, N design, and N maximum with the following properties:

Mix Criteria	**HMA Class**							
	Min.	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**	**Min.**	**Max.**
	15.0		14.0		13.0		12.0	
Voids in Mineral Aggregate								
ESAL's (millions)	VFA							
<0.3	70	80	70	80	70	80	67	80
0.3 to <3	65	78	65	78	65	78	65	78
3 to <10	73	76	65	75	65	75	65	75
10 to <30	73	76	65	75	65	75	65	75
>or = 30	73	76	65	75	65	75	65	75
Dust/Asphalt Ratio	0.6	1.6	0.6	1.6	0.6	1.6	0.6	1.6
Stripping Evaluation WSDOT Test Method T 718	Pass		Pass		Pass		Pass	

	ESAL's (millions)	N initial	N design	N maximum
%Gmm	<3	<or= 91.5	96.0	<or= 98.0
	0.3 to <3	<or= 90.5	96.0	<or= 98.0
	>or= to 3	<or= 89.0	96.0	<or= 98.0
Gyratory Compaction (number of gyrations)	<3	6	50	75
	0.3 to <3	7	75	115
	3 to < 30	8	100	160
	>or= 30	9	125	205

The mix criteria VMA and VFA only apply to HMA accepted by statistical evaluation.

When material is being produced and stockpiled for use on a specific contract or for a future contract, the uncompacted void content, fracture, and sand equivalent requirements shall apply at the time of stockpiling. When material is used from a stockpile that has not been tested as provided above, the Specifications for uncompacted void content. fracture, and sand equivalent shall apply at the time of its introduction to the cold feed of the mixing plant.

G. Asphalt for Binder: Type, grade, and viscosity-temperature curve.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver asphalt concrete mix in trucks with tarps covering the asphalt concrete mix.

B. Maintain temperature of mix above 250 deg. F until placed and compacted.

PART 2 PRODUCTS

2.01 PAVEMENT CLASS

A. HMAHMA: Meet all applicable WSDOT requirements for HMA Class 3/4 inch bituminous pavements in accordance with Sections 9-02 and 9-03 of the WSDOT Standard Specifications.

B. Use commercial HMA mix design as follows::

1. General: The Contractor shall develop a mix design prior to the initial production of HMA and prior to the production of HMA each calendar year thereatler. The mix design aggregate structure and asphalt binder content shall be determined in accordance with WSDOT Standard Operating Procedure 732 and meet the requirements of Sections 9-03.8(2) and 9-03.8(6) of WSDOT. Mix designs that were developed during the calendar year prior to the current year's production of HMA that have been issued a WSDOT mix design/anti-strip evaluation report will be accepted provided the Contractor submits a certification letter stating that the aggregate and asphalt binder have not changed. Changes to aggregate that may require a new mix design include the source of material or a change in the percentage of material from a stockpile greater than 5 percent. The Contractor may vary the RAP percentage in accordance with Section 5-04.2 of WSDOT. Changes to the percentage of material from a stockpile will be calculated exclusive of the RAP content. Changes to asphalt binder that may require a new mix design include the source of the crude petroleum supplied to the refinery, the refining process. and additives or modifiers in the asphalt binder.

2 Statistical or Nonstatistical Evaluation: Mix designs for HMA accepted by statistical and nonstatistical evaluation shall be submitted to the Project Engineer on WSDOT Form 350-042. For a mix design that was originally developed for another WSDOT contract, the Contractor shall also submit WSDOT Form 350-041 and include all changes to the job mix formula that have been approved on other contracts.

The Contractor shall submit representative samples ofthe mineral materials that are to be used in the HMA production. The Contracting Agency will use these samples to determine anti-strip requirements. ifany, in accordance with WSDOT Test Method T 718. Anti-strip evaluation ofHMA mix designs proposed by the Contractor that include RAP will be completed without the inclusion of the RAP. Submittal of RAP samples is not required. A mix design/anti-strip evaluation report will be provided within 25 calendar days after a mix design submittal has been received in the State Materials Laboratory in Tumwater or approved alternative laboratory. No paving shall begin prior to issuance of the mix design/anti-strip evaluation report or reference mix design/ anti-strip evaluation report for that year.

3. Commercial Evaulation: Mix designs for HMA accepted by commercial evaluation shall be submitted to the Project Engineer on WSDOT Form 350-042; only the first page is required. Anti-Strip e\'aluation of the mix design by the Contracting Agency is not required. The Project Engineer will determine anti-strip requirements for the HMA. Paving shall not begin HMA, the Contractor shall select a class of HMA and design level of Equivalent Single Axle Loads (ESAL's) appropriate for the required use.

2.02 AGGREGATES

A. Aggregates for bituminous concrete: Manufactured from ledge rock, talus, or gravel and meeting the following:

B. Aggregate for bituminous surface treatment: manufactured from ledge rock, talus, or gravel, and meeting the following test results:

1. Los Angeles Wear, 500 Rev. 35% max.
2. Degradation Factor 30 min.

C. Grading and Quality Aggregate for bituminous surface treatment shall conform to the requirements in the table below for grading and quality. All percentages are by weight.

D. The material shall meet the requirements for grading and quality when placed in hauling vehicles for delivery to the roadway, or during manufacture and placement into a temporary stockpile.

Crushed Screening Percent Passing					
	3/4" to 1/2"	**5/8" to No. 4**	**1/2" to No. 4**	**3/8" to No. 4**	**No. 4 - 0**
1"	99-100				
3/4"	95-100	99-100			
5/8"		95-100	99-100		
1/2"	0-20		90-100	99-100	
3/8"	0-5		60-85	70-90	99-100
No. 4		0-10	0-3	0-5	76-100
No. 10		0-3			30-60
No. 200	0-1.5	0-1.5	0-1.5	0-1.5	0-10.0
% fracture, by weight, min.	90	90	90	90	90

A. The fracture requirement shall be at least one fractured face and will apply to the combined aggregate retained on the No. 4 sieve in accordance with FOP for AASHTO T 335.

B. The finished product shall be clean, uniform in quality, and free from wood, bark, roots, and other deleterious material.

C. Crushed screenings shall be substantially free from adherent coatings. The presence of a thin, firmly adhering film of weathered rock shall not be considered as coating unless it exists on more than 50 percent of the surface area of any size between successive laboratory sieves.

D. The portion of aggregate for bituminous surface treatment retained on a No. 4 sieve shall not contain more than 0.1 percent deleterious materials by weight.

E. Fine aggregate used for choke stone applications meeting the grading requirements of Section 9-03.1(2)B may be substituted for the No. 4-0 gradation.

F. Use blending Sand to make up a deficiency of material passing a U.S. No. 40 sieve, provided, that the aggregate in the final mix meets pertinent fracture requirements.

2.03 BLENDING SAND

A. Blending sand shall be clean, hard, sound material, either naturally occurring sand or crusher fines, and must be material which will readily accept an asphalt coating. The exact grading requirements for the blending sand shall be such that, when it is mixed with an aggregate the combined product shall meet the requirements of Section 9-03.8(6) WSDOT for the class of material involved. Blending sand shall meet the following quality requirement:

B. Sand Equivalent 30 Minimum.Mineral Filler shall conform to the requirements of AASHTO M-17.

2.04 BITUMINOUS MATERIALS

A. Bituminous Materials: meet the requirements of the WSDOT Standard Specifications.

1. Prime Coat; Per approved submittal.
2. Joint Sealants: Hot poured joint sealants shall meet the requirements of AASHTO M 324 Type IV, except for the following:
3. The Cone Penetration at 25°C shall be 130 maximum.
4. The extension for the Bond, non-immersed, shall be 100 percent.
5. The hot poured joint sealant shall have a minimum Cleveland Open Cup Flash Point of 205°C in accordance with AASHTO T 48.
6. Hot poured joint sealants shall be sampled in accordance with ASTM D 5167 and tested in accordance with ASTM D 5329

B. Asphalt Material:.

1. Asphalt furnished under these Specifications shall not have been distilled at a temperature high enough to injure by burning or to produce flecks of carbonaceous matter, and upon arrival at the Work, shall show no signs of separation into lighter and heavier components.

2. The Asphalt Supplier of Performance Graded Asphalt Binder (PGAB) and Cationic Emulsified Asphalt shall have a Quality Control Plan (QCP) in accordance with WSDOT QC 2 "Standard Practice for Asphalt Suppliers That Certify Performance Graded and Emulsified Asphalts".

3. The Asphalt Supplier of PGAB and Cationic Emulsified Asphalt shall certify through the Bill of Lading that the PGAB or Cationic Emulsified Asphalt meets the Specification requirements of the Contract.

C. Performance Graded Asphalt Binder (PGAB):

1. PGAB meeting the requirements of AASHTO M 320 Table 1 of the grades specified in the Contract shall be used in the production of HMA.

2. In addition to AASHTO M 320 Table 1 specification requirements, all performance grade (PG) asphalt binders shall meet the following requirements.

Additional Requirements by Performance Grade (PG) Asphalt Binders							
Property	**Test Method**	**PG 58-22**	**PG 64-22**	**PG 64-28**	**PG 70-22**	**PG 70-28**	**PG 76-28**
RTFO Residue: Elastic Recovery(1)	AASTO T2301(2)			60% min.	60% min.	60% min.	60% min.

2.05 PROPORTIONS OF MATERIALS

A. Provide materials for Bituminous concrete composed of such sizes, gradings and quantities that, when proportioned and mixed together, will produce a well-graded mixture within the requirements listed in the WSDOT Standard Specifications.

B. Provide proportions of the several components used in production of the asphalt concrete mixture within WSDOT specified limits to provide a pavement having surface texture, air voids, Voids in Mineral Aggregate (VMA), and Voids Filled with Asphalt (VFA) values satisfactory to the Engineer. The proportions so fixed shall be changed only by the Engineer's approval.

2.06 PAVEMENT SAWCUTTING

A. Provide all water, cutting blades, electric power supply, fuel, and compressed air, as required for saw cutting equipment.

2.07 ADJUSTMENT OF UTILITIES VAULTS AND MANHOLES AND OTHER BURIED STRUCTURES

A. Provide rim and risers for all structures requiring rising as part of the work as shown on the Construction Drawings.

PART 3 EXECUTION

3.01 SAW CUTTING

A. Saw cut existing pavement edges that are broken or irregular where new pavement will abut existing pavement.

3.02 JOINT SEALER

A. Apply joint sealer to the edges of new paving joints, catch basins, manholes, etc.

3.03 GENERAL

A. Place HMA only during dry weather. Do not place HMA when the atmospheric temperature is below 40 deg. F.

B. Place HMA when its temperature is above 250 deg. F.

C. Place HMA on properly sterilized and compacted crushed base rock, which is dry, clean, and has been documented to be true to line and grade with the minimum slopes shown on the Construction Drawings.

D. Compact underlying crushed base rock and base course, where present, as described in Section 02722.

E. Do not allow unnecessary traffic on the HMA until it has completely cooled and set.

3.04 TRANSPORTATION

A. Transport the hot-mix asphalt in suitable dump trucks.

B. Cover each load with a tarpaulin while in transit to minimize heat loss to the mixture.

3.05 ASPHALT CONCRETE MIXING AND PLACEMENT

A. Mix, handle, batch, haul, place, roll and compact asphalt concrete in accordance with the applicable sections of the WSDOT Standard Specifications.

B. Place the material to the dimensions and grades indicated on the Construction Drawings.

C. Spread and finish the hot-mix asphalt using special spreading and finishing equipment designed and operated such that the finished surface of the course strikes off at required grade.

D. Place the hot-mix asphalt pavement for final cover in two 2-inch thick lifts after compaction.

E. Place the hot-mix asphalt pavement for repair in maximum 3-inch lifts after compaction, and match the total thickness of the adjoining asphalt being repaired.

F. Immediately following spreading, compact the hot-mix asphalt by rolling with a self-propelled roller of sufficient weight to compact the mixture to the required density while it is still in a malleable state.

G. Begin rolling at the outside edges of the strip being paved and progress towards the center of the strip, allowing the compression wheels to overlap, by half their width, the area covered on the preceding pass.

H. Place the hot-mix asphalt as continuously as possible, and pass the roller over the unprotected end of the freshly laid mixture only when the laying of the course is discontinued long enough to permit the mixture to become chilled.

I. When resuming work, cut back the previously laid material to produce a lightly beveled edge for the full thickness of the course. Remove the cut-away material from the site and lay new mix against the fresh cut.

J. Where hot-mix asphalt contacts Portland cement concrete, lightly spray the Portland cement concrete with hot asphalt immediately before the asphalt is placed. Promptly and completely remove asphalt or asphalt stains upon exposed surfaces of Portland cement concrete not covered by the new asphalt.

K. Immediately after the HMA has been spread and struck off, and after surface irregularities have been adjusted, thoroughly and uniformly compact the mix.

L. Compact completed course such that it is free from ridges, ruts, humps, depressions, objectionable marks, checking, cracking, and irregularities and conforming to the line, grade, and cross-section shown on the Construction Drawings.

M. Complete compaction when the mixture is in the proper condition so that no undue displacement, cracking, or shoving occurs.

N. Continue rolling until the hot-mix asphalt has been compressed to a degree of compactness not less than 92% of the maximum theoretical specific gravity (Rice density) as determined by AASHTO T 230.

O. Compact areas inaccessible to large compaction equipment using mechanical or hand tampers.

P. Remove any HMA that becomes loose, broken, contaminated, shows an excess or deficiency of asphalt, or is in any way defective.

Q. Replace defective HMA with new hot mix and compact to conform to the surrounding pavement area.

R. Types of rollers used and their relative position in the compaction sequence are generally at the Contractor's option, provided the specified densities are attained, except, use pneumatic tired rollers for compaction of the wearing course beginning October 1st of any year through March 31st of the following year.

3.06 FINISHED SURFACE

A. Provide a finished asphalt concrete surface that is of uniform texture, smooth, true to grade, and free from defects of all kinds.

B. Provide a completed surface of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds.

C. Provide a completed surface that does not vary more than ⅛ inch from the lower edge of a 10-foot straightedge placed on the surface parallel to the centerline. Provide a transverse slope that does not vary more than ¼ inch in 10 ft from the rate of transverse slope shown in the Plans.

3.07 QUALITY CONTROL

A. Perform inspection and testing described below.

1. Sampling and testing of proposed asphalt mix design.

2. HMA temperature at time of installation.
3. Pavement thickness.
4. Pavement smoothness.
5. Pavement density.
6. Reports.

B. Report test results available to the CQAC as they are obtained.

C. Perform work in accordance with the requirements of the pertinent sections of the WSDOT Standard Specifications, (current edition).

D. Perform sampling and testing for compliance with the Contract provisions.

E. Unless otherwise referenced or modified, quality control and quality standards for this section are as specified in the State of Washington Standard Specifications for Road, Bridge and Municipal Construction (WSDOT Standard Specifications), (current edition).

3.08 QUALITY ASSURANCE

A. The CQAC may perform independent testing including:

1. AASHTO T 230 - Standard Method of Test for Determining Degree of Pavement Compaction of Bituminous Aggregate Mixtures.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No measurement will be made for furnishing and placing bituminous asphalt paving to repair asphalt pavement outside of the TFA.

B. Measurement for Bid Item 75, Furnish and Place HMA to construct the TFA Final Cover, will be by the cubic yard (CY) based on a survey of the installed asphalt area multiplied by the designed neat line thickness shown on the drawings.

4.02 PAYMENT

A. No payment will be made for furnishing and placing bituminous asphalt paving to repair asphalt pavement outside of the TFA. Include costs for this work in other Bid Items

B. Payment for Bid Item 75, Furnish and Place HMA to construct the TFA Final Cover, includes all costs to furnish, place, shape and compact “HMA” to construct the TFA Final Cover as shown on the Drawings and as described in Sections 02722 and 02743.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installing geotextile for the following applications:

1.02 RELATED SECTIONS

A. Section 02332 – Soil Excavation and Management.

B. Section 02333 – SWMU 30 Excavation and Backfill (NIC).

C. Section 02339 – Engineered Fill.

D. Section 02621 – LNAPL Recovery Trenches.

E. Section 02630 – Storm Drainage Systems.

1.03 REFERENCES

A. ASTM D4491 — Test Methods for Water Permeability of Geotextiles by Permittivity.

B. ASTM D4533 — Test Method for Trapezoid Tearing Strength of Geotextiles.

C. ASTM D4716 – Test Method for Constant Head Hydraulic Transmissivity of Geotextiles and Geotextile Related Products.

D. ASTM D4751 — Test Method for Determining Apparent Opening Size of a Geotextile.

E. ASTM D4833 — Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.

F. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

G. ASTM D4884 – Standard Test method for Strength of Sewn or Thermally Bonded Seams of Geotextiles.

H. ASTM D5261— Standard Test Methods for Measuring Mass Per Unit Area of Geotextiles.

I. ASTM D6241 - 04(2009) Standard Test Method for the Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.

1.04 SUBMITTALS FOR REVIEW 14 DAYS PRIOR TO SCHEDULED INSTALLATION

A. Provide manufacturers cut sheet for specified product.

1.05 WARRANTEES

A. Provide manufacturers product warrantee.

1.06 DELIVERY STORAGE AND HANDLING

A. Transport material to the site in a closed trailer.

B. Label, and deliver geotextiles in accordance with ASTM D4873.

C. Mark roll numbers, manufacturer's name, product identification, lot number and roll dimensions on the geotextile protective covering.

D. Provide unloading straps with rolls delivered to the site.

E. Maintain integrity of protective wrapping during shipment and storage.

F. Elevate off ground during storage.

G. Protect geotextiles from site construction, precipitation, extended ultraviolet radiation including sunlight, chemicals that are strong acids or strong bases, flames including welding sparks, temperatures in excess of 160°F (71°C), any other environmental condition that may damage the property values of the geotextile.

H. Document geotextile that was damaged during transportation, loading, unloading, delivery, and provide documentation to the Engineer or CQAC.

I. Replace geotextile separator rejected by the CQAC upon delivery.

PART 2 PRODUCTS

2.01 GEOTEXTILE SEPARATOR

A. Products comprised of non-woven, continuous-filament needle punched polypropylene or polyester fabric; staple-filament needle punched yarn oriented into a staple network that maintains its structure during handling, placement, and long-term service.

B. The product cannot be heat burnished.

C. Resistant to soil chemicals.

D. New product made from virgin materials.

E. Geotextile used for separation conforming to the following minimum average roll values (MARV):

Test	ASTM Test Designation	Minimum MQC Test Frequency	Unit	Minimum Requirement
Mass/Area	D5261	1/100,000 sf	oz/yd^2	12
Grab Tensile Strength	D4632	1/100,000 sf	Pounds	320
Puncture Strength	D4833 or D6241	1/100,000 sf	Pounds	190
Permittivity	D4491	1/540,000 sf	Sec^{-1}	0.8
Apparent Opening Size	D4751	1/540,000 sf	mm	<0.150
UV Resistance (500 hours)	D4355	Historical data on similar product		70% of strength

2.02 SEWING EQUIPMENT AND ACCESSORIES

A. Maintained in adequate number in order to avoid delaying Work.

B. Supplied by a power source capable of providing constant voltage under a combined-line load.

C. Provided with a protective lining and splash pad large enough to catch spilled fuel under an electric generator, if used on geotextile.

PART 3 EXECUTION

3.01 PREPARATION

A. Prior to installation of geotextile separator, prepare underlying material in accordance with specifications and Construction Drawings.

B. Verify that all MQC, CQC, and CQA data has been collected, reviewed, and filed.

3.02 PROTECTION

A. When placing soil materials over geotextile ensure the following:

1. No damage to geotextile.
2. No slippage of geotextile on underlying layers.
3. No excessive tensile stresses are applied to geotextile.

3.03 DEPLOYMENT

A. Follow manufacturer's recommendations, standards, and guidelines.

B. Cut geotextile using approved cutter only.

C. Protect other in-place material when cutting geotextile.

D. Do not entrap excessive dust, stones, or moisture in geotextile that could damage or clog drains or filters or hamper subsequent seaming.

E. Remove any foreign objects.

F. Weight geotextile with sandbags or equivalent as ballast during deployment. Leave ballast in place until geotextile is covered with succeeding construction layer

G. Anchor geotextile on slopes greater than 10 percent. Roll geotextile down slope in such a manner as to continually keep the geotextile sheet in sufficient tension to prevent folds and wrinkles.

H. Sew geotextile for SWMU 30 areas prior to installing in excavation area.

3.04 GEOTEXTILE SEAM SEWING

A. Sew all geotextile seams where geotextile deployed under water. Other geotextile seams may be sewn or overlapped.

B. Overlap geotextile 3 inches minimum prior to seaming. Do not seam horizontally on slopes steeper than 10 percent (i.e., seam along, not across slopes).

C. Ensure that no soil materials are left in seams of geotextiles.

D. Sew with polymeric thread having chemical resistance and strength properties equal to or exceeding those of geotextile.

E. Use a 401 two-thread chain stitch, or equivalent.

3.05 GEOTEXTILE SEAM OVERLAPPING

A. Overlap adjoining panels by 2 ft.

B. Ensure that no soil materials are left in seams of geotextiles.

3.06 REPAIRING

A. Repair holes or tears in geotextiles with a patch from the same geotextile material, continually sewn or heat bonded in place with a minimum seam overlap of 12 inches in all directions.

B. Sew or heat bond the geotextile within one inch of the outside edge of the patch materials.

C. Remove any soil or other material that may have penetrated the torn geotextile.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. No measurement will be made for geotextile.

4.02 PAYMENT

A. No payment will be made for geotextile. Include costs to furnish and install geotextile in other Bid Items.

End of Section

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installing geogrid as a reinforcement geosynthetic over the cutoff wall.

1.02 RELATED SECTIONS

A. Section 02339 – Engineered Fill.

B. Section 02469 – Cutoff Wall.

C. Section 02722 – Crushed Base Rock and Base Course.

1.03 REFERENCES

A. ASTM D4759 – Standard Practice for Determining the Specification Conformance of Geosynthetics.

B. ASTM D4873 - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples.

C. ASTM D 6637 - Determining Tensile Properties of Geogrids by the Single or Multi-Rib Test Method; 2001.

D. ASTM F 904 - Standard Test Method for Comparison of Bond Strength or Ply Adhesion of Similar Laminates Made from Flexible Materials; 1991.

E. ASTM D7737 - Standard Test Method for Individual Geogrid Junction Strength.

1.04 SUBMITTALS FOR REVIEW 14 DAYS PRIOR TO SCHEDULED INSTALLATION

A. Provide manufacturer’s data sheets for each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

B. Samples: Two 4 inch by 20 inch samples of each product to be used.

1.05 WARRANTIES

A. Provide manufacturer’s product warranty.

1.06 PRE-INSTALLATION MEETING

A. Prior to geogrid installation, conduct a meeting at the site to review the installation requirements. Notify the Port at least 3 days in advance of the time of the meeting.

1.07 DELIVERY STORAGE AND HANDLING

A. Label, and deliver geogrid rolls in accordance with ASTM D4873.

B. Mark roll numbers, manufacturer's name, product identification, lot number and roll dimensions on the geogrid protective covering.

C. Provide unloading straps with rolls delivered to the site.

D. Store products in manufacturer's unopened packaging until ready for installation.

E. Elevate off ground during storage.

F. Prevent excessive mud, fluid concrete, epoxy, or other deleterious materials from coming in contact with and affixing to materials.

G. Polymeric Materials: Store at temperatures above minus 20 degrees F (minus 29 degrees C); rolled materials may be laid flat or stood on end.

H. Document any geogrid that was damaged during transportation, loading, unloading, delivery, and provide documentation to the Port or CQAC.

I. Replace geogrid rejected by the CQAC upon delivery.

PART 2 PRODUCTS

2.01 UNIAXIAL GEOGRID

A. New product made from virgin materials.

B. Manufactured from high density polyethylene.

C. Uniaxial geogrid used for reinforcement conforming to the following minimum average roll values (MARV) in the machine direction, per ASTM D4759:

Property	ASTM Test Designation	Minimum MQC Test Frequency	Unit	Minimum Requirement
Tensile Strength at 5% Strain	D6637	1/100,000 sf	lb/ft	3,980
Ultimate Tensile Strength	D6637	1/100,000	lb/ft	9,870
Junction Strength	D7737 using 10% per minute strain rate	1/100,000	lb/ft	9,250
Flexural Stiffness	D7748, using 3 ft min. long specimen	1/100,000	mg-cm	6,000,000
UV Resistance (500 Hours)	ASTM D4355	Historical product data	%	95

2.02 TRIAXIAL GEOGRID

A. New product made from virgin materials.

B. Manufactured from punched high density polypropylene sheet, which is then oriented in three substantially equilateral directions so that the resulting ribs have a high degree of molecular orientation, which continues at least in part through the mass of the integral node.

C. Triaxial geogrid used for reinforcement conforming to the following minimum average roll values (MARV) in the machine direction, per ASTM D4759:

Property	ASTM Test Designation	Minimum MQC Test Frequency	Unit	Minimum Requirement
Rib Pitch, Longitudinal		1/100,000 sf	in.	1.6
Rib Pitch, Diagonal		1/100,000 sf	in.	1.6
Mid-rib Depth, Diagonal		1/100,000 sf	in.	0.08
Mid-rib Depth, Transverse		1/100,000 sf	in.	0.06
Mid-rib Width, Diagonal		1/100,000 sf	in.	0.04
Mid-rib Width, Transverse		1/100,000 sf	in.	0.05
Rib Shape		1/100,000 sf		Rectangular
Aperture Shape		1/100,000 sf		Triangular
Junction Efficiency	D6637 and D7737	1/100,000 sf	%	93
UV Resistance (500 Hours)	ASTM D4355	Historical product data	%	80

2.03 FILL ABOVE UNIAXIAL GEOGRID

A. Crushed aggregate not containing any deleterious materials.

B. Meeting the following gradation criteria.

U.S. SIEVE SIZE	PERCENT PASSING
1½ in.	100
¾ in.	50 to 100
#4	25 to 50
#40	10 to 20
#100	5 to 15
#200	<10

2.04 FILL ABOVE TRIAXIAL GEOGRID

A. Base rock in accordance with Section 02722.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify cutoff wall is complete and soil-cement bentonite has cured for a minimum of 14 days and achieved an unconfined compressive strength of a minimum of 8,000 psf, prior to installing uniaxial geogrid.

B. Excavate anchor trenches parallel to the alignment of the cut off wall prior to deploying uniaxial geogrid.

C. Before deploying triaxial geogrid place compacted granular material over uniaxial geogrid to base of final cover elevation.

3.02 PROTECTION

A. When placing soil materials over geogrid ensure the following:

1. No damage to the product.
2. No excessive tensile stresses are applied to geotextile.

3.03 DEPLOYMENT

A. Deploy Structural geogrid section in accordance with approved shop drawings and manufacturer's instructions.

B. Unroll the structural geogrid on the compacted engineered fill and cut to the length indicated on the Construction Drawings.

C. Unroll and place uniaxial geogrids perpendicular to the slurry wall and anchor into trenches.

D. Unroll and place triaxial geogrid as shown on the drawings.

E. Apply tension by hand to eliminate wrinkles and stake or pin the geogrid near the ends as required to maintain alignment and tension during filling.

F. Cut uniaxial geogrids within 2 inches (50mm) from the thick transverse bar and place that end of the strip at the slope face or to the position near the slope face shown on shop drawings.

G. Vehicles shall not operate above the cutoff wall alignment until the rock base has been placed over the triaxial geogrid.

3.04 GEOGRID SEAM OVERLAPPING

A. Overlap adjoining panels by 1 foot.

B. Shingle overlaps in the direction of anticipated fill spreading.

C. Ensure that no soil materials are left in seams.

D. Use plastic ties and 2-foot intervals to secure the overlaps.

3.05 REPAIRING

A. Geogrid sections damaged during installation must be repaired by placing geogrid across the full design width and overlapping a minimum of 1 foot on both sides.

3.06 FILL PLACEMENT OVER UNIAXIAL GEOGRID

A. Back dump specified uniaxial fill material near edge of geogrid, then spread out over the cutoff wall alignment without operating equipment directly over the soil-cement-bentonite cutoff wall alignment.

B. Use only low ground pressure equipment

C. No turns, sudden stops or spinning permitted above geogrid.

D. Use static compaction.

3.07 FILL PLACEMENT OVER TRIAXIAL GEOGRID

A. Place base rock material in accordance with Section 02722.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement for Bid Item 76, Furnish and Install Uniaxial Geogrid, will be made by the square foot (SF) based on a field measurement of the installed geogrid.

B. Measurement for Bid Item 77, Furnish and Install Triaxial Geogrid, will be made by the square foot (SF) based on a field measurement of the installed geogrid.

C. Measurement for Bid Item 78, Furnish and Install Select Gravel, will be made on a per ton (TON) basis, based on certified weight tickets provided with each load of Select Gravel Fill.

4.02 PAYMENT

A. Payment for Bid Item 76, Furnish and Install Uniaxial Geogrid, includes all costs to furnish and install geogrid reinforcement as shown on the Drawings and as described in Section 02773.

B. Payment for Bid Item 77, Furnish and Install Triaxial Geogrid, includes all costs to furnish and install geogrid reinforcement as shown on the Drawings and as described in Section 02773.

C. Payment for Bid Item 78, Furnish, Load, Haul, Place, and Compact Select Gravel Over Cutoff Wall Geogrid Payment includes all costs to furnish, place, grade and compact select fill over geogrid inside the cut off wall alignment as shown on the Drawings and as described in Section and 02773.

End of Section

DIVISION 3 - CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Furnishing and installing controlled density fill to backfill around utilities supported above open excavation in the SWMU 30 excavations.

B. The intent of specifying the use of CDF slurry is to ensure the placement and consolidation of backfill under the haunch of pipelines and utilities that cross the SWMU 30 excavations to maintain their slope, elevations and integrity.

1.02 RELATED SECTIONS

A. Section 02333 – SWMU 30 Excavation and Backfill.

B. Section 02339 – Engineered Fill.

1.03 REFERENCES

A. ASTM C 33 – Standard Specification for Concrete Aggregates.

B. ASTM C 150 - Standard Specification for Portland Cement.

C. ASTM C 138 - Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete

D. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

E. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

F. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete

G. ASTM C 618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete

H. ASTM C 1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

I. ASTM D 4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

1.04 SUBMITTALS FOR REVIEW DURING CONSTRUCTION

A. Submit a mix design for the CDF 14 days prior to scheduled installation.

B. Submit certified copies of all laboratory mix reports.

C. Submit name, address and phone number of proposed CDF batch plant.

1.05 SUBMITTALS DURING CONSTRUCTION

A. Submit batch tickets for each truck load of CDF delivered to the site:

B. Submit test reports for slump, air content and temperature on the day the tests are taken.

C. Submit test reports for CDF compressive strength testing within 3 days of completing the 7-day and 28-day compressive strength tests.

D. TRIAL BATCHES

1. Provide trial batches from proposed supplier.

2. Provide historical compressive strength data for similar mix designs.

1.06 QUALITY ASSURANCE

A. Provide CDF composed of cementitious material, water, fine aggregate and an admixture.

1. Cementitious materials: Portland cement in combination with fly ash.

2. Admixture: air-entrainment agent.

3. Proportioned to meet the mix design.

PART 2 PRODUCTS

2.01 CONTROLLED DENSITY FILL

A. A flowable, excavatable, self-compacting and self-leveling material, which after solidifying has the structural characteristics of a well-compacted load bearing soil.

2.02 CDF MATERIALS

A. Portland Cement- ASTM C150- 94, Type I or II, low-alkali.

B. Flyash - Type F with no more than 3 percent carbon.

C. Water: clean and potable.

D. Air entraining mixture: conforming to ASTM C 260

E. Sand: Clean sand mixture free from organic matter and meeting the following gradation:

U.S. Sieve Size	Percent Passing
No. 4	100
No. 6	93 - 100
No. 8	85 - 95
No 50	15 - 30
No 200	0 – 2.5

2.03 CDF MIX DESIGN

A. Portland Cement: 94.pounds per cubic yard.

B. Flyash: 300 pounds per cubic yard.

C. Sand: 2,800 pounds per cubic yard.

D. Water: 300 pounds per cubic.

E. Air-Entraining Admixture - 10 ounce per cubic yard.

F. Do not include admixtures that tend to increase strength with time without Engineer's approval.

G. Strength at 24 hours: not less than 15 psi when tested in accordance with ASTM D 4832.

H. 28 day strength: a minimum 50 psi and a maximum 100 psi when tested in accordance with ASTM D 4832.

I. Slump: no greater than 7 inches.

J. Air content at delivery: no greater than 20 percent.

K. Provide a mix that does not produce excessive bleed water.

PART 3 EXECUTION

3.01 PREPARATION

A. Verify that all highly contaminated soil excavation is complete.

B. Verify that utilities and pipelines crossing the excavation are supported in their original position.

C. Verify that there are no breaches in the excavation walls that will allow CDF to flow laterally out of the excavation.

D. Install earthfills or bulkheads around excavation to prevent spillage out of excavation.

E. Complete installation of backfill materials below the CDF prior to installing CDF.

F. Verify that underlying gravel and/or engineered fill has been placed and compacted to no closer than 12 inches below the bottom of the utility.

3.02 MIXING

A. Batch CDF at a ready mix concrete plant and deliver to the site by means of transit mixing trucks.

B. Continue mixing until the cement and water are thoroughly dispersed throughout the material.

C. Place CDF slurry within 1 hour after mixing.

3.03 INSTALLATION

A. Discharge CDF directly from the transit mixing truck to the excavation.

B. Place CDF to the lines and grades shown on the Construction Drawings.

C. Place CDF in a manner and at a rate that prevents utilities crossing the excavation from becoming buoyant or otherwise disturbed.

D. Limit the CDF fill depth, or ballast the utility as necessary to avoid floating of the utility.

E. Place CDF uniformly on both sides of the utility conduit or pipe to approximately the spring line and allow to set for 1 hour prior to placing additional CDF.

F. Make each stage of fill placement as continuous an operation as practicable.

G. Do not place CDF on frozen ground.

H. Remove groundwater in excavation or trench prior to placement of CDF.

I. Vibrate the fill by hand-operated mechanical compactor to remove voids underneath the utilities and pipelines.

J. Do not allow equipment traffic on the CDF until the surface can withstand the equipment weight.

K. If necessary to prevent displacement or damage provide steel trench plates that span the trench or other means to prevent damage from traffic.

3.04 WEATHER CONDITIONS

A. Place CDF under the following weather Conditions:

1. At least 40 degrees F at the time of placement.

2. Stop mixing and placement when the temperature is 38 degrees F or less and falling.

3.05 QUALITY CONTROL

A. Perform the following tests immediately after discharge from the mixer. Perform one test each for each truck load (batch) delivered to the site.

1. Unit Weight: ASTM C 138.

2. Slump: ASTM C 143

3. Air content: ASTM C 231

4. Temperature; ASTM C 1064

B. Obtain samples and perform 7-day and 28-day compressive strength tests at a frequency of 1 set per 50 cubic yards delivered to the site.

3.06 QUALITY ASSURANCE

A. The CQAC may perform independent testing including 7-day and 28-day compressive strength tests at a frequency of 1 set per 50 cubic yards delivered to the site.

PART 4 MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. Measurement

4.02 PAYMENT

A. Payment.

End of Section