

[09/04/26]

TO: PLAN HOLDERS LIST

SUBJECT: PROCUREMENT NO. 072026-1051
ARKEMA INTERIM ACTION-PHASE 1

ADDENDUM NUMBER 04

This addendum is issued to amend the following:

Drawing C1.9:

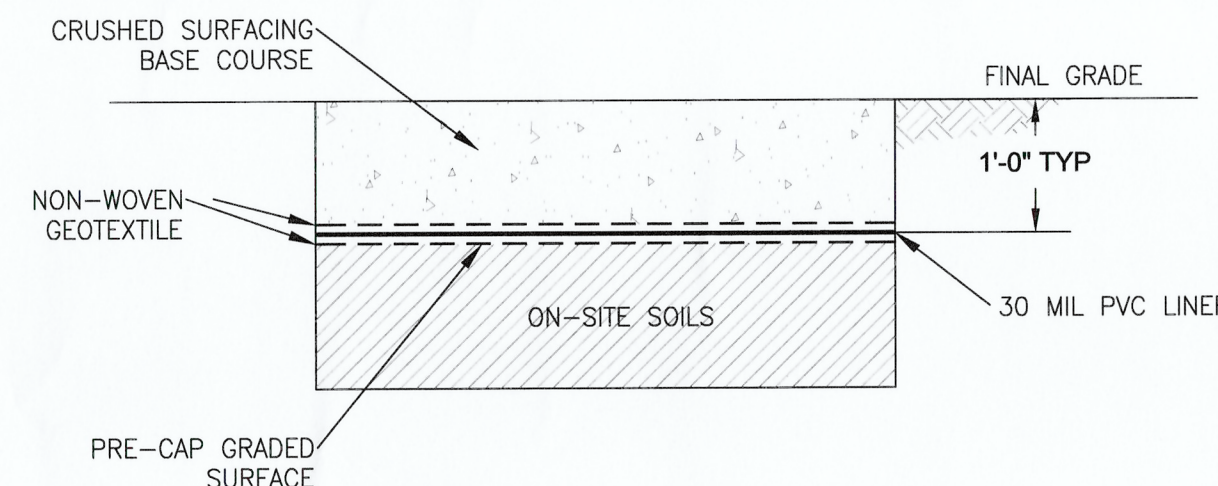
Revised Note 3 to clarify number of crossings and typical protective cap.

31 20 00 – Earthwork:

3.09.C. – Revised reference to Bid Item #28 to #29

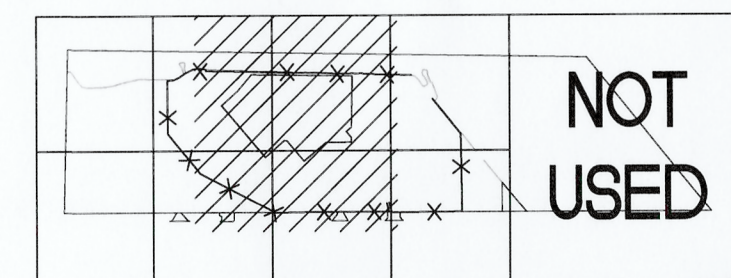


- | LEGEND | |
|---------|---|
| ◎ | SANITARY SEWER MANHOLE |
| ○ | UTILITY CLEAN OUT |
| ⊕ | STORM MANHOLE |
| ⊗ | STORM CATCH BASIN |
| — | STORM CULVERT |
| ⊖ | WATER MANHOLE |
| ⊕ | WATER VALVE |
| ⊖ | WATER METER |
| ⊕ | FIRE HYDRANT |
| ⊗ | IRRIGATION CONTROL VALVE |
| ⊕ | GAS VALVE |
| ⊕ | GAS RISER |
| ⊕ | POWER METER |
| ⊕ | POWER CABINET |
| ⊕ | UTILITY POLE |
| ⊕ | UTILITY POLE WITH DROP(S) |
| ⊕ | GUY ANCHOR |
| ⊕ | JUNCTION BOX |
| ⊕ | POWER VAULT |
| ⊕ | LIGHT POLE |
| ● | COLUMN |
| ● | BOLLARD |
| ⊕ | RAILROAD SWITCH |
| ⊕ | MONITORING WELL |
| —X—X—X— | DISTANCE AND DIRECTION OF NOTED OBJECT FROM PROPERTY LINE |

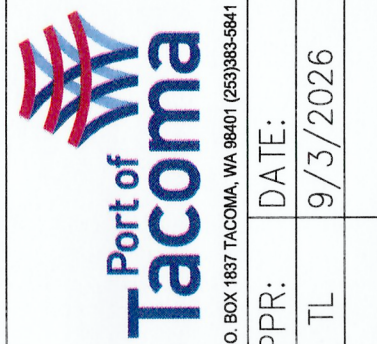
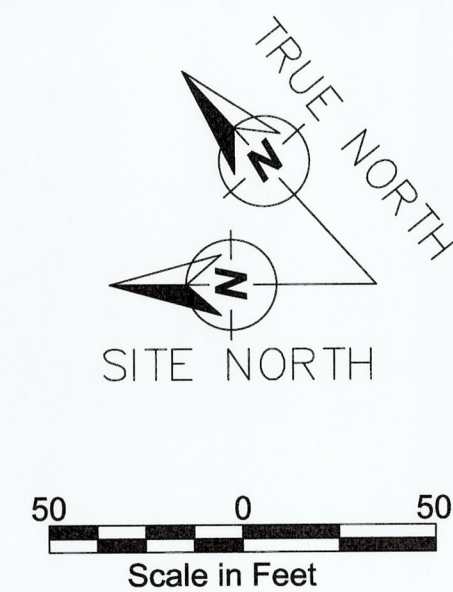


SCALE: NTS

- NOTES



KEY PLAN



APPROVED:	R. WEBB	07/29/26
	CHECKED BY	DATE
	T. LOUIERE	07/29/26
DIRECTOR	ENG.	DATE
PRINTED BY: kbeqley Sep 03, 2026		
PORT ADDRESS: ONE SITCUM PLAZA		
TACOMA, WA 98401-1837		

ARKEMA INTERIM ACTION - PHASE 1
CONTAINMENT WALL

6697
C1.9
SH #27 OF #44

FINAL RESTORATION CONTOURS

SH #27 OF #44	FINAL RESTORATION CONTOURS		
TOWNSHIP:	21N	RANGE:	3E SECTION: 36
CONTRACT / CONS:	PA000000403		
M. ID:	101585.01	DAT-HRZ:	WA83/2011 VERT: MLLW 15.73 @ POT MON #178
PHASE:	FOR BID	PARCEL:	0321351053
		DRAWING SCAL:	AS NOTED

UCL: 0021007000 DRAWING OFFICE: HQ NOTED DRAWING NO: 00-101-1000

THIS DRAWING IS THE PROPERTY OF THE PORT OF TACOMA AND SHALL NOT BE USED ON OTHER WORK, DISCLOSED, COPIED, IN WHOLE OR IN PART, WITHOUT WRITTEN PERMISSION

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

- A. Earthwork shall include, but not be limited to:
1. Excavation, fill and grading of existing native soils and/or import soils.
 2. Processing, preparation and management of existing excavated soils for onsite reuse.
 3. Excavation and backfill for utilities and utility structures.
 4. Grading, contouring and preparation of grades and subgrades for sitework.
 5. Fill and backfill of soils to required elevations.
 6. Surveying for earthwork, utilities and record documents.
 7. Provide and install geotextile and PVC liner materials.
 8. Provide and install various import soil materials.
 9. Provide various import utility bedding and backfill soils specified herein.
 10. Providing and managing earthwork material stockpiles.
 11. Earthwork compaction to required densities.
 12. Earthwork Quality Control.
 13. Earthwork protection.
 14. Final grading.
 15. Provide quarry spall apron pads and shoreline protection.
 16. Earthwork maintenance.
 17. Soil Material Disposal.

1.02 PROJECT STAGING OF THE WORK

- A. Stage 1 work shall consist of installing TESC measures.
- B. After Stage 1 work is complete, Stage 2 work shall be initiated. As shown on the Contract Documents, Stage 2 work consists of:
1. Site Clearing and Grubbing work
 2. Selective Site Demolition work.
 3. Barrier-Containment Wall pre-load installation.
 4. Stormwater Outfall work, weather and permitting schedule pending.
- C. After Stage 2 work is complete, Stage 3 work shall be initiated. As shown on the Contract Documents, Stage 3 work consists of:
1. Stormwater Outfall work, weather and permitting schedule pending.
 2. Stormwater System pre-load installation.
 3. Completing earthwork cuts and fills and grading to Pre-Cap Grade. If after all grading is complete to the required subgrade elevations, provide a detailed topographic survey to demonstrate installation compliance with the contract document requirements.

D. After Stage 3, the Contractor shall complete Stage 4. As shown on the Contract Documents, Stage 4 work consists of:

1. Stormwater system installation (piping and structures).
2. Barrier-Containment Wall installation.
3. Install the stormwater treatment vaults.

E. After Stage 4, the Contractor shall complete Stage 5. As shown on the Contract Documents, Stage 5 work consists of:

1. Installation of the Barrier-WallPVC Liner System and gravel cover.
2. Providing an as-built survey and the civil 3D surface model of the finish grade surface to the Engineer.
3. Providing seeding work.

F. After Stage 5, the Contractor shall complete Stage 6. As shown on the Contract Documents, Stage 6 work consists of:

1. Completing Punchlist work.
2. Completing Record Drawing work.
3. Completing Contract Document work.
4. Obtaining Final Approvals and Acceptances.

1.03 EARTHWORK DEFINITIONS (DEFINITIONS ARE LISTED ALPHABETICALLY)

- A. Authorized Backfill: Authorized backfill is the backfill of specified soil materials, at the direction of the Engineer, placed in authorized overexcavation to return area to line and grade shown on the Contract Documents.
- B. Authorized Overexcavation: Authorized overexcavation is the excavation of soil materials, at the direction of the Engineer, beyond lines and grades shown on the Contract Documents.
- C. Backfill Material: Soil materials used to fill an excavation.
- D. Common Soil Material: Onsite native soils or reclaimed soils (contaminated or mixed imported and/or native soils). Native soil materials may be difficult to install or work during wet weather construction due to its moisture sensitivity.
- E. Common Fill Material: Common fill material shall consist of approved common soil materials that are used for fill purposes.
- F. Excavation: The removal of material located above and to required lines, grades, dimensions and subgrades.
- G. Fill Material: Satisfactory soil materials used to raise grades that are higher in elevation (or above) existing grades.
- H. Import Soil Materials: Approved soil materials provided from offsite sources. See PART 2 and Section 31 05 16 – Aggregates for specific import soil material requirements.
- I. Pipe Zone Bedding and Backfill Material: Soil bedding and backfill material placed below, around and above utility piping.
- J. Satisfactory Soil Materials: Satisfactory soil materials are soils that are free of unsuitable soils and are at or below the optimum moisture content as approved by the Engineer.

- K. Soft Spot: A pocket or spot in the existing native soil or improved subgrade that is structurally unstable and will not pass a proof roll test.
- L. Structures: Above or below ground man-made facilities that may include, but not be limited to underground utility vaults, catch basins/manholes.
- M. Subgrade: Surface or elevation remaining after completing an excavation or fill/embankment or backfill that subsequent import soil materials are constructed upon.
- N. Unsatisfactory Soil Materials: Unsatisfactory soil materials are soils that have not been approved for specified installations, are soils that are mixed with other deleterious soils due to the Contractor's operations or are soils that have deteriorated due to excessive moisture. Unsatisfactory soil materials have no acceptable installations unless they are processed to comply with common fill material requirements.
- O. Unsuitable Soil Material: Existing native soils that consist of, but are not limited to peat, muck, swampland or soils containing clay, debris, waste, frozen materials, vegetable organics, tree roots or other deleterious matter. Existing native soils classified as GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487 or a combination of these groups are unsuitable. Unsuitable soils also include large rocks or boulders which are too large to effectively allow compaction in lifts as required for common fill.
- P. Utilities: Underground or above ground pipes, conduits, and structure located over the site.
- Q. Utility Structures: Underground vaults, catch basins and manholes used with utilities.
- R. Utility Structure Bedding Material: Satisfactory import soil material placed below the utility structure and above the structure foundation grade to provide utility structure support.
- S. Utility Trench or Structure Foundation: Firm, unyielding soils located below the respective utility or structure. See Drawing cross sections.

1.04 SUBMITTALS

The Contractor shall prepare and submit the following to the Engineer:

- A. For Import Aggregate Materials:
 - 1. Comply with Section 31 05 16 Aggregate requirements.
 - 2. Comply with Interim Action Work Plan Appendix I for Acceptance Criteria for Virgin Quarry Material.
- B. Manufacturer's Data Certificate: Provide supplier name of materials
- C. Temporary Sheet Pile Cofferdam Shop Drawings
- [3] D. Surveying product deliverables stamped by PLS (in Autocad Civil 3D-2024 edition and PDF): Coordinate with Section 01 71 23 - Field Engineering requirements.
 - 1. The project pre-load measurements.
 - 2. The project as-builts (a Topographic survey of all work performed).
 - [3] 3. The finish ~~subgrade~~ Pre-Cap Grade surface.
 - [3] 4. The ~~finish~~ Final ~~G~~grade surface.

- E. Contractor Work Plan: The Contractor shall submit a work plan (combination of drawings and description) for approval. Plan shall include truck loading and truck routes to prevent tracking of contaminated material from the work area in accordance with specification 02 60 00. Plan shall include methods for adhering to soil movement criteria specified in section 1.05.B.

[3] F. Contractor Quality Control Plan for the PVC Liner System: The Contractor shall submit a quality control plan for approval. Plan shall include material certifications and documentation, quality control testing, experience of QC team, methods for documenting installation and repair work and provide as-builts consistent with industry standards.

F.G. Certificates shall include, but not necessarily be limited to:

1. Geotextile.
2. PVC liner.

1.05 JOB CONDITIONS

- A. The project site is an active contaminated soil site. Former owners included Arkema, Elf Ato Chem, AtoFina Chemicals to name a few. The main constituent to remediate is arsenic. Previous remediation work has been performed to limit the movement of arsenic in groundwater, including installation of a sheet pile wall, ferric chloride injections and limited excavation.

[3] B. All excavated soil materials shall be treated as arsenic impacted materials. All excavated soil materials (except for site clearing waste materials) shall remain onsite.

1. All excavated soils located within the barrier-containment wall limits shall remain within the barrier-containment wall limits. The barrier-containment wall limits are shown on the drawings.

[3] 2. All excavated soils located outside of the barrier-containment wall limits may be placed as common fill located either inside or outside of the barrier-containment wall limits. The barrier-containment wall limits are shown on the drawings.

- C. The site is a historical industrial site and debris may be encountered during excavation.

1. Trash, concrete, wire, rope or other industrial waste shall be considered as debris.
2. Boulders and large rocks shall be considered as debris.
3. Vegetation from clearing and grubbing shall be considered as debris.

- D. Geotechnical Information is available in Section 00 31 00 Available Project Information includes relevant portions of the former Arkema Manufacturing site Geotechnical Memorandum, dated November 8, 2024, prepared by Sage Geotechnical and boring logs prepared as part of the pre-design investigation.

- E. Existing site soils are moisture sensitive and there is a seasonably high groundwater table.

- F. The project earthwork volumes do not balance. The project requires import soil volumes. All onsite soils (excluding site clearing waste soils) shall remain onsite. The Contractor shall be entirely responsible to provide satisfactory soil volumes to meet required plan grade elevations.

- G. Provide TESC stockpile protection BMP's in accordance with the SWPPP.

- H. The Contractor is advised to review the rainfall and weather records over the last year (2025 to present). Actual rainfall records over the last year may vary from average normal (NOAA) rainfall totals. The actual rainfall may have saturated existing soils and/or raised or lowered the groundwater tables over the site.

- I. Schedule: Coordinate this work with critical time schedule established for construction and take necessary measures to ensure schedule is met. Coordinate with Project Sequencing/Scheduling requirements.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All imported materials shall be of good quality and of the quantity, size, shape, and gradation specified herein. Coordinate with Section 31 05 16 Aggregates for import soil requirements.
- B. All import material shall be from Engineer approved source.
- C. All approved materials shall be provided from single source throughout the Work.
- D. The use of import recycled concrete and asphalt materials is NOT allowed.
- E. The use of recycled onsite concrete and asphalt materials is allowed.

2.02 GEOTEXTILE FABRIC

A. Geotextile for Shoreline Stabilization

1. Non-woven geotextile fabric shall be placed over all excavated shoreline protection areas, prior to the placement of quarry spalls, as shown on the Contract Documents.
2. Fabric shall be non-biodegradable; resistant to most soil chemicals, and acids and bases in the pH range of 3 to 12; free of defects or flaws which significantly affect its physical properties; protected from ultraviolet degradation. Use of fabric other than Carthage Mills FX®-160HS or Amoco 4516 will require approval by the Engineer prior to use.

[3] B. Geotextile for Barrier Containment Wall PVC Liner Protection

1. Non-woven geotextile fabric shall be placed below and above the 30-MIL PVC liner, as shown on the Contract Documents.
2. Fabric shall be non-biodegradable; resistant to most soil chemicals, and acids and bases in the pH range of 3 to 12; free of defects or flaws which significantly affect its physical properties; protected from ultraviolet degradation. Use of fabric other than TenCate Mirafi® 140N will require approval by the Engineer prior to use.

C. Geotextile for all other applications

1. Geotextiles shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. The geotextile shall also be free of all treatment or coating which might adversely alter its hydraulic or physical properties after installation.
2. Stabilization Geotextile Fabric shall be woven and conform to the following requirements:
 - a. Grab Tensile Strength: 315 lbf, minimum; ASTM D4632.
 - b. Seam Breaking Strength: 270 lbf, minimum; ASTM D4632.
 - c. Tear Strength: 112 lbf, minimum; ASTM D4533.
 - d. Puncture Resistance: 620 lbf, minimum; ASTM D6241.
 - e. Apparent Opening Size: No. 40 sieve, maximum; ASTM D4751.
 - f. Permittivity: 0.10 per second, minimum; ASTM D4491.

- g. UV Stability: 50 percent after 500 hours' exposure; ASTM D4355.
- h. Grab Failure Strain: <50%; ASTM D4632.
- D. Use of fabric other than that specified will require approval by the Engineer prior to use.
- E. PVC liner
 - 1. Thickness: 30 MIL $\pm$ 1.5 MIL; ASTM D5199.
 - 2. Tensile Properties; ASTM D882:
 - a. Strength at Break: 73lbs/in. width, minimum.
 - b. Elongation: 380%, minimum.
 - c. Modulus at 100%: 30 lbs/in. width, minimum.
 - 3. Tear Strength: 8 lbs, minimum; ASTM D1004.
 - 4. Dimensional Stability: 3%, maximum change; ASTM D1204
 - 5. Seam Strength; ASTM D7408
 - a. Shear Strength: 58 lbs/in. width, minimum.
 - b. Peel Strength: 15 lbs/in. width, minimum.
 - 6. Specific Gravity: 1.2, minimum; ASTM D792.
 - 7. Water Extraction: 0.15%, maximum; ASTM D 1239
 - 8. Volatile Loss: 0.70%, maximum; ASTM D1203
 - 9. Resistance to Soil Burial; ASTM G160
 - a. Breaking Factor: 5% change, maximum.
 - b. Elongation at Break: 20% change, maximum.
 - c. Modulus at 100% Elongation: 20% change, maximum.
 - 10. Hydrostatic Resistance: 100 lbs/in², minimum; ASTM D751.
 - 11. Plasticizer Minimum Average Molecular Weight: 400g/mol; ASTM D2124.

PART 3 EXECUTION

3.01 GENERAL

- A. Prior to start of Earthwork, the Contractor shall:
 - 1. Complete required TESC Erosion controls work.
 - 2. Complete site clearing and grubbing of work areas.
 - 3. Complete required Selective Demolition work.
 - B. Mining onsite materials for offsite export use is prohibited.
 - C. Open Excavations
 - 1. The Contractor shall minimize the extent of open Excavations after regular working hours.
 - 2. The Contractor shall backfill all daily Excavations so that there are no open Excavations at the end of each work day.
 - D. Dewatering: Comply with Section 31 23 19 Dewatering requirements.
-

- E. Project Sequencing/Scheduling requirements: The Contractor shall expect to perform Earthwork work during rainy/wet weather conditions in the spring, summer, fall and winter months. The Contractor shall implement and employ means and methods necessary to execute earthwork work in accordance with Plan and Specification requirements and within the project schedule time frame. Schedule work to minimize existing earthen soil disturbances.
- F. Traffic: Conduct Earthwork operations to ensure minimum interference with roads and other adjacent property. Do not close or obstruct streets or other occupied or used facilities without permission from authorities having jurisdiction.
- G. Surveying: All Construction survey work shall be performed by a licensed Surveyor or someone who works under the supervision of the licensed Surveyor of Record. All survey product deliverables shall be stamped and sealed by the Surveyor of Record.
- H. TESC: Provide soil stockpile covers and protection from the weather in accordance with Section 01 57 13 TESC and CSWPPP requirements.

3.02 INTERTIDAL WORK

A. Intertidal Work

- 1. Portions of the work along the Hylebos Waterway shoreline and the East-West ditch are located below the high tide line or ordinary high water level of Hylebos Waterway (approximately elevation +13.5 ft. Mean Lower Low Water (MLLW), work in the intertidal zone (shoreline generally below +13.5 ft. MLLW) are submerged under water during high tides and exposed ground during low tides. The Contractor's intertidal work shall comply with all aspects of the U.S. Army Corps of Engineers permit for the project, and in accordance with the Contract Documents.
- 2. Work between 0 feet and +13.5 feet MLLW
 - a. The Contractor shall schedule work between May 1, 2026 through February 14, 2027.
 - b. The Contractor shall schedule work during low tides of elevations that are at least 2 feet below the elevation of active work in order to work "in the dry".
 - c. The Contractor shall only excavate as much intertidal area as can be compacted by an excavator mounted plate compactor that delivers a minimum impulse force of 16,000 lbs. at 2,100 cycles per minute or similar equipment prior to inundation by tidal waters. The hoe pack shall function and operate in accordance with the manufacturer's specifications.
 - d. Prior to inundation by tidal waters, the Contractor shall establish a smooth surface free of depressions that might otherwise result in entrapment of juvenile salmonids or other fish with the falling tide.
- 3. Work below +13.5 feet MLLW shall be conducted when tides are out and below the elevation of the work area when reasonably possible. When not so, the work can be completed when area is submerged during permitted in water work period. For in water work, provide a contractor design-build temporary steel sheet pile cofferdam so that the adjacent Hylebos Waterway may be kept clean during outfall construction.
- 4. The Contractor shall use land-based equipment for work unless approved otherwise by the Engineer.

5. The Contractor shall provide a design-build temporary sheet pile cofferdam within the outfall work space to allow outfall work performance. Remove temporary sheet pile cofferdam upon completion of the outfall work. Complete the shoreline protection immediately upon temporary cofferdam removal.
6. Heavy construction equipment (like excavators, dozers, cranes, dump trucks, etc.) shall be kept off of the intertidal portion of the site and work from above elevation +13.5 ft. MLLW. Positioning of construction equipment below elevation +13.5 ft. MLLW is allowed only upon approval of a detailed Contractor work plan for such activities, and only when not practical otherwise. Or the Contractor may work within the temporary sheet pile cofferdam work space.
7. A containment boom shall be installed and maintained in the water adjacent to the intertidal work areas prior to and during the commencement of Excavation activities. The containment boom shall be installed outside of the temporary cofferdam and maintained throughout the outfall work duration.
 - a. The containment boom shall be a typical floating hard boom, such as an oil containment boom, with material (e.g., rubber) extending 4 feet below the water surface. The purpose of the boom shall be to deter fish from entering the littoral habitat adjacent to the work being completed on the intertidal shoreline and to contain floatable debris that is released during the work.
 - b. Installation of the boom shall ensure that no fish are trapped within the contained area during low tides.
 - c. If fish are observed within the contained area, the Contractor shall remove the boom temporarily to release observed fish and then re-install the boom after releasing observed fish.

3.03 EXISTING UTILITIES IN RIGHT OF WAY

- A. Contact and notify utility agencies as required by state laws prior to commencing Work. Call Local Utility Line Information service at [1-800-424-5555] not less than 3 (three) working days before performing Work. Request existing underground Utilities to be located and marked within and adjacent to the project work area.
- B. If Utilities are to remain in place, provide adequate means of protection during Earthwork operations.
- C. Maintain and protect above and below grade existing Utilities to remain.
- D. Do not interrupt existing Utilities serving facilities occupied and used by others except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided. Temporary utility services may be required. Provide minimum of three business working days' notice to utility agency and Engineer and receive written notice to proceed before interrupting utility.
- E. Expose existing Utilities when necessary to ensure that no grade conflict exists with utilities.
- F. Notify Engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- G. Damage to existing Utilities that are to remain shall be repaired to the Utility Purveyors requirements at no additional cost to the Port.

3.04 ONSITE REUSE

- A. The Contractor shall consider all excavated material as suitable for onsite reuse as Common Fill Material located in the onsite subgrade installation except for the following:
 - 1. Site clearing materials.
 - 2. Debris, rocks, boulders, and vegetation waste
 - 3. Selective demolition materials (see section 02 41 19 for specifics).
- B. The Contractor may stockpile excavated common soil material for onsite reuse as follows:
 - 1. Stockpile soil materials suitable for reuse until required for fill.
 - 2. Locate stockpiles away from edge of excavations.
 - 3. Stockpile materials for reuse without intermixing with other soils or import aggregate materials.
 - 4. Place, grade and shape stockpiles for proper drainage, directing surface water away from stockpile site to prevent erosion or deterioration of materials.
- C. The Contractor may use satisfactory onsite common soils for the utility pre-load work in accordance with Drawing requirements.
- D. Only clean virgin soils are allowed/installed above the PVC liner and located within the gravel cap section.

3.05 IMPORT MATERIAL STOCKPILE

- A. The Contractor shall stockpile delivered Import Soil Materials in approved areas only, in a manner that will not endanger Work and will not obstruct access routes.
- B. The Contractor shall prevent the Import Soil Material stockpiles from contamination or intermixing with common soils.

3.06 CONDUCT OF EXCAVATION

- A. The Contractor shall excavate to required subgrade elevations, lines and grades shown on the Contract Documents within specified tolerances regardless of character of materials and obstructions encountered unless otherwise directed by the Engineer.
 - 1. If the Contractor identifies Unsuitable Soil Material, notify the Engineer. Unsuitable Soil Material shall be removed, stockpiled onsite, and tested by the Port for disposal.
 - 2. Unsatisfactory Soil Materials located within contract Excavation extents shall be removed as Excavation, stockpiled onsite and covered in accordance with Section 01 57 13 TESC and CSWPPP requirements. The unsatisfactory soils shall be processed to comply with common fill requirements or stockpiled onsite for reuse at a later date.
 - 3. Common Soil Material located within contract Excavation extents shall remain onsite and may be used for satisfactory common fill purposes or stockpiled for future use.
 - 4. In the event that materials used for decommissioning shallow groundwater monitoring wells are encountered in Excavations, such as clays and bentonite, the materials shall remain onsite and may be used for satisfactory common soil purposes.
 - 5. Comply with paragraph 1.05.B, JOB CONDITIONS requirements.

- B. Excavations: Excavations shall comply with WAC 296-155, Part N OSHA, WISHA, local codes and ordinances having jurisdiction. The site is underlain by Type C soils per WAC 296-155-66401 and a seasonal high groundwater table. The Contractor is responsible for all Excavation and trench safety. Provide and install timbering and sheeting, trench boxes and shoring as necessary to protect workers, work, existing Utilities and other properties where sloping is not possible because of space restrictions or instability of material excavated; remove timbering and sheeting, trench boxes and shoring above pipe prior to backfilling Excavations.
- C. Should uncharted, or incorrectly charted, piping or other Utilities be encountered during Excavation, the Contractor shall consult utility agency immediately for directions and cooperate with Engineer and utility agencies in keeping respective services and facilities in operation; and repair damaged utilities to satisfaction of utility agency.
- D. Excavations for Site Improvements:
 - 1. Excavation for Quarry Spall Pads: Excavate to the required elevations, lines and grades within the specified tolerances
- E. Excavations to Subgrade: Execute Subgrade and Grade to Inspection requirements in paragraph 3.13 SUBGRADE AND GRADE TO INSPECTIONS.

3.07 CONDUCT OF SHORELINE EXCAVATION

- A. The Contractor shall excavate the Hylebos shoreline to the lines, grades (within ± 0.1 ft.), and extents shown on the Contract Documents for shoreline protection and onsite reuse. The Engineer will observe the Excavation and may provide guidance on modification to Excavation extents based upon observed field conditions.
- B. The Contractor shall stockpile existing excavated shoreline materials designated for reuse located in approved areas only. See Plans for specific materials. Otherwise, existing excavated shoreline materials shall be considered as Common Soil Material.
- C. The Contractor shall use dump trucks or containers for transport within the site that do not leak material or water.

3.08 CONDUCT OF UTILITY AND UTILITY STRUCTURE EXCAVATIONS

- A. The Contractor shall excavate utility trenches for underground storm drain utility piping and Utility Structure installations, to the line and grade shown on the Contract Documents.
- B. The Contractor shall excavate trenches sufficiently wide to enable installation of Utilities and allow inspection.
- C. Slope sides of Excavations shall comply with WAC 296-155, OSHA, WISHA, local codes and ordinances having jurisdiction. The Contractor shall provide and install timbering and sheeting, trench boxes and shoring as necessary to protect workers, work, existing Utilities and other properties where sloping is not possible because of space restrictions or instability of material excavated. The Contractor shall remove timbering and sheeting, trench boxes and shoring above pipe prior to backfilling Excavations.
- D. The Contractor's trenching operations shall not proceed more than 100 feet in advance of pipe laying except with written approval of the Engineer.
- E. The Contractor shall not disturb bottom of excavations intended as bearing surfaces. Provide firm foundation for Utilities and Utility Structures.
- F. Execute Subgrade and Grade to Inspection requirements in paragraph 3.14 SUBGRADE AND GRADE TO INSPECTIONS.

3.09 CONDUCT OF AUTHORIZED OVEREXCAVATION AND BACKFILL

- A. The Contractor shall not excavate or backfill beyond the lines and grades shown in the Contract Documents unless authorized by the Engineer. Unauthorized overexcavation and backfill shall be at the Contractor's expense.
- B. Overexcavation and backfill that is required to repair deteriorated grades, as a result of the Contractor's operations will not be considered Authorized Overexcavation and backfill work.
- C. The Engineer shall direct the Contractor to excavate beyond the lines and grades shown on the Contract Documents and to backfill the Authorized Overexcavation in accordance with Bid Item #28-29 provisions. Overexcavation and backfill may be required in the following cases:
 - 1. Unsuitable Soil Materials exposed at required Excavations to Subgrades.
 - 2. Unsatisfactory soils due to excessive moisture in native soils located at required gravel cover section Excavations to Subgrades.
 - 3. Unsuitable Soil Materials exposed at the trench foundation grade.
 - 4. Unsatisfactory soils due to excessive moisture at the trench foundation grade.
- D. Authorized Overexcavation and backfill quantities shall be quantified as Excavation cubic yards. The Contractor and the Engineer shall agree in writing to the in-place, neat line, field measured Authorized Overexcavation quantity. The Contractor shall backfill the overexcavation with specified materials. Contractor reimbursement for overexcavation and backfill work is included in the Unit Price.
- E. The Contractor shall record all Authorized Overexcavation and backfill locations on the Record Drawings.

3.10 CONDUCT OF PRE-LOAD FILL PLACEMENT

- A. The Contractor shall not begin the pre-load fill until demolition and site clearing operations are complete.
- B. Place the pre-load fill in accordance with the plan requirements. Unless otherwise specified on the drawings, the pre-load material shall comply with import gravel borrow requirements. Coordinate with Section 31 05 16 Aggregates for Earthwork requirements.
- C. Place pre-load monitoring plates and measure the elevations at 30' intervals along the perimeter, bi-weekly. The Contractor shall provide detailed elevations of the pre-load at the beginning and end of the pre-load time duration. The pre-load time duration is estimated to be 2 months. The elevations shall be recorded by a professional land surveyor.
- D. The Contractor shall provide the preload data to the Engineer to determine whether the preload can be removed. To remove the preload, the settlement data must show a linear trend when plotted against the logarithm of time, and the average difference between the last two readings shall be less than 0.02 ft. The Engineer may select other criteria to evaluate preload removal, based on the observed performance of the preload.
- E. Upon completion of the pre-load embankment work, the Contractor may reuse the pre-load materials in the construction of the barrier containment wall outer berm (provided the material is kept clean, the barrier containment wall inner berm and/or the common fill within the barrier containment wall limits. At the utility pre-load, the Contractor shall remove the upper portion of the pre-load in accordance with Plan requirements.

3.11 CONDUCT OF SHORELINE BACKFILL AND STABILIZATION PLACEMENT

- A. The Contractor shall not begin backfill or shoreline stabilization until soil Excavation elevations have been approved by the Engineer.
- B. Conduct of Geotextile Fabric Placement
 - 1. The Contractor shall place geotextile fabric on all excavated shoreline areas as shown on the Contract Documents and in accordance with manufacturer's recommendations.
 - 2. The Contractor shall roll out geotextile fabric oriented up and down the slope.
 - 3. The Contractor shall overlap adjacent pieces of geotextile fabric a minimum of 3 feet. The Contractor shall install geotextile fabric such that a single piece covers the slope from the lower limit to the top of slope with no joints or overlaps.
 - 4. The Contractor shall place geotextile fabric in a manner that avoids ripping of the material during shoreline protection material placement.
- C. Conduct of Import Material Placement
 - 1. The Contractor shall place materials to the lines, grades, and thicknesses shown on the Contract Documents.
 - 2. The Contractor shall start material placement at the bottom of the slope and proceed upward.
 - 3. The Contractor shall place Import Soil Materials by methods which do not tend to segregate rock/particle sizes.
 - 4. The Contractor shall use an excavator mounted plate compactor (hoepac) that delivers a minimum impulse force of 16,000 lbs. at 2,100 cycles per minute or similar equipment prior to compaction of shoreline protection import materials, except riprap. The hoepac shall function and operate in accordance with the manufacturer's specifications.

3.12 CONDUCT OF EARTH EMBANKMENT FILL AND BACKFILL

- A. The Contractor shall provide satisfactory fill and backfill installations in accordance with Contract Document requirements. The Contractor shall:
 - 1. Pass the Subgrade and Grade to Inspection test.
 - 2. Place backfills and fills in continuous layers not more than 8 (eight) inches in loose depth for material compacted by heavy compaction equipment and not more than 4 (four) inches in loose depth for material compacted by hand-operated tampers.
 - 3. Do not place Backfill Material or Fill Material on surfaces that are unsatisfactory, muddy and wet.
 - 4. Place backfill and fill soil materials evenly on all sides of Structures and Utilities to required elevations, and uniformly along the full length of each Structure.
 - 5. Before compaction, moisten or aerate each layer to required percentage of maximum dry density or relative dry density.
 - 6. Compact backfill and fill in accordance with requirements herein.

3.13 CONDUCT OF UTILITY AND UTILITY STRUCTURE BACKFILL

- A. Pass the Subgrade and Grade to Inspection test per paragraph 3.14.

- B. The Contractor shall remove concrete formwork, trash, and debris prior to placing backfill.
- C. The Contractor shall backfill utility trench Excavations to the lines and grades shown on the Contract Documents.
- D. Trench sides shall be supported or shored as required to maintain safe working conditions and code requirements.
- E. The Excavations shall be kept free from water until pipeline and Utility Structure bedding, pipeline jointing, pipeline backfill and final backfill is completed.
- F. The Contractor shall place and compact pipe zone bedding and backfill below, around and above the piping to the dimensions shown on the Contract Documents. The Contractor shall:
 - 1. Shape pipe zone bedding to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
 - 2. Carefully compact pipe zone backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit.
 - 3. Coordinate backfilling with Utilities testing.
 - 4. Backfill voids located within the pipe zone backfill zone while as a result of installing and removing shoring and bracing with Pipe Zone Backfill Material.
- G. The Contractor shall place Pipe Zone Bedding Material to the plan cross section requirements evenly and carefully removing rock or other debris capable of damaging pipe. Place Pipe Zone Backfill material in lifts not exceeding eight (8) inches in depth and compact to specified densities to subgrade.
- H. The Contractor shall coordinate with other Utilities prior to pouring concrete so that the other Utilities may cross the concrete filled trench without obstruction.
- I. For Utility Structure bedding and backfill, the Contractor shall:
 - 1. Pass the Grade to Inspection test.
 - 2. Provide firm earthen foundation for all Utility Structures.
 - 3. Place and compact Utility Structure Bedding Material in accordance contract requirements.
 - 4. Place and compact Utility Structure pipe zone backfill at specified densities to subgrade in accordance with Contract Document requirements.

3.14 SUBGRADE AND GRADE TO INSPECTIONS

- A. The Contractor shall coordinate and schedule an inspection with the Engineer at the following times:
 - 1. Upon completion of trench Excavation to the lines and grade shown in the Contract Documents, prior to pipeline bedding and backfill installation.
 - 2. Upon completion of all cut to fill grades and prior to any subsequent fill placement.
- B. The Engineer will conduct testing as appropriate to verify the soil firmness/stability at the foundation grade (see Drawing cross sections).
 - 1. Test subgrade or grade surface in accordance with paragraph 3.18 FIELD QUALITY CONTROL/TESTING requirements.

2. Should the testing or Engineer determine that the soils located at the required grades and Subgrades are firm/stable, then subsequent work shall be conducted.
3. Should the Engineer determine that the soils located at the required grades and Subgrades are not firm/stable, then the Engineer will determine the necessary corrective measures. Corrective measures may include AUTHORIZED OVEREXCAVATION AND BACKFILL.

3.15 CONDUCT OF GRADING

- A. The Contractor shall grade the Subgrade area surfaces to conform to required finish grade contours, lines, and grades/elevations less the respective surfacing section depths so that the respective surfacing sections can be placed to required depths evenly and uniformly on top of the prepared Subgrade. Work shall include, but not be limited to:
 1. Preparation of native material to receive backfill and fills
 2. Excavating and removal of native materials
 3. Providing various Imported Soil Materials
 4. Grading and compacting soils to the required Subgrade elevations
 5. Providing positive drainage at parking and staging areas being driven on, Subgrades, and other areas as necessary during and for construction. Positive drainage shall be accomplished by establishing grades as designed or by interim methods as necessary.
- B. The Contractor shall complete finish grading after installation of respective surfacing sections. Conform to required finish grade contours, lines, and grades.
- C. During construction, the Contractor shall maintain lines and grades including crown and cross-slope of Subgrade, uniformly grade areas to a smooth surface, free of irregular surface changes, comply with compaction requirements, and grade to cross sections, lines, and elevations required by Contract Documents.

3.16 CONDUCT OF COMPACTION

- A. The Contractor shall compact soil materials in maximum 8 (eight) inch lifts under all areas to not less than the following percentages of maximum dry unit weight according to ASTM D1557.
 1. Gravel area Subgrades shall pass a proof roll test. The Contractor shall compact each layer of fill to 95 percent maximum dry unit weight.
 2. For the existing biofiltration swale located in the southern portion of the site, the Contractor shall compact the soils in Excavation to Subgrade conditions to 90% of maximum dry unit weight. In fill to Subgrade conditions, compact the fill to 90% of maximum dry unit weight. The Contractor shall hand rake these areas smooth prior to topsoil placement as described in Section 32 92 19 – Seeding.
 3. For Utility Trenches and Structures, the Contractor shall compact pipe zone bedding and Utility Structure bedding aggregates at 90 percent maximum dry unit weight and pipe zone backfill aggregates to subgrade at 95 percent maximum dry unit weight.
- B. The Contractor shall provide all water required for soil compaction.

3.17 TOLERANCES

- A. The Contractor shall uniformly grade areas within grading extents. The Contractor shall provide smooth finish surfacing within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades. Finish surfaces free of irregular surface changes and as follows:

- [3] 1. Gravel area finish grades and subgrades shall be shaped to required lines and grades within 0.50 inch above or below required elevations. The Contractor shall obtain the Engineer's subgrade approval prior to placement of gravel area section materials.

[3] 3.18 PVC LINER

A. Preparation

1. Provide smooth, even subgrade. Provide a subgrade that is free ~~face~~ of sharp projections, voids, particles 1-1/2 inches or larger in size and angular rocks, cobbles, roots, vegetation, debris, protrusions, and groundwater and other deleterious objects.

B. Installation

1. Place base geotextile prior to installation of PVC liner.
2. Place PVC liner over prepared surface and geotextile to ensure minimal handling. Install in compliance with manufacturer's written instructions. Install liner in a relaxed condition, free from stress and tension.
3. All seams shall have air channel testing performed in accordance with ASTM D7177. Seams shall be pressurized to 30 pounds per square inch and held at this pressure for 5 minutes. Engineer shall be present during all testing.
4. PVC liner shall be welded to PVC well casings where wells are proposed to penetrate the liner.
5. Liner Repairs: Repair tears, punctures, and other imperfections in PVC liner and seams using patches of liner material, liner-to-liner bonding materials, and bonding methods in accordance with ~~manufacturers~~ manufacturers' written instructions. Apply bonding solvent or weld to contact surfaces in accordance with manufacturers written instructions.
- 4-6. Protect installed liner. Repair or replace areas of liner damaged by scuffing, punctures, traffic, rough subgrade, or other unacceptable conditions. Place geotextile over PVC liner following acceptance by the Engineer.

[3] 3.183.19 FIELD QUALITY CONTROL/TESTING

- A. General: The Contractor shall coordinate, schedule, notify and allow the Engineer to inspect and approve grades, Subgrades and fill/backfill layers before further construction work is performed. The Engineer and/or their testing agent shall perform field density tests in accordance with ASTM D 6938 as applicable or a proof-roll test may be required at all grades at the Engineer's discretion. The Contractor shall provide samples of material 2 weeks prior to planned use for testing by ASTM D 1557. If fills are below specified density, the Contractor shall provide additional compaction for retesting. If additional testing is required due to failure of areas tested, the Contractor shall pay for such retesting.
- B. Utility Trenches and Backfill Testing: The Contractor shall coordinate, schedule, notify and allow the Engineer and/or their testing agent to conduct in-place density tests per D 6938, minimum of one (1) field density test for every 100 lineal feet/ 1 vertical foot of trench.

- C. Utility Structure Backfill Testing: The Contractor shall coordinate, schedule, notify and allow the Engineer and/or their testing agent to conduct in place density tests per ASTM D 6938, minimum of two per Utility Structure located within the pipe zone backfill.
- D. Cut to fill grades: A proof-roll test shall be required at all gravel area cut to fill grades prior to the placement of subsequent fills in the presence of the Engineer.
- E. Proof Roll Test: The Contractor shall notify the Engineer a minimum of two calendar days prior to proof roll test shall meet the following requirements:
 - 1. Completely proof-roll the Subgrade in one direction and repeat proof rolling in direction perpendicular to first direction. Maximum vehicle speed shall be 3 mph.
 - 2. Proof-roll with a fully-loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
 - 3. Should the surface of the proof roll tested area deflect and fail the test and/or reveal a Soft Spot, the Contractor shall provide corrective measures as directed by the Engineer and then retest area until the proof roll test is acceptable.
 - 4. Should the Subgrade surface area not deflect, the proof roll test will be considered acceptable and subsequent fill/embankment or paving work shall commence.

[3] 3-193.20 PROTECTION

- A. The Contractor shall protect graded areas from traffic and from becoming excessively wetted or eroded due to weather conditions.
- B. The Contractor shall prevent and protect the existing native soil grades from deterioration. Deterioration of prepared or installed work areas, as a result of, but not limited to, scheduling and sequencing of work, construction and equipment operations, working hours and weather shall not be the basis for additional Authorized Overexcavation and backfill work.

[3] 3-203.21 MAINTENANCE

- A. The Contractor shall repair and reestablish grades to specified tolerances where installed surfaces have become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions at no additional cost to the Port. Remove and replace soil material to depth as directed by Engineer; reshape and recompact.
- B. The Contractor shall recondition compacted areas, where completed compacted areas are disturbed by subsequent construction operations, deterioration or adverse weather, repair prior to further construction with no additional cost to the Engineer.

[3] 3-243.22 DISPOSAL

- A. The Contractor shall stockpile all unsuitable soil. Further handling of the material will be at the direction of the Engineer and will be in accordance with Specification 02 60 00 and 02 61 00 if off-site disposal is necessary.

END OF SECTION