



Civil & Electrical Specifications

Long Lake Substation

FEBRUARY 2012

SECTION 00003
TABLE OF CONTENTS

DIVISION 1 GENERAL REQUIREMENTS

Section 01300 Submittals

Section 01640 Substitution and Product Option

DIVISION 2 SITE WORK

Section 02110 Site Preparation

Section 02220 Excavation And Embankment

Section 02225 Trenching

Section 02231 Base Course & Crushed Surfacing

Section 02275 Riprap

Section 02722 Site Storm Drainage System

Section 02731 Spill Prevention, Countermeasure & Control Apparatus (SPCC)

Section 02831 Chain Link Fencing and Gates

Section 02901 Temporary Erosion/Sediment Control

DIVISION 3 CONCRETE

Section 03110 Formwork For Structural Cast-In-Place Concrete

Section 03200 Concrete Reinforcement

Section 03300 Cast-In-Place Concrete

Section 03345 Concrete Finishes

Section 03602 Non-Metallic Grout

DIVISION 5 METALS

Section 05091 Welding

Section 05110 Structural Steel Erection

DIVISION 9 FINISHES

Section 09905 Galvanizing Repair

Appendix A

PSE Standards

Appendix B

Submittal Log

SECTION 01300
SUBMITTALS

PART 1. GENERAL

1.01 No materials shall be delivered to the site until the proposed source material tests have been approved by the Owner.

1.02 All submittals are for Owner information and approval. Contractor shall order specific submittal items only when materials have been approved or directed to do so by Owner.

1.03 The Contractor shall review and approve all submittals prior to transmitting to Owner. Submittals shall indicate dimensions, installation details, type of material, pattern, color, weight or grade, connections required to work with other trades, and methods of finishing. Submit shop drawings for each section of the specification where indicated. Final approval of dimensions, fitting and ability to comply with the Contract documents shall be the Contractor's responsibility.

END OF SECTION 01300

SECTION 01640
SUBSTITUTION AND PRODUCT OPTION

PART 1. GENERAL

1.01 "OR APPROVED EQUAL" CLAUSE

- A. In order to establish a basis of quality, certain processes, equipment and materials may be specified, on the plans or herein, by designating a manufacturer by name and referring to a brand or product designation. It is not the intent of these specifications to exclude other processes, equipment or materials of a type and quality equal to those designated.
- B. Whenever a manufacturer's name, brand or item designation is given, it shall be understood that the words "or approved equal" follow such name or designation whether, in fact, they do so or not.

1.02 SUBSTITUTIONS

- A. Within two weeks after notice to proceed, Owner will consider formal requests from Contractor for substitution of products, construction methods or equipment in place of those specified herein.
- B. The Contractor's submittal requesting substitutions shall include:
 - 1. Detailed description of method or products.
 - 2. Comparison of proposed substitution with product or method specified.
 - 3. Data relating to changes in construction scheduling.
 - 4. Accurate cost data on proposed substitutions in comparison to method or product specified.

END OF SECTION 01640

SECTION 02110
SITE PREPARATION

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. Work shall include, but not be limited to, removal of the following items within clearing limits as defined by the Grading Plans:
 - 1. Roots and debris.
 - 2. Vegetative layer, soft silt and topsoil.
- B. Following the grubbing and stripping operations, the site shall be ready for excavation and placement of embankment.

PART 2. MATERIALS

2.01 Non-applicable

PART 3. EXECUTION

3.01 EXAMINATION

- A. The Contractor shall examine the site to determine the types of materials to be removed.

3.02 PROTECTION

- A. The Contractor shall not damage trees, shrubs, plants, or other vegetation outside of the clearing limits shown on the Plans.
- B. All trees, shrubs, plants or vegetative cover damaged by the Contractor outside of the clearing limits shall be restored to the satisfaction of the Engineer at the Contractor's expense.

3.03 PERFORMANCE

- A. Grubbing
 - 1. All roots shall be removed a minimum of 12-inches below the original ground surface, except that all roots 1-inch and larger shall be removed entirely.
 - a. Deeper grub depths shall be meet in areas as noted on plans.
 - 2. The roots of all plants which normally sprout from roots, as identified by the Engineer, shall be removed.
- B. Stripping
 - 1. The existing vegetation layer and topsoil, and soft or organic rich near surface soils shall be removed from all areas of the site to be graded.
- C. Disposal

1. All trees, shrubs, roots, brush, vegetation, topsoil, debris, asphalt and concrete shall be removed from areas to be graded and disposed of in a legal manner.
2. No materials resulting from clearing and grubbing operations may be burned or disposed of on site.

END OF SECTION 02110

SECTION 02220
EXCAVATION AND EMBANKMENT

PART 1. GENERAL

1.01 SUBMITTALS

- A. Submit gradation test results for all imported fill material proposed for construction.

PART 2. MATERIALS

2.01 EMBANKMENT

- A. Material for embankment shall be well-graded and granular, free of debris, organic material, frozen material, concrete, rubble or other objectionable material
Embankment material shall meet or exceed WSDOT Section 9-03.14(2) Select Borrow.
- B. All embankment material shall be approved by the Owner prior to importing or placement. It shall be the Contractor's responsibility to use the proper fill material to suit existing weather conditions and to change fill material as directed by the Owner.
- C. Material from on-site excavation may be used for embankment if it meets the requirements specified above and is approved by the Owner. Contractor shall provide gradation tests for on-site material upon request of Engineer to obtain approval. Otherwise, material shall be imported from off-site.

PART 3. EXECUTION

3.01 STRUCTURAL EXCAVATION

- A. Excavate to lines and grades shown on the approved design drawings, or as directed by the Owner's representative. Permissible tolerances shall not exceed one-tenth of one foot variation in elevation. Over-excavation beyond designated limits shall be replaced with embankment material at Contractor's expense.
- B. If an excavation gets wet, or if exceptionally weak materials are encountered in an excavation, all softened soils should be stripped off down to undisturbed soil and replaced with compacted, embankment material. Perched groundwater, if encountered, may need to be controlled with sump pumps. Collected water shall be discharged to a suitable discharge point.
- C. Where forming is required, excavations shall extend a sufficient distance from walls and footings to allow for placing and removal of forms, backfilling and compaction, and installation of services and inspection. Excavation walls and bottoms shall be trimmed to reasonably smooth lines and grades, without undercutting. Bottom of excavation shall be square and true within allowed tolerances.

- D. Final cut areas shall be proof rolled, where practical, with heavy construction equipment to a firm and unyielding condition prior to placing compacted fill material. Probing shall be used to evaluate subgrade if proof rolling is not feasible.
- E. The Owner's representative shall be present during all proof rolling operations.
- F. Areas of soft, wet soil, or areas that exhibit "pumping" or weaving action when rolled, shall be excavated to a depth specified by the Owner and the unsuitable material replaced with embankment material.

3.02 DISPOSAL OF WASTE MATERIAL

- A. Foreign materials, buried rubble or other buried structures, and native soil materials which cannot be processed to uniform moisture or gradation necessary to achieve specified densities, shall be disposed of off-site at the appropriate waste disposal area unless stated otherwise in the Project Conditions.
- B. Excess native soil shall be disposed of off site at the appropriate disposal area unless stated otherwise in the Project Conditions.
- C. The Contractor shall be responsible for all permits required for such off site disposal.

3.03 EMBANKMENT AND COMPACTION

- A. All embankment material shall be conditioned to a moisture content suitable for compaction.
- B. Material shall be placed in lifts not to exceed 8-inches in loose thickness and each lift shall be compacted to 95 percent of maximum dry density as determined by ASTM D 1557 (latest) prior to placement of subsequent overlying lifts.
- C. Existing sloping ground over 20% shall be benched prior to the placement of fill material. Benching shall begin at the top of the slope. Fill material shall be placed in horizontal layers and keyed into the existing slope. Compaction equipment shall be operated on the slope as each successive lift is placed.
- D. If standing water occurs at the bottom of an excavation, initial fill below water level shall be quarry rock or free draining sand and gravel compacted to 95% of maximum dry density as directed.

3.04 MOISTURE CONTROL

- A. During the compacting operations, maintain optimum practicable moisture content required for compaction purposes in each lift of the fill. Maintain moisture content uniform throughout the lift. Insofar as practicable, supplement natural moisture, if required, by sprinkling the fill. At the time of compaction, the water content of the material shall be at optimum water content plus or minus two percentage points.
- B. Do not compact fill material which contains excessive moisture. Aerate material by blading, discing, harrowing, or as approved, to hasten the drying process prior to compaction.

- C. Any materials which become unstable as the result of improper selection of techniques, equipment, or operations during inclement wet weather shall be replaced at Contractor's expense.

3.05 **COMPACTION TESTING AND EVALUATION**

- A. In-place density and moisture content will be verified using ASTM D1556, D2922, or D3017. The Contractor will cooperate with this testing work by leveling small test areas as designated by the Owner.
- B. Owner's costs of retesting failed areas will be back charged to the Contractor.

END OF SECTION 02220

SECTION 02225
TRENCHING

PART 1. GENERAL

1.01 SUBMITTALS

- A. Submit gradation test results for all imported material proposed for construction.
- B. Submit working drawings and calculations for proposed shoring methods according to WSDOT Section 2-09.3(3) "Shoring and Cofferdams"

PART 2. MATERIALS

2.01 PIPE BEDDING

- A. Pipe bedding material for rigid pipe shall conform to PSE Standard Specification 1275.1340, "Gravel Backfill Aggregate for Pipe Bedding".
- B. Pipe bedding for flexible pipe shall conform to WSDOT Section 9-03.12(3) "Gravel Backfill for Pipe Zone Bedding."

2.02 TRENCH BACKFILL

- A. Embankment material is allowed for trench backfill, except the maximum particle size shall not exceed 1-inch within 12-inches of the top of the pipe.

2.03 SHORING

- A. Materials for shoring shall be in accordance with WSDOT Section 2-09.3(3)D.

PART 3. EXECUTION

3.01 TRENCH EXCAVATION AND PREPARATION

- A. Trenches shall be excavated to the width and depth that will allow placement of the pipe bedding and pipe as specified on the Plans and in these Specifications.
- B. Prior to the placement of the pipe bedding, the trench bottom shall be graded to remove any organic material, rocks larger than 4-inches in diameter, roots, and other undesirable material.
- C. Areas in the trench bottom that contain soft, wet soils, or exhibit "pumping" action shall be removed as directed by the Engineer. Embankment material shall be used to replace the unsuitable.
- D. Trenches shall either be over-excavated to provide a stable slope or shored to provide worker protection as required by law.

3.02 PLACEMENT OF BEDDING MATERIAL

- A. Prior to placement of the pipe, bedding materials shall be placed and spread along the trench bottom and compacted to a 4-inch minimum thickness to provide a uniform support along the entire length of the pipe.
- B. Subsequent lifts of pipe bedding of not more than 6-inch thickness each shall be placed along the sides of the pipe and each lift compacted prior to placement of the next lift until a total additional thickness of pipe bedding equal to one-half of the pipe diameter is reached or the thickness shown on the drawings, if greater.
- C. Care shall be taken to ensure that the bedding material is brought up simultaneously on both sides of the pipe and that it is thoroughly worked under the pipe haunches prior to compacting.

3.03 TRENCH BACKFILL

- A. Trench backfill shall be placed in lifts not to exceed 8-inches in loose thickness and each lift shall be compacted to 95 percent of maximum dry density as determined by ASTM D1557 (latest) prior to placement of subsequent lifts. Care shall be taken during compaction operations so as to not damage the pipe.
- B. Compaction equipment shall be approved by Owner prior to trench excavation.

3.04 EXCAVATION AND BACKFILL FOR CATCH BASINS

- A. Excavation for catch basins shall be sufficiently oversized to permit mechanical compaction of backfill.
- B. Backfill material and placement shall be as specified for trenches.

END OF SECTION 02225

SECTION 02231
BASE COURSE & CRUSHED SURFACING

PART 1. GENERAL

1.01 SUBMITTALS

- A. Submit gradation tests for all imported backfill material in accordance with ASTM D422 performed by an approved independent testing laboratory and certified to be in compliance with specifications.
- B. Submit 1-gallon samples of all fill material proposed for construction. Samples shall be representative and clearly marked to show the source of material and the intended use on the Project.

PART 2. MATERIALS

2.01 IMPORTED GRAVEL BACKFILL

- A. Base Course
 - 1. Base course material shall be in accordance with PSE Standard Specification 1275.1310, "Base Course Aggregate".
- B. Top Course Crushed Surfacing
 - 1. Top course materials material shall be in accordance with PSE Specification 1275.1320, "Top Course Crushed Aggregate. "
- C. Yard Course Crushed Surfacing
 - 1. Imported yard course material shall be per PSE Standard Specification 1275.1330, "Yard Course Crushed Aggregate".
- D. It shall be the Contractor's responsibility to use the proper fill material to suit existing weather conditions and to change fill material as directed by the Owner.
- E. Material finer than the No. 200 sieve shall be non-plastic. Gravel backfill material shall be free from roots, debris, and other deleterious materials, and shall be well graded, free draining and compactable.
- F. The Contractor shall make his own arrangements to obtain the necessary materials at his own expense, and all costs of acquiring, producing and placing this material in the finished work shall be included in the unit contract prices.

2.02 COMPACTION EQUIPMENT

- A. Compaction equipment shall be of suitable type and adequate to obtain the densities specified. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort.

PART 3. EXECUTION

3.01 PLACEMENT AND COMPACTION

- A. All aggregate material shall be placed at the locations and to the depths and grades as shown on the Plans. All depths indicated on the Plans are compacted depths.
- B. Yard and driveways shall have a minimum 9-inch thick base course. Station yard and shoulders shall be surfaced with a minimum 4-inch yard course.
- C. The following nominal depth of compacted material shall not be exceeded in any one lift without the approval of Owner.
 - 1. Base Course: 9"
 - 2. Top Course: 3"
- D. Each lift shall be compacted to 95 percent maximum dry density as determined by ASTM D1557 (latest) and/or D3017 prior to placement of the next lift.
- E. Backfill shall not be placed until forms, rubbish, and deleterious materials have been removed from area of work, and all inspections and approvals obtained.
- F. No backfill shall be placed against any concrete structure until concrete has set and cured for at least seven days or as approved by Owner.
- G. Structures against which backfill is to be placed shall be adequately braced and shored to prevent displacement or damage during backfilling and compaction.

3.02 REMOVAL AND REPLACEMENT

- A. Where aggregate (base course, top course, or yard course) must be removed for the installation of underground facilities, care shall be taken that the different aggregate materials are not mixed or that the aggregate materials are not contaminated with other materials such as embankment fill. Contaminated material shall not be reused but shall be removed from the site and replaced with materials as originally specified.
- B. After the installation of underground materials, structures, and equipment, aggregate shall be placed and re-compacted as originally specified. Special care shall be taken to ensure compaction in trenches and around foundations and drainage structures.

END OF SECTION 02231

SECTION 02275

RIPRAP

PART 1. GENERAL

1.01 SUBMITTALS

- A. Submit gradation test results for riprap demonstrating compliance with specifications.

PART 2. MATERIALS

2.01 STONE

- A. Stone for riprap shall be hard, sound, durable and free from segregation, seams, cracks, and other defects tending to destroy its resistance to weather.

2.02 GRADING

- A. Riprap shall be free of any rock fines, soil, organics, debris, or other extraneous material.
- B. Unless shown otherwise in the drawings, riprap shall meet the following requirements for grading:

PART 3.	Sieve	PART 4.	Percent
Size		Passing	
PART 5.	8"	PART 6.	100
PART 7.	3"	PART 8.	40
		(max)	
PART 9.	¾"	PART 10.	10
		(max)	

PART 11. EXECUTION

11.01 PLACEMENT

- A. Riprap shall be placed at the locations and to the depths indicated on the Plans.
- B. Material shall be placed in such a way that all relatively large stones are in contact with each other and the voids between filled with the finer materials to provide a well-graded, compacted mass.
- C. Care shall be taken not to disturb the underlying materials when placing riprap material.
- D. After placement, the riprap shall be compacted by tracked equipment making a minimum of three passes.

END OF SECTION 02275

SECTION 02722
SITE STORM DRAINAGE SYSTEM

PART 1. GENERAL

1.01 SUBMITTALS

1. Submit shop drawings for custom formed Type 2 manholes proposed for project

1.02 TRENCHING AND BACKFILL

- A. Requirements for trenching, pipe bedding, trench backfill, and excavation, and backfill for catch basins are included in SECTION 02225.

PART 2. MATERIALS

2.01 DRAIN AND CULVERT PIPES

- A. Drain and culvert pipes shall be constructed of round, plain or perforated, high density polyethylene corrugated pipe or PVC pipe as noted on the Drainage Plan.
 1. PVC pipe for gravity storm sewer shall conform to ASTM D3034, "Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings", SDR35. PVC pipe shall have integral wall bell and spigot joints. Joints shall conform to ASTM D3212, "Joints for Drain and Sewer Pipes Using Flexible Elastomeric Seals".
 2. High Density Polyethylene (HDPE) pipe and fitting material shall comply with the requirements of ASTM D3350 Cell Classification 324420C; or ASTM D1248 Type III, Class C, Category 4, Grade P33.
 3. HDPE pipe shall have a smooth interior and corrugated exterior. Four through ten inch pipe shall meet the requirements of AASHTO M252 Type S.
 4. Fittings shall meet the requirements of AASHTO M252 or AASHTO M294. Fabricated fittings shall be welded on the interior and exterior at all junctions.
 5. Corrugated pipe shall be joined with coupling bands or external snap couplers covering at least two full corrugations on each end of the pipe. Silt-tight (gasketed) connections shall be used and incorporate a closed-cell synthetic expanded rubber gasket conforming to ASTM D1056 Grade 2A2. Gaskets shall be installed on the connection by the pipe manufacturer.

2.02 CATCH BASINS AND INLETS

- A. Catch basins and inlets shall be pre-cast concrete as noted on the Plans.
 1. Type 1 catch basin shall conform to Washington State Department of Transportation (WSDOT) Standard Plan B-5.20-00, latest revision.
 2. Inlets shall conform to Washington State Department of Transportation (WSDOT) Standard Plan B-25.60.00, latest revision.

2.03 METAL FRAME AND GRATE

- A. Metal frame and grate for all Inlets and Type 1 catch basins shall conform to WSDOT Standard Plan B-30.10-00 and B-30.20-01 or B-30.50-00, latest revision.

PART 3. EXECUTION

3.01 DRAIN AND CULVERT PIPES

- A. Pipe shall be installed true to line and grade as shown in the Drainage Plan, and in accordance with the typical pipe bedding detail.
- B. Care shall be taken to ensure that the pipe is properly aligned before joints are forced home and that joints are not contaminated with mud, silt, gravel, or other foreign materials prior to or during construction.
- C. All perforated pipes shall be installed with perforations down.

3.02 CATCH BASINS

- A. All catch basins shall be installed on a level compacted or undisturbed foundation, true to line and grade as shown on the Plans.
- B. All basins shall be water-tight and covers shall be seated properly to prevent rocking.
- C. All joints and wall openings shall be thoroughly grouted to be watertight.
- D. The ends of all pipes shall be trimmed flush with the inside walls.
- E. Grates and solid covers shall be adjusted to the grades shown on the Plans.

END OF SECTION 02722

SECTION 02731

SPILL PREVENTION, COUNTERMEASURE & CONTROL APPARATUS (SPCC)

PART 1. GENERAL

1.01 SUBMITTALS

- A. Provide cut sheets for Rock Containment System

PART 2. MATERIALS

2.01 OIL STOP VALVE ASSEMBLY

- A. The oil stop valve assembly shall conform to the requirements of an AFL/Clark Oil Stop Valve Model OSV- 6 or equal.

2.02 PIPING

- A. Piping for the oil stop valve assembly shall be Schedule 80 PVC, ASTM C-14. Perforated pipe shall be Schedule 80 PVC with holes drilled as shown on drawings.

2.03 GRATE INLET

- A. The enclosure for the oil stop valve assembly shall be a Type 2 grate inlet per WSDOT Standard Plan B-35.40-00 (latest) with a 1/8" thick powder coated (safety yellow) steel diamond plate lid, as noted on the Drainage Plan Details.

2.04 GATE VALVE

- A. Gate valve shall be heavy duty bronze conforming to the requirements of ASTM B62.
- B. Valve shall be of the double disc, taper seat type, with rising stem, union bonnet and handwheel for operation.
- C. Manufacturer's name, type of valve, and size shall be cast on the valve.
- D. Connection to the pipe shall be with a mechanical union joint with suitable transition gasket.

2.05 VALVE BOX AND LID

- A. The valve box and lid shall be manufactured from cast iron. The box shall be extendible to obtain the depth required.

2.06 OPERATING HANDLE

- A. A standard hand wheel shall operate the valve.

2.07 BENTONITE

- A. Shall be a granular, low dust sodium bentonite.

2.08 ROCK CONTAINMENT SYSTEM

- A. EnviroGrid Cellular containment system shall be utilized to stabilize yard rock in SPCC curb. Use product identified on plans.

PART 3. EXECUTION

3.01 VAULT

- A. The oil stop valve vault shall be installed in accordance with the Plan.

3.02 VALVE ASSEMBLY INSTALLATION

- A. The assembly shall be installed in the Type 2 grate inlet as noted on the Plan details.
- B. All PVC joints shall be solvent welded per manufacturer's specifications.
- C. The gate valve box shall be adjusted to be flush with finished grade.

3.03 BENTONITE SEAL

- A. The bentonite seal shall be spread evenly and uniformly over the sand blanket at the rate of 100 pounds of bentonite per 100 square feet.

END OF SECTION 02731

SECTION 02831

CHAIN LINK FENCING AND GATES WITHOUT SLATS & WITH SLATS

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. Work shall include but not be limited to the installation of chain link fence, swing gates, associated appurtenances, and details necessary for a complete installation.

1.02 SUBMITTALS

- A. The Contractor shall submit detailed shop drawings for all fence and gate materials prior to installation for approval by Owner.
- B. Submit detailed shop drawings for Welded Wire Fence and Maintenance Gate as shown on Plan Details.
- C. Submit detailed shop drawings for Wood Isolation Fence and Access Gate as shown on Plan Details.

PART 2. MATERIALS

2.01 CHAIN LINK FENCE

- A. Posts, Braces, Rails and Supports
 1. The fence shall be designed to withstand wind loading in accordance with ASCE 7-05.
 2. Fence posts, braces, swing gates, and rails shall be fabricated from steel pipe in accordance with ASTM A501, and shall be galvanized in accordance with ASTM A53.
 3. Rails and braces shall be 1 1/4-inch standard (1.660-inch O.D., weight 2.27 lb/lf) or larger steel pipe.
 4. Line posts for 7-foot high chain link fence without slats, shall be 2.5-inch standard 2.875-inch O.D., weight 5.79 lb/lf) or larger steel pipe. Corner posts shall be of a size equal to or greater than that of line posts.
 5. Line posts and corner posts for 7-foot high chain link fence with slats shall be 3.5-inch standard (4.0-inch O.D., weight 9.11 lb/lf) or larger steel pipe. Corner posts shall be of a size equal to or greater than that of line posts.
 6. Gate post for the 7-foot chain link fence without slats shall be 6-inch standard (6.625-inch O.D., weight 18.97-lb per lineal foot) or larger steel pipe.
 7. Gate posts for the 7-foot high chain link fence with slats shall be 6-inch standard (6.625-inch O.D., weight 18.97-lb per lineal foot) or larger steel pipe.
 8. Extension arms on intermediate posts shall be pressed steel, set at a 45 degree angle facing outward (unless otherwise specified on the Plans) and shall carry three strands of barbed wire. Extension arms on corner posts shall be heavy malleable iron or

pressed steel. Arms and barbed wire shall be capable of withstanding a downward pressure of at least 200 pounds.

9. All fence posts and the open pipe ends on fence gates shall be closed off with a galvanized pipe cap.

B. Fabric

1. Fabric **without slats** shall be 9-gauge wire woven into a 2-inch mesh size, galvanized per latest revision of ASTM A392, Class 2, 2.0 oz. zinc coating. Both top and bottom edges of the fabric shall have a twisted and barbed selvage.
2. **Fabric with slats** shall be 9-gauge wire woven into a 3-1/2 x 5-1/2 inch mesh size, galvanized per latest revision of ASTM A392, Class 2, 2.0 oz. zinc coating.
3. **Slats** shall be vinyl and shall be inserted vertically into each mesh of the chain link fabric, and fastened in position by a weaving machine which produces a bow knuckle selvage at each end of the slat. Stainless steel staples only are permitted. Finish shall be a uniform color gray unless otherwise stated.

2.02 CHAIN LINK SWING GATE

A. Frame Construction

1. The gate frame shall be constructed of 1 1/2-inch standard (1.900-inch O.D., weight 2.72 lb/lf) or larger steel pipe as shown on the drawings and shall carry three strands of barbed wire.
2. All corners shall be coped, fitted and welded so as to form a rigid frame. Welds shall be cleaned after fabrication. Gate frame shall be hot dip galvanized after welding in accordance with ASTM A123 (latest), 2.0 oz zinc coating. .
3. Gates shall be braced with diagonal truss rods as shown on the Fencing Detail Drawing to keep them rigid and prevent sagging, buckling, and side weave.
4. Gates shall be fabricated and installed to the true, measured opening.

B. Hinges, Latches, and Locks

1. Hinges shall be malleable iron, industrial strength with 180-degree swing opening to the inside on interior gate posts, and 90-degree swing opening to the inside on corner gate posts. Hinges shall be installed to allow the gate to swing into the substation only, and be fitted so that the gate cannot be lifted off of them. **Hinges for gates with vinyl slats** shall be welded to the gate post, after they are properly positioned and adjusted, so that they will not shift or move under operating or wind loads.
2. Double swing gates shall have a center stop, set in concrete as shown on the drawings, and out gate keepers located as directed by the PSE representative. Double gates shall be equipped with a center locking bar constructed of 1-inch steel pipe. Latches shall be installed so that one side of the double gate may be opened without lifting the center locking bar. The free gate shall be on the right hand side when looking at the substation from the outside, and be equipped with stops to prevent it from passing center when closed.

3. All latches, stops, and brackets shall be constructed from 3/16-inch steel bar stock. The gate latch for gates with vinyl slats shall be a Hoover Commercial Strong Arm latch or equivalent.
4. Bolts holding latches and other locking hardware shall be peened to prevent removal of nuts. Nuts shall be located on the inside of the secured area.
5. All parts shall be hot-dip galvanized after fabrication in accordance with ASTM A153 (latest).
6. Center locking bar, gate latch, gate stop, and other details necessary for locking gate-to-gate are shown on the Fencing Detail Drawing.

C. Fabric

1. For gate fabric, see Section 2.01.B

D. Barbed Wire

1. Barbed wire shall be composed of two #12-1/2 gauge wires, twisted with four point barbs spaced 5" apart, galvanized per latest revision of ASTM A121, Class 3, .80 oz.zinc coating.

2.03 CONCRETE

- A. Concrete for fence and gate post installation shall have a 2,500 psi minimum 28-day compressive strength.

PART 3. EXECUTION

3.01 FENCE POSTS

- A. Corner and line posts shall be installed in concrete footings as shown on the Plan details. Footings shall be 12-inch minimum diameter and 3'-5" minimum deep as measured from top of base course. Posts shall be embedded in the concrete full depth, and top of concrete footing shall be sloped away from post for drainage. Gate post footings shall be 18" minimum diameter and 3'-8" deep from top of base course.
- B. All posts shall be plumbed and aligned to provide a straight line installation. Posts not properly aligned or plumbed shall be removed and reset prior to installation of the fabric. Corner posts shall be braced so as to permit tensioning of the fence fabric against them.
- C. All posts shall be installed at 10'-0" on center maximum unless shown otherwise on drawings.

3.02 FABRIC

- A. Fabric shall be fastened to the top rail and braces with at least four aluminum ties per 10-foot section so as to prevent sag and motion. Tie ends shall be twisted three full twists.
- B. A bottom tension wire shall be positioned approximately four inches above the bottom of the fabric and secured to the fabric on 24-inch center with minimum 11-

gauge steel hog rings. The tension wire shall be seven gauge coil spring, galvanized per latest revision of ASTM A641, Class 3.

3.03 GATES

- A. Gates shall be installed to be level and swing freely between the closed and fully open position.
- B. Gates shall extend down to clear the station or driveway grade by not more than two inches and shall be equal in height to the adjacent fence. Maximum gap between gate frame and post shall be 3-inches.

3.04 FIELD WELDING AND FIELD DRILLED HOLES

- A. All field welds shall be thoroughly wire brushed, cleaned and hot zinc stick coated per ASTM A780, Galvanizing Repair.
- B. All field drilled holes in galvanized components shall be coated with a sprayed on zinc rich primer or better.

END OF SECTION 02831

SECTION 02901

TEMPORARY EROSION/SEDIMENT CONTROL

PART 1. GENERAL

1.01 DESCRIPTION OF WORK

- A. Work shall consist of providing temporary erosion/sedimentation control during the construction phase of the project. Control facilities shall be installed prior to clearing when possible. They shall be constructed in accordance with local regulations and shall ensure sediment laden water does not enter natural drainage or storm sewer systems.

1.02 SUBMITTAL

- A. Provide first revision prior to mobilization indicating and/or verifying start of construction BMPs to be utilized. The accepted submittal shall be the first update in the project's Construction SWPPP that shall be maintained on site by the Contractor's designated CESCL (Certified Erosion and Sediment Control Lead)

1.03 MAINTENANCE

- A. The Contractor shall maintain all temporary erosion control devices in good condition and shall immediately repair any non-functioning devices and notify Construction Manager.

PART 2. MATERIALS

2.01 FILTER FABRIC FENCE

- A. Fence filter material shall be as specified on the drawing details.
- B. Fence supports shall be 2" X 4" Douglas Fir or equivalent.
- C. Wire fabric shall be 14-gauge material welded into 2" X 2" mesh openings.

2.02 STABILIZED CONSTRUCTION ENTRANCE

- A. Material shall be 4 to 8-inch quarry spalls.

PART 3. EXECUTION

3.01 FILTER FABRIC FENCE

- A. Fences shall be constructed to be 2 ft. in height above grade.
- B. Support posts shall be installed at 6 feet on center and buried a minimum of 1 ft. below grade.
- C. The 14-gauge wire mesh fabric shall be securely fastened to the support posts with wire staples for the total height of the post above ground.

- D. The filter fabric material shall be fastened to the wire mesh on the project side of the fence using staples or wire rings.
- E. The bottom of the filter fabric material shall be buried in a 4-inch deep trench the full length of the fence.
- F. Tie-back wires shall be installed as directed by the Engineer to prevent fence overturning due to heavy sediment loads.

3.02 Stabilized Construction Entrance

- A. Quarry spalls shall be installed to a minimum depth of 12-inches.

3.03 SEEDED AREAS

- A. Unsurfaced graded areas shall be seeded as a means of erosion control immediately following completion of earth work.
- B. All areas except the station yard, driveways, the shoulder around the perimeter of the station fence, and any other areas specified to be covered with crushed surfacing or paving shall be seeded as specified.
- C. Special care shall be taken to ensure exclusion of seed from the areas outlined above.
- D. All two to one slopes or steeper, except for rock slopes, shall be covered with excelsior matting or straw tacked with asphalt emulsion in order to reduce erosion and enhance vegetative establishment.

END OF SECTION 02901

SECTION 03110

FORMWORK FOR STRUCTURAL CAST-IN-PLACE CONCRETE

PART 1. GENERAL

1.01 CODES

- A. Materials, preparation and installation shall conform to the latest International Building Code and ACI Standards.

PART 2. MATERIALS

2.01 FORM RELEASE AGENT

- A. Form release agent for surfaces not exposed for view shall be clear light petroleum form oil.

2.02 SNAP TIES

- A. Snap ties, with cones, shall have a minimum assembled working strength to resist imposed loads of freshly placed concrete, with a break-off point one-inch minimum back from surface. Removable form bolts and clamps with cones shall meet requirements of snap ties. Wire ties and wood spreaders shall not be used.

2.03 PLYWOOD

- A. Plywood shall be new or in new condition BB Plyform Class I exterior grade 3/4 inch minimum thickness.

2.04 FRAMING

- A. Framing, studding and bracing shall be "standard" grade or better, West Coast species lumber.

2.05 CHAMFER STRIPS

- A. Chamfer strips shall be 3/4-inch, 45 degree bevel wood strips for all exposed edges, when specified.

2.06 EMBEDDED ITEMS

- A. Items required for mechanical and electrical installation shall conform to ACI Standard 318, "Building Code Requirements for Reinforced Concrete Construction," paragraph 6.3, for embedment of pipes and conduits.
- B. Aluminum and copper materials shall not be used.

PART 3. EXECUTION

3.01 LAYOUT

- A. Forms shall be located, leveled, and aligned by engineering level or transit. Forms shall be properly braced and tied together to maintain position and shape under all load conditions.
- 3.02 FORM RELEASE AGENT
- A. Contact surface of forms shall be coated as required with releasing agent before first use and after each subsequent use.
- 3.03 SNAP TIES
- A. Snap ties shall be spaced for job conditions and as required for rate of concrete placement.
- 3.04 FORM CONSTRUCTION
- A. Before concrete is placed in any form, verify horizontal and vertical form position and correct all inaccuracies. Complete all wedging and bracing in advance of placing of concrete.
 - B. When setting form ties, leave no metal to remain in wall closer than one-inch from surface. Ties shall fit tight to prevent mortar leakage at holes in form. Ties shall be protected from rusting at all times. No wire ties or wood spreaders will be permitted. Cutting ties back from concrete face will not be permitted.
 - C. Coordinate the installation of all items to be inserted or embedded in concrete. Support all items to maintain accurate alignment and prevent distortion during concrete placement.
- 3.05 BLOCKOUTS
- A. Where pipes or conduits pass through the slab, place such conduits in the form prior to pouring the concrete.
- 3.06 NOTIFICATION AND INSPECTION
- A. Prior to placing of any concrete, and after placement of reinforcing steel in the forms, notify the Owner at least 24 hours in advance of placing concrete to permit inspection.

END OF SECTION 03110

SECTION 03200
CONCRETE REINFORCEMENT

PART 1. GENERAL

1.01 Codes and Standards

- A. Materials, preparation and installation shall conform to the latest International Building Code and ACI Standard 318, "Building Code Requirements for Reinforced Concrete"; and CRSI, "Manual of Standard Practice."

1.02 Storage

- A. Materials are to be stored on-site, neatly separated, and racked up on skids off the ground, with identification tags plainly visible for convenient identification.

1.03 Submittals

- A. Provide shop drawings showing steel reinforcing details in accordance with the drawings and as specified herein.

- 1. List required shop drawings for project or utilize the following language: None required for this Project. Steel reinforcement placement shall match Plan details.

PART 2. MATERIALS

2.01 Deformed Steel Bars

- A. Bars for reinforcement shall meet the requirements of ASTM A615, Grade 60, "Billet Steel Bars for Concrete Reinforcement," unless shown otherwise on the drawings. Deformed steel bars shall be per PSE Standard 1275.1200.

2.02 TIE WIRE

- A. Tie wire shall be 16 gauge minimum, black annealed steel, meeting requirements of Federal Specification FS QQ-W-461G.

2.03 WELDS

- A. Reinforcing steel shall not be welded.

PART 3. EXECUTION

3.01 PLACEMENT AND SUPPORT

- A. Reinforcement shall be placed in accordance with PSE Standard Practice Number 8350.2150, INSTALLATION REQUIREMENTS FOR DEFORMED STEEL REINFORCING BARS.
- B. Maintain minimum concrete cover over reinforcement and tolerances as specified in ACI 318.

3.02 SPLICES

- A. Splices for reinforcing bars shall be located and lapped as shown on the drawings and approved shop drawings.

END OF SECTION 03200

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1. GENERAL

1.01 CODES AND STANDARDS

- A. Unless shown otherwise on the drawings, materials, preparation, and installation shall conform to the latest International Building Code, ACI Standard 318, "Building Code Requirements for Reinforced Concrete Construction"; and ACI Standard 301, "Structural Concrete for Building."

1.02 SUBMITTALS

- A. If requested, Contractor shall provide manufacturer's certification that materials meet specified requirements. Contractor shall also provide certification of material content per cubic yard of ready-mixed concrete furnished.
- B. Submit concrete design mix indicating compliance with specifications. Design mix may be used, as approved by Owner, at Contractor's option.

1.03 NOTIFICATION AND INSPECTION

- A. Prior to placing any concrete, and after placement of reinforcing steel in the forms, notify the Owner at least 24 hours in advance to allow time for inspection.

PART 2. MATERIALS

2.01 CONCRETE

- A. Concrete shall be per PSE Standard Specification 1275.1130.

2.02 CURING AGENT

- A. A curing agent shall be required for the building foundation and floor and other slabs. The curing agent shall be non-yellowing and meet requirements of ASTM C309, Type 1, Classes A and B, such as Day-Chem Cure and Seal 315.

PART 3. EXECUTION

3.01 PREPARATION

- A. Water shall be removed from place of deposit before concrete is placed.
- B. All laitance and other unsound material shall be removed before additional concrete is placed against hardened concrete.

3.02 PLACEMENT

- A. Concrete shall be placed in accordance with ACI 301.
 - 1. Concrete shall be placed so as to avoid segregation due to handling or flowing, and at such rate that it remains plastic and flows easily into spaces between reinforcement.

2. After concrete placement is started, it shall be carried on as a continuous operation until placing of a panel or section, as defined by its boundaries or predetermined joints, is completed.
 3. All concrete shall be thoroughly consolidated by suitable means during placement and shall be worked around reinforcement and embedded fixtures and into corners of forms.
 4. No addition of water to increase slump will be allowed unless approved by the Owner.
 5. A bonding agent shall be used when placing concrete against existing concrete surfaces.
- B. Concrete placement during hot and cold weather shall be in accordance with ACI 305 and ACI 306.
1. Adequate equipment shall be provided for heating concrete materials and protecting concrete during freezing or near-freezing weather.
 2. All concrete materials and all reinforcement, forms, fillers, and ground with which concrete is to come in contact shall be free from frost. Frozen materials or materials containing ice shall not be used.
 3. During hot weather, proper attention shall be given to handling, placing, protection, and curing to prevent excessive concrete temperatures or water evaporation that may impair required strength or serviceability of the member or structure.

3.03 CURING

- A. Concrete shall be protected from premature drying and excessive hot or cold temperature extremes. Curing procedures shall be maintained for seven days after placement.
- B. The curing agent shall be applied per manufacturer's instructions. Agent shall be applied immediately after the final finishing when the water sheen has disappeared. Care shall be taken to ensure an even film without under or over-application.

END OF SECTION 03300

SECTION 03345
CONCRETE FINISHES

PART 1. GENERAL

1.01 SCOPE

- A. All surfaces shall be finished as specified herein.

PART 2. MATERIALS

- A. Not Used

PART 3. EXECUTION

- A. Working on unformed surfaces in various finishing operations shall be held to the minimum required to produce the desired finish. Use of any finishing tool in areas where water has accumulated will not be allowed. Work in these areas shall be delayed until the water has been absorbed or has been removed. In no case shall cement or mixture of cement and sand be spread on the surface to absorb excess moisture, nor shall such materials or water be added to facilitate troweling. Joints and edges, unless specified otherwise, shall be carefully finished with edging tools.
- B. Surfaces shall be worked to an even, uniform finish. Consolidate, level and screed to true levels or slopes. Float concrete surface by hand or power equipment to within an allowable tolerance of 1/8-inch in ten feet. Floating shall be started after some stiffening has taken place in the surface concrete and the moisture has disappeared.
- C. The area of slab in front of exterior doorways shall receive a light broom finish, as shown on the drawings.
- D. Exterior slabs and tops of foundations shall receive a light broom finish following screeding and floating. After brooming, neatly tool joints and edges.
- E. Snap-tie holes shall be filled with grout or dry-pack after forms are removed.

END OF SECTION 03345

SECTION 03602
NON-METALLIC GROUT

PART 1. GENERAL

1.01 REFERENCES

- A. Conform Non-Shrink Grouts to the following minimum standards:
 - 1. ASTM C827 - Standard Test Method for Early Volume Changes of Cementitious Mixtures
 - 2. ASTM C938 - Nonshrink Grout
- B. PSE Standard 8350.0100, "Installing Grout"

1.02 NOTIFICATIONS

- A. Notify Owner's Representative at least 24 hours, or the Friday before the following Monday, before grouting structures and equipment. Inform of activities taken to avoid damage to grout from freezing temperatures and/or conditions causing significant moisture loss before proper curing occurs.

1.03 SUBMITTALS

- A. Submit manufacturer's data, grout mix, aggregate gradations, and additive manufacturer's product literature to the Owner's Representative for review prior to beginning concrete construction work. Provide subsequent submittals when mix design changes for any reason.
- B. Provide manufacturer's literature on any proprietary grouts used in construction, and indicated as required in this Section.
- C. Submit for review membrane curing compound and the method of curing for all grout, for review by the Owner's Representative.

PART 2. PRODUCTS

2.01 MATERIALS FOR EQUIPMENT BASES AND GROUTED CONNECTIONS

- A. Grout for use under equipment bases shall be a flowable non-shrink non-metallic type made with shrinkage compensating cement passing ASTM C878 and installed in accordance with the manufacturer's instructions.
- B. Furnish acceptable materials by one of the following manufacturers or approved equal:
 - 1. MTB Masterflow 713 Plus by Master Builders, or approved equal
- C. Membrane curing compound shall meet the requirements of ASTM C309.

PART 3. EXECUTION

3.01 INSTALLATION OF GROUT

- A. Grout all substation structures.
- B. Shim columns and rails of equipment to plumb alignment, or install surfaces to be grouted to tolerances recommended.
- C. Grout items in place using a minimum of 1 inch of grout, selected for the application.
 - 1. Provide strength equal to 8000 psi, minimum, at 28 days.
 - 2. Assure temperature of air and surfaces in contact with grout are 40 F or above.
 - 3. Clean all surfaces to which grout is to be placed just before grouting; remove laitance and roughen surfaces with a wire brush.
 - 4. Immediately after placing grout, trim surfaces with a trowel and cover exposed grout with clean wet rags and maintain moisture for a minimum of 6 hours.
 - 5. After removing wet rags cure all exposed grout with a membrane curing compound.
- D. Grout shall be applied in such a manner as to provide drainage of any water likely to become trapped under the equipment bearing surface or bearing plate.

Install and cure proprietary grout in accordance with manufacturer's recommendations.

END OF SECTION 03602

SECTION 05091

WELDING

PART 1. GENERAL

1.01 SUBMITTALS

- A. Welder's Qualifications

1.02 QUALITY ASSURANCE

- A. Installer Qualifications: All welders are required to be currently certified by AWS or Washington Association of Building Officials (WABO) for structural welding.
- B. American Welding Society Structural Code - Steel, ANSI/AWS D1.1, edition current as of Bid Date
- C. American Welding Society Structural Code - Reinforcing Steel, ANSI/AWS D1.4, edition current as of Bid Date

1.03 REFERENCES

- A. PSE Standard 8575.6120, "Installing Welded Substation Connections"

PART 1. PRODUCTS

1.01 OWNER-FURNISHED MATERIALS

- A. Substation busses and conductors, as indicated in the Contract Documents

1.02 MISCELLANEOUS MATERIALS

- A. Welded aluminum substation connections shall use filler wire, 4043 alloy.
- B. Contractor shall supply all welding supply materials required to provide a complete installation.

PART 1. EXECUTION

1.01 PREPARATION

- A. Welding:
 - A. Remove all paint and galvanizing prior to welding.
 - B. Shape edges to be joined as indicated on drawings or as required by AWS.
 - C. Prepare and clean edges of all oil, grease, scale and rust in accordance with AWS.
- B. Protection:
 - A. Take all precautions required by regulations and Standard Specifications to protect personnel and property.
 - B. Carefully mask or shield all adjacent surfaces to prevent damage from heat or welding materials.

- C. Take particular care to prevent fires.
- D. When welding finished assemblies located adjacent to or above finished materials, protect surfaces from damage due to welding.

1.02 WELDING PROCEDURES

- A. Perform the work for welded substation connections in accordance with procedures written and qualified in accordance with AWS requirements and PSE Standard 8575.6120 “Installing Welded Substation Connections”.

1.03 SCHEDULING

- A. Coordinate work with fabrication and erection required to meet approved Construction Schedule.

1.04 CLEANING

- A. Clean in accordance with AWS requirements.

1.05 REPAIR

- A. Repairs shall be performed in accordance with AWS requirements.
- B. Repair all damaged finishes as directed, or replace damaged items at no additional cost to Owner.

END OF SECTION 05091

SECTION 05110
STRUCTURAL STEEL ERECTION

PART 1. GENERAL

1.01 QUALITY ASSURANCE

- A. Perform Contract work in accordance with the specifications of the American Institute of Steel Construction (AISC); in particular, provisions of the “Code of Standard Practice for Steel Buildings and Bridges,” and the “Specification for Design, Fabrication and Erection of Structural Steel for Buildings,” latest editions.
- B. Construct structure joints in accordance with the “Specification for Structural Joints using ASTM A325 or A490 Bolts.”

PART 1. PRODUCTS

1.01 INCIDENTAL STRUCTURAL SHAPES AND PLATES:

- A. Conform to the requirements of ASTM A-36.
- B. Exposed surfaces are to be galvanized in accordance with ASTM A-123.

1.02 MATERIALS REQUIRED FOR ERECTION

- A. Provide all miscellaneous materials required for erection of steel structures to Owner’s Representative, including but not limited to the following:
 - 1. Miscellaneous steel framing required for support and bracing of steel during erection.
 - 2. Minor steel components not specifically indicated on drawings including shim stock, spacer steel plates, and similar materials.

PART 3. EXECUTION

1.02 GENERAL REQUIREMENTS

- A. Erect framing and accessories in accordance with this Section and the referenced publications of the American Institute of Steel Construction, unless otherwise specified.
- B. Notify the Owner’s Representative when shop errors or damaged members are found.
- C. Do not erect any structure on concrete foundations that have cured for less than 7 days. If high temperatures are consistently less than 45 degrees during the previous seven-day period, allow at least 14 days curing before erection.
- D. Align and level baseplates with leveling nuts, and grout for full and even bearing.
- E. Erect supports plumb and aligned for proper fitting.

1.03 ERECTION OF STEEL FRAMING

- A. Do not ream or flame cut for correction of mismatched holes due to fabrication errors. Drill bolt holes, if a minor amount of holes are discovered missing. Major errors shall be brought to the attention of the Owner's Representative.
- B. A reasonable amount of drifting will be allowed.
- C. Repair damage to prime coats.
- D. Assemble bolted connections as shown on the steel fabricators shop drawings. ASTM A 325 bolts shall be pre-tensioned with load indicator washers, or by the "turn-of-the-nut" method.
- E. Project bolts not less than 1/8 inch or more than 3/8 inch beyond the locknut when assembled.
- F. Repair damage to galvanizing in accordance with Section 09905.

END OF SECTION 05110

SECTION 09905
GALVANIZING REPAIR

PART 1. GENERAL

1.01 QUALITY ASSURANCE

- A. Conform to the requirements of SSPC, the Steel Structures Painting Council.
- B. Requirements of the paint coating systems manufacturer shall be considered minimum application requirements, and shall be supplemented by the requirements of this Section where more restrictive.
- C. Intent of this Section is for Contractor to perform touch-up Work that results in a completely coated facility devoid of tack marks or signs of construction when the Contractor completes all construction activities and demobilizes from the site

1.02 SUBMITTALS

- A. Manufacturer's information showing galvanized repair material, application information and substrate preparation required for minimum application integrity.

PART 2. PRODUCTS

2.01 ZINC RICH PAINT/PRIMER SHALL BE THE FOLLOWING, OR APPROVED EQUAL:

- A. CRC Zinc-It
- B. Aervoe 141 Zinc Rich Galvanize

PART 3. EXECUTION

3.01 SURFACE PREPARATION

- A. Wire brush or grind to bare metal to prepare area for galvanizing repair. The area repaired shall extend beyond the damaged galvanizing into the surrounding undamaged galvanizing.
- B. Remove grease, dirt and other deleterious materials in accordance with Steel Structures Painting Council Specifications, SP-10.
- C. The surface shall be dry prior to application.

3.02 APPLICATION REQUIREMENTS

- A. General:
 - 1. Apply all coatings in strict accordance with the manufacturer's instruction.
 - 2. Do not apply until any preceding coat is dry and hard.
 - 3. Apply only to thoroughly dry surfaces.

4. Do not apply galvanizing repair in rainy, damp or frosty weather.
5. Do not use materials that have exceeded the manufacturer-stated pot life.
6. Where installation of equipment makes surfaces inaccessible, repair these surfaces prior to installing the equipment.

B. Workmanship requirements:

1. Coat to achieve neat appearance of finished surfaces.
2. Inspect for and repair paint ridges, sags, runs, drops, laps and unnecessary brush marks.
3. Mix coating thoroughly and limit the use of thinners.
4. Allow for proper drying time between coats.
5. Protect all surfaces to remain uncoated, and all finish coated surfaces.

C. Mechanically mix repair compound before using.

D. Thinning requirements:

1. Dilute only as required to achieve suitable viscosity.
2. Use only thinner type and amount recommended by manufacturer.

END OF SECTION 09905

APPENDIX A
PSE STANDARDS

The following PSE Standards, cited in the foregoing Specifications, are reproduced here in numerical order.

<u>PSE STANDARD</u>	<u>TITLE</u>
<u>0150.3200</u>	Techniques for Temporary Erosion and Sediment Control
<u>1275.1130</u>	Concrete, Structural
<u>1275.1200</u>	Deformed Steel Bars (Rebar)
<u>1275.1310</u>	Base Course Aggregate
<u>1275.1320</u>	Top Course Aggregate
<u>1275.1330</u>	Yard Course Crushed Aggregate
<u>1275.1340</u>	Gravel Backfill Aggregate for Pipe Bedding
<u>1275.1350</u>	Gravel Backfill Aggregate for Drains
<u>1275.1370</u>	Sand for Substation Oil Retention Area or Control Cable Installation
<u>1275.1380</u>	Sand Backfill for Gas Pipe, Electrical Conduit and Cable
<u>8350.0100</u>	Installing Grout
<u>8350.2150</u>	Installation Requirements for Deformed Steel Reinforcing Bars
<u>8350.2163</u>	Anchor Bolt Installation
<u>8350.2200</u>	Concrete, Installation

Scope

This standard provides procedures that serve as the general guidelines for temporary erosion and sediment control for Puget Sound Energy (PSE) maintenance, installation, and emergency repair activities on small jobs *below the thresholds* defined by the Washington State Department of Ecology (Ecology).

In This Standard

These topics are covered in this standard:

Topic	See Page
Introduction	1
Tools and Equipment	2
Definitions	3
Dewatering Vaults	9
Dewatering Excavations and Trenches	16
Construction Runoff Control Procedure	19
Controlling Sediment due to Heavy Equipment or Concrete Work	24

Introduction

State and Local Jurisdictional Requirements

Erosion and sediment control requirements are established by state and local jurisdictions. The intent of this standard is to ensure that minimum jurisdictional requirements for erosion and sediment control are met for PSE work. In general:

- Stormwater runoff or pump discharge leaving work site shall be free of sediment; *dirty water* shall not be allowed to leave a work site.
- Sediment shall not remain on any hard surface when the work is complete.
- At active construction sites, street sweeping must be performed prior to washing the street.
- Any *waters of the state* or sensitive area shall be protected from erosion or sedimentation caused by PSE work activities.
- Materials and tools appropriate for controlling erosion and sediment shall be available on-site when any work is performed during the wet season and rain events.
- Preserve natural vegetation whenever practicable and as per jurisdiction requirements.

Eastern & Western Washington Stormwater Management Manuals

This standard covers some of the common erosion and sediment control techniques approved for use by local jurisdictions and Ecology. Ecology is responsible for the Washington State Water Quality Program and publishes Stormwater Management Manuals for Eastern and Western Washington. Ecology requires that many of the jurisdictions within Washington State have approved Stormwater Management plans that meet the Ecology requirements as a minimum.

NOTE: Some local jurisdictions adopt regulations that are more restrictive than the Ecology requirements.

Continued on next page

Thresholds Vary for Construction SWPPP

This standard applies to small jobs that do not require a Construction Stormwater Pollution Prevention Plan (Construction SWPPP). The SWPPP is a site-specific document that describes the *potential* for sediment, erosion, or pollution problems on a construction project, and explains and illustrates the measures or Best Management Practices (*BMPs*) to be used on the construction site to control those problems.

All construction projects that *exceed the Ecology thresholds* require a site-specific Construction SWPPP.

Ecology thresholds:

- Total disturbed area of one acre.
- Addition or replacement of 2,000 sq ft of impervious surface.
- Clearing of 7,000 sq ft of vegetation.

NOTE: Some local jurisdictions require a site-specific Construction SWPPP and related documentation for projects *below the Ecology thresholds*.

Compliance

It is imperative to comply with site-specific erosion control plans, any Construction SWPPP, and/or local jurisdiction requirements as they often have varying compliance thresholds. Compliance must be made to the more stringent threshold.

Tools and Equipment

The following tools and materials may be needed to perform the procedures in this standard depending on the work to be done.

Item	MID
Silt fence (with attached wood stakes)	9995690
Gravel bag (filled with pea gravel)	9995692
Catch basin insert	9995728
Sediment bag (for filtering pump discharge)	9995748
Mulch	None
Erosion control seed mix	None
Vault lid lifter (for lifting grates)	7414200
Tarp (for covering spoils)	7457600
Catch basin protector	9997533
Wire-backed silt fence (with attached stakes)	None
Straw wattle	9998192
Filter sock (for filtering pump discharge)	9998194

Definitions

Best Management Practices (BMPs)

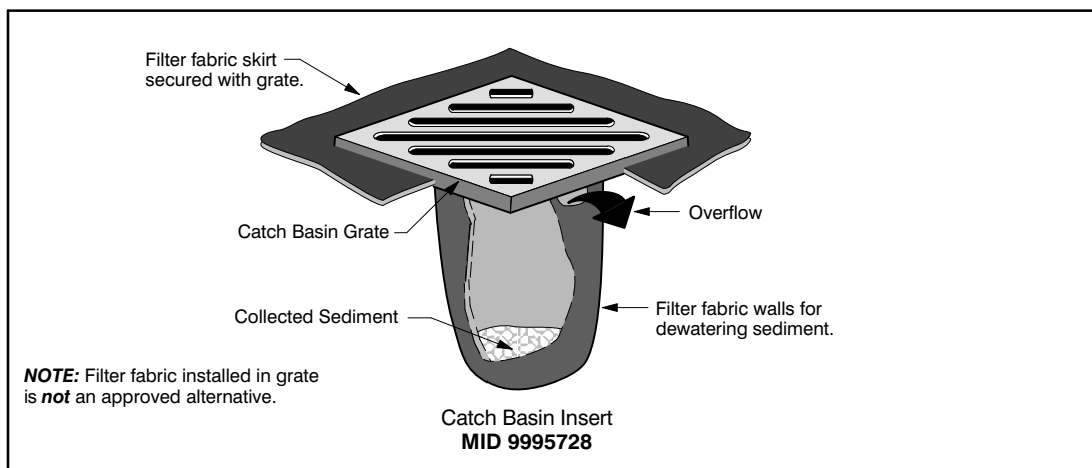
Jurisdiction-approved maintenance procedures, construction activities, and/or equipment that are used in order to prevent or reduce the release of sediment and pollutants to *waters of the state*. Ecology BMP references are shown for applicable definitions. See Ecology Stormwater Management manuals for other approved *BMPs*.

Bore Pit

An excavation at either end of a boring operation or directional drill to allow adequate working space.

Catch Basin Insert

A temporary insert, manufactured of filter fabric, installed at catch basins or storm inlets to trap sediment. Used with *gravel bags* or *straw wattles* to create upstream sediment filter or impounding area around a storm inlet. Prevents sediment from entering storm drainage systems or *waters of the state*. Refer to the Ecology Stormwater Management Manual, *BMP C220*.



Catch Basin Protector

A temporary cover to prevent *dirty water* from entering a catch basin or storm inlet. The protector must extend for several inches over each side of the catch basin with *gravel bags* placed on top to ensure a complete seal. The protector must be used in combination with other containment methods such as a Vactor truck. Refer to the Ecology Stormwater Management Manual, *BMP C220*.



Continued on next page

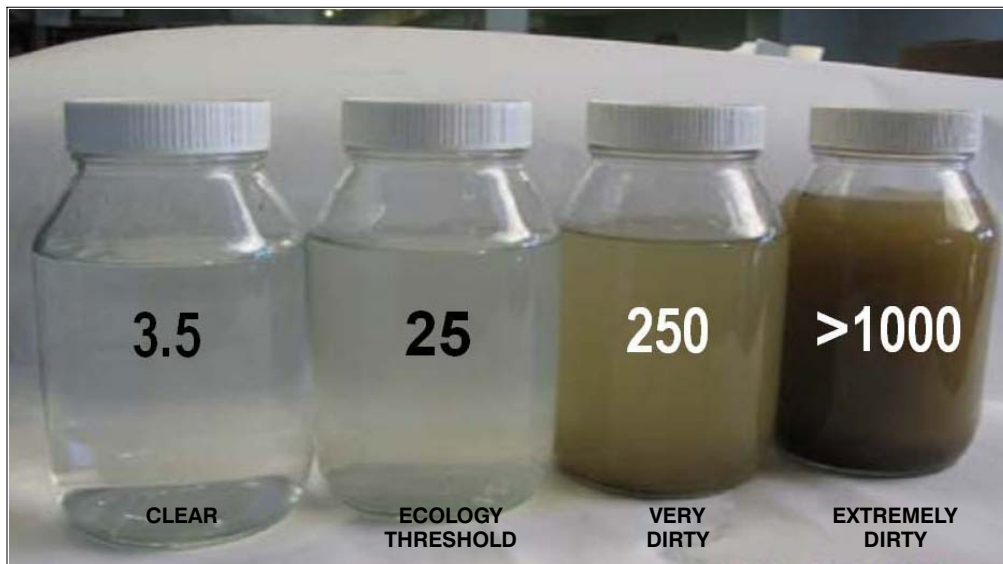
Definitions, *continued*

Dirty Water

Water that is cloudy, discolored, turbid, or has apparent sediment. *Dirty water* must be filtered using a reasonable number or combination of techniques. If the water cannot be filtered until it is clear, it must be contained and disposed properly. *Dirty water* shall never be allowed to leave the work site.

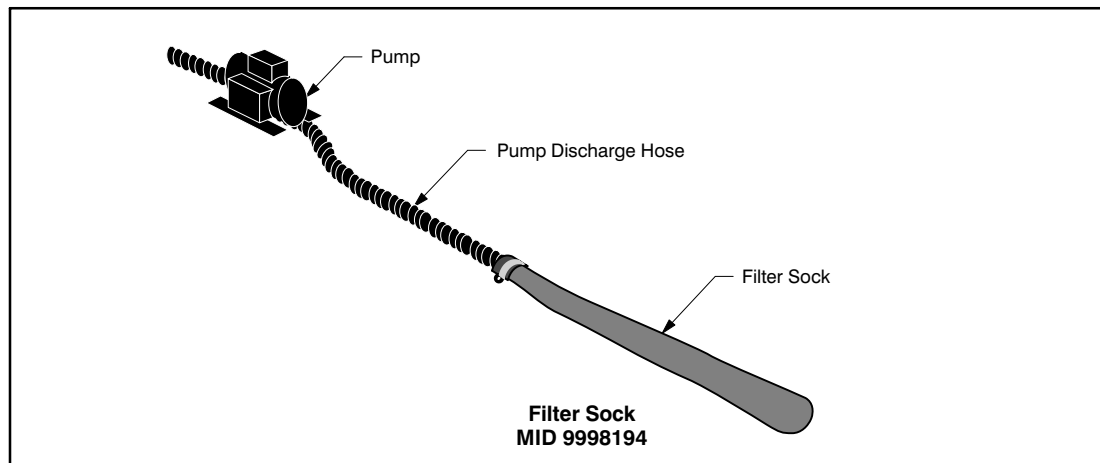
Water turbidity is measured in Nephelometric Turbidity Units (NTU). Ecology limits for work site water discharge allow no more than 5 NTU over existing background turbidity of the *waters of the state* accepting the discharge under most conditions, per WAC 173-201A.

The following photo shows water turbidity samples measured in NTU.



Filter Sock

A collection sock, manufactured of filter fabric, installed on a pump discharge hose to trap sediment. Used only for vault dewatering to prevent *dirty water* from entering storm drains, *flowing ditches*, or any *waters of the state*. Appropriated technique only when sediments accumulated in the vault are not disturbed. ***Not approved for excavation or trench dewatering.***



Flowing Ditch

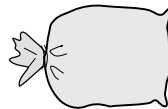
Any ditch or swale that contains flowing or standing water; this may be classified as a stream.

Gas or Electric Emergency Control

Emergency Control is achieved when threat to life and property is eliminated as a first step in gas or electric emergency repair, including appropriate traffic controls and excavation shoring.

Gravel Bag

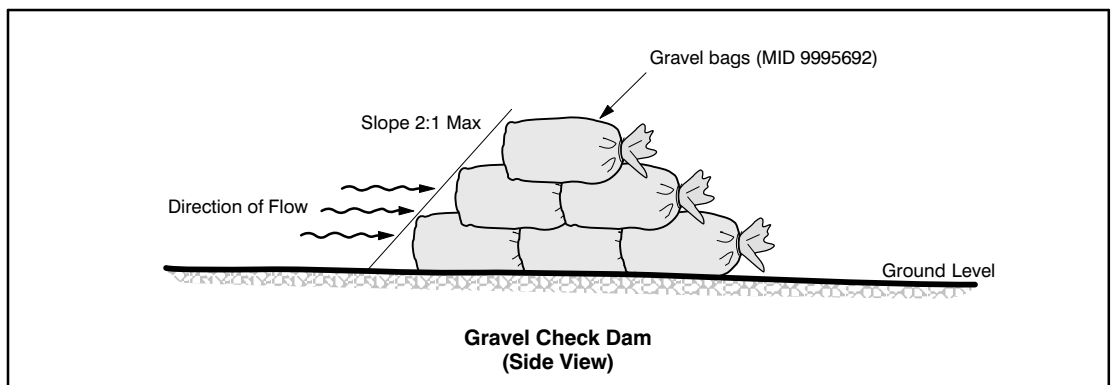
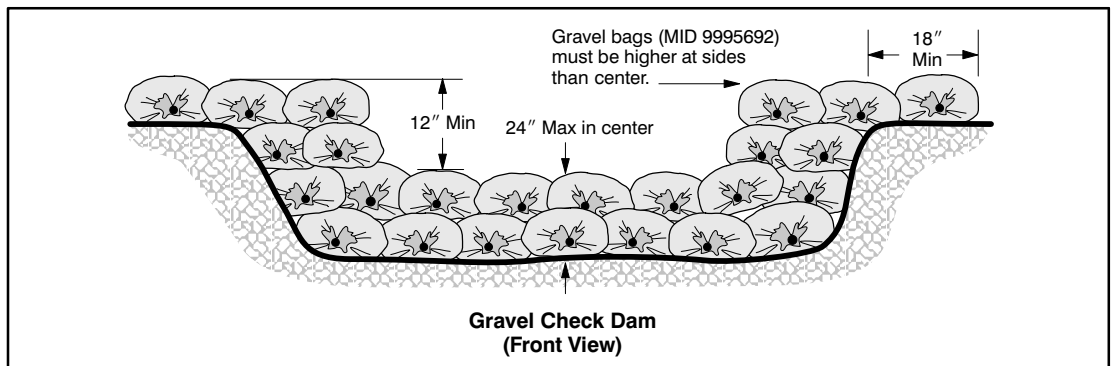
A polypropylene bag filled with pea gravel. Used to secure the bottom of *silt fences*, trap sediment in curb lines, construct *gravel check dams*, secure *catch basin protectors*, or provide simple and efficient water diversion. When not in use, protect the bags from direct sunlight.



Gravel Bag
MID 9995692

Gravel Check Dam

A small dam constructed of *gravel bags* across a drainage ditch. Reduces the velocity of concentrated flows, reducing ditch erosion. This method is not commonly allowed in creeks, streams, or *flowing ditches*. Refer to the Ecology Stormwater Management Manual, *BMP C207*.



Continued on next page

Definitions, *continued*

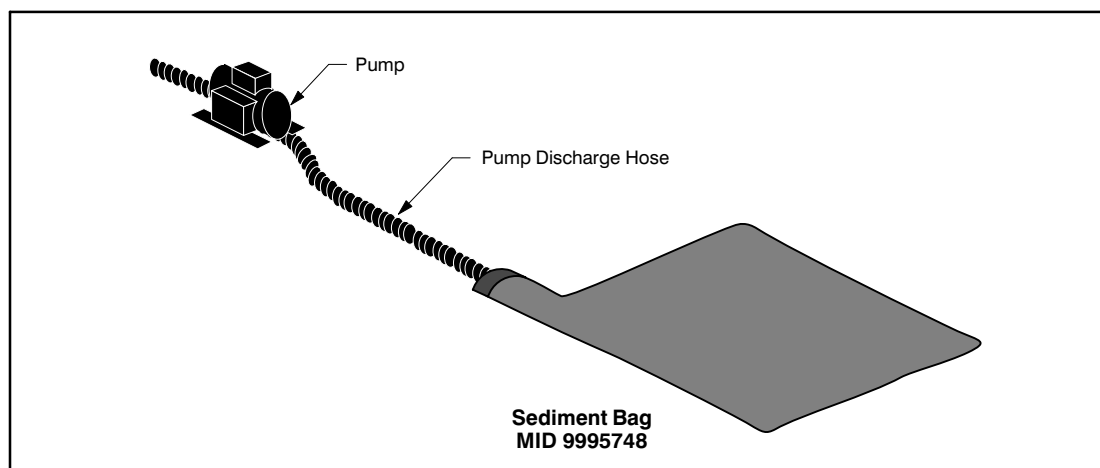
Landscaped Area Any site where grass and/or plantings are maintained.

Mulch Straw, jute matting, or other approved organic material used to stabilize slopes, seeded areas, or areas disturbed during construction.

Straw *mulch* must be air-dried and free from undesirable seed and course material. Minimum application rates are 2 inches to 3 inches thick; approximately 5 bales per 1,000 sq ft. Hand application generally requires greater thickness than blown straw. The thickness of straw may be reduced by half when used in conjunction with seeding. Refer to the Ecology Stormwater Management Manual, *BMP C121*.

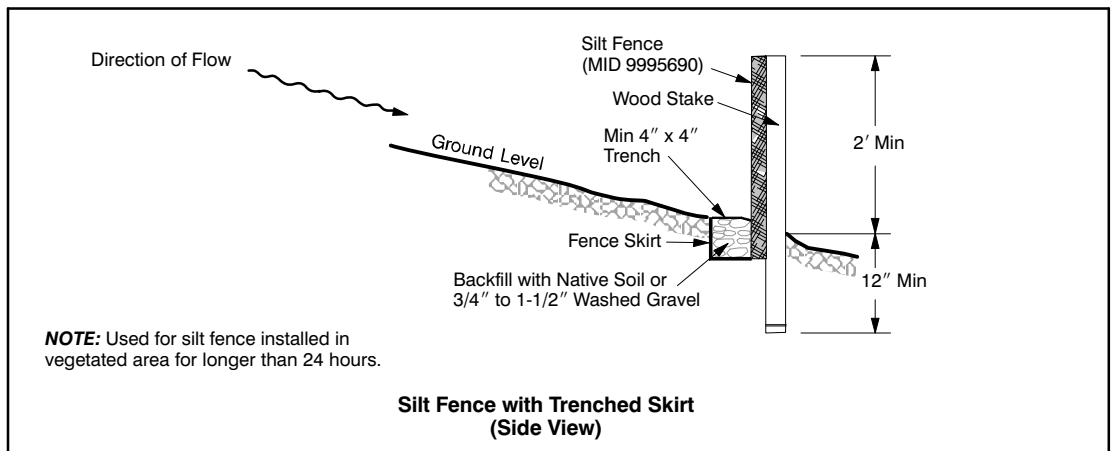
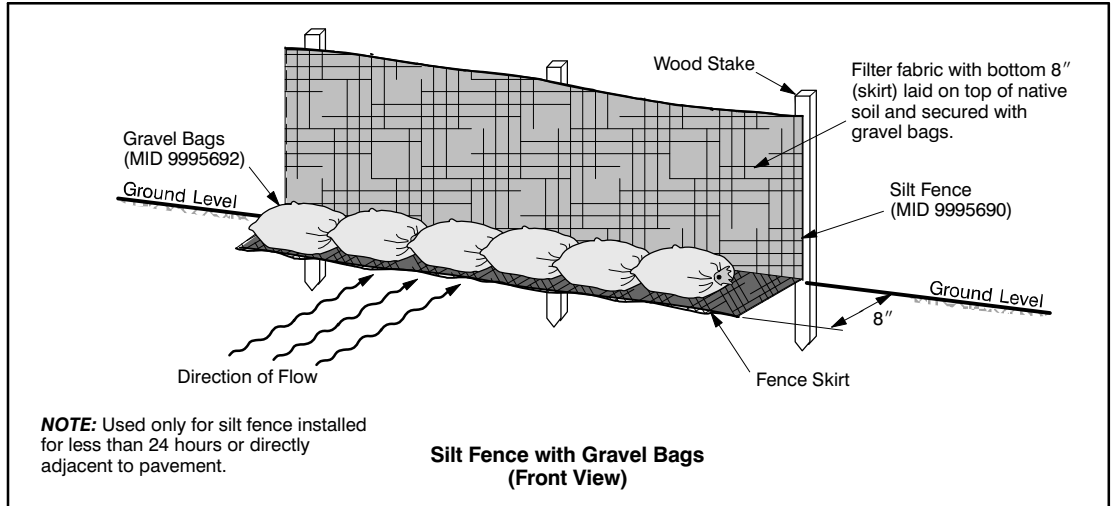
Oil-contaminated Debris Any soiled *catch basin insert, sediment bag, filter sock*, collected sediment, or other materials contaminated with oil. Oil-contaminated debris is returned to the service center or other approved site for disposal.

Sediment Bag A collection bag, manufactured of filter fabric, installed on a pump discharge hose to trap sediment. *Used only for vault dewatering* to prevent *dirty water* from entering storm drains, *flowing ditches*, or any *waters of the state*. *Not approved for excavation or trench dewatering*.



Silt Fence

A temporary sediment trap consisting of a filter fabric stretched across and attached to supporting wood stakes, secured at the base with *gravel bags* or with fence skirt anchored by trenching. Not for high velocity flows or discharge volumes greater than 0.5 cfs. Refer to the Ecology Stormwater Management Manual, *BMP C233*.

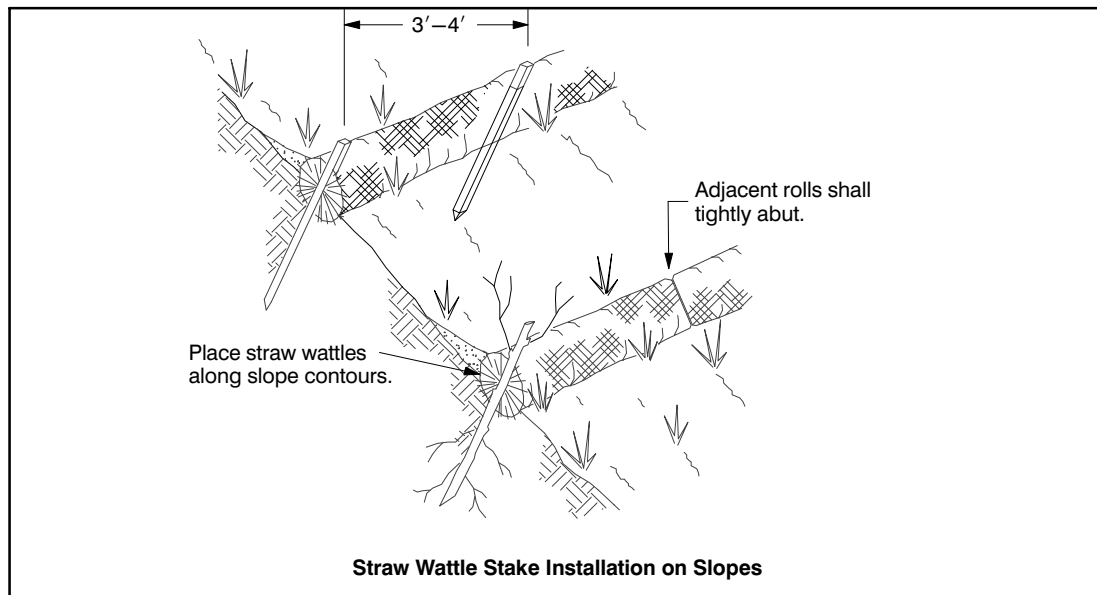


Continued on next page

Definitions, *continued*

Straw Wattle

Roll of weed-free straw, wrapped in polyethylene, used to reduce soil erosion and retain sediment at work sites. Can be used to specifically protect storm drain inlets, divert and direct stormwater to treatment areas, and as an alternative to *silt fences* for perimeter sediment control. Also used to prevent erosion on disturbed slopes. Refer to the Ecology Stormwater Management Manual, *BMP C235*.



Vegetated Strip

Any natural vegetation within or adjacent to a work site. Vegetated strips may be used downslope of disturbed areas in order to reduce the transport of coarse sediment from a construction site. Provides a temporary physical barrier to sediment and reduces the runoff velocities of overland flow. Vegetated strips are not to be used to treat concentrated flows or substantial amounts of overland flows. Refer to the Ecology Stormwater Management Manual, *BMP C101 and C234*.

Waters of the State

Any surface waters including lakes, rivers, ponds, streams, inland waters, saltwaters, wetlands, and all other surface waters and water courses within the jurisdiction of the state of Washington per WAC 173-201A. This includes any stormwater conveyance system or *flowing ditch*.

Wet Season

For purposes of erosion and sediment control, the *wet season* is defined as October 1 through April 30, unless otherwise specified by the responsible jurisdiction.

Wire Backed Silt Fence

Silt fence with a 2-inch by 4-inch wire mesh backing. This heavy-duty silt fencing may be required by some jurisdictions in place of the standard *silt fence*. Refer to the Ecology Stormwater Management Manual, *BMP C233*, and apply modification of a wide mesh backing.

Dewatering Vaults

These steps are commonly acceptable to jurisdictions when pumping water (dewatering) from vaults. Additional site-specific steps and practices may be required by the responsible jurisdiction and/or by permit.

NOTE: Terms that appear in *italics* are defined in the Definitions section.

Step	Action						
1	<div style="display: flex; align-items: flex-start;"> <div style="background-color: black; color: white; padding: 5px; margin-right: 10px;"> CAUTION! </div> <div> <p>During emergency repairs, achieve <i>gas or electric emergency control</i> before installing erosion and sediment control measures.</p> <p>Provide appropriate traffic control according to Standard 0100.4000.</p> </div> </div>						
2	<p>After <i>gas or electric emergency control</i> has been achieved, install erosion and sediment control measures as required before proceeding with operation, repairs, or construction.</p>						
3	<p>Check the condition of the water in the vault. If the water is excessively oily, foul smelling, or shows fluorescent coloration, follow the oil spill cleanup instructions in Standard 0150.3100.</p>						
4	<p>Evaluate the work site and discharge area for appropriate erosion and sediment control.</p>						
5	<p>Prepare the pump intake area.</p> <div style="display: flex; align-items: flex-start;"> <div style="background-color: black; color: white; padding: 5px; margin-right: 10px;"> CAUTION! </div> <div> <p>The intake hose shall not come in contact with cables, connectors, or equipment unless the equipment has been <i>identified, isolated, tested for voltage, and grounded</i>.</p> </div> </div> <p>To expose equipment in the vault during troubleshooting, insert the intake hose so that the sediment accumulated along the bottom of the vault <i>is not disturbed</i>.</p> <p>To enter the vault, the sediment can be removed to provide a safe working environment.</p> <table border="1" data-bbox="581 1283 1442 1627" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">If vault is located . . .</th> <th style="width: 50%;">Then . . .</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">In a roadway or other paved area,</td> <td style="padding: 5px;">Remove sediment and <i>dirty water</i> while dewatering the vault with a Vactor truck. — OR — Remove the sediment and dispose as <i>oil-contaminated debris</i>.</td> </tr> <tr> <td style="padding: 5px;">In an unpaved area,</td> <td style="padding: 5px;">Remove the sediment and dispose properly as spoils.</td> </tr> </tbody> </table>	If vault is located . . .	Then . . .	In a roadway or other paved area,	Remove sediment and <i>dirty water</i> while dewatering the vault with a Vactor truck. — OR — Remove the sediment and dispose as <i>oil-contaminated debris</i> .	In an unpaved area,	Remove the sediment and dispose properly as spoils.
If vault is located . . .	Then . . .						
In a roadway or other paved area,	Remove sediment and <i>dirty water</i> while dewatering the vault with a Vactor truck. — OR — Remove the sediment and dispose as <i>oil-contaminated debris</i> .						
In an unpaved area,	Remove the sediment and dispose properly as spoils.						

Continued on next page

Dewatering Vaults, *continued*

Step	Action								
6	<p>Prepare the pump discharge area. Do not allow <i>dirty water</i> to leave the work site or enter <i>waters of the state</i>.</p> <table border="1" data-bbox="532 415 1393 1514"> <thead> <tr> <th data-bbox="532 415 914 455">If discharging water . . .</th> <th data-bbox="914 415 1393 455">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 455 914 940">Into a <i>vegetated strip</i>,</td> <td data-bbox="914 455 1393 940"> <p>Use a splash guard (dissipater) on the discharge hose to minimize erosion.</p> <p>Install <i>gravel check dams</i>, <i>straw wattles</i>, and/or <i>silt fence</i> to trap the sediment and prevent erosion (<i>Figure 3</i>).</p> <p>Multiple <i>gravel check dams</i> or <i>straw wattles</i> may be necessary to trap sediment and slow water velocity to acceptable speeds.</p> <p>NOTE: Concentrated flows typical of a hydraulic pump can cause severe erosion.</p> </td> </tr> <tr> <td data-bbox="532 940 914 1373">Into a roadway or other paved area,</td> <td data-bbox="914 940 1393 1373"> <p>Install <i>catch basin inserts</i> on the downstream storm inlets receiving the filtered vault water (<i>Figure 1</i>).</p> <p>Install <i>gravel bags</i> or <i>straw wattles</i> against curb upstream of storm inlets to capture sediments. Multiple sets of <i>gravel bags</i> or <i>straw wattles</i> may be necessary to reduce turbidity to acceptable levels.</p> <p>Install protection on additional storm inlets if the discharge water reaches beyond the first stormwater inlet.</p> </td> </tr> <tr> <td data-bbox="532 1373 914 1514">Into a roadway or other paved area and the pump intake hose is secured so that sediment is not disturbed during pumping,</td> <td data-bbox="914 1373 1393 1514">Install a <i>fitter sock</i> or <i>sediment bag</i> on the pump discharge hose (<i>Figure 2</i>).</td> </tr> </tbody> </table> <p>NOTE: Any pump discharge without sediment protection directly pumped into a <i>flowing ditch</i> or <i>waters of the state</i> is not allowed.</p>	If discharging water . . .	Then . . .	Into a <i>vegetated strip</i> ,	<p>Use a splash guard (dissipater) on the discharge hose to minimize erosion.</p> <p>Install <i>gravel check dams</i>, <i>straw wattles</i>, and/or <i>silt fence</i> to trap the sediment and prevent erosion (<i>Figure 3</i>).</p> <p>Multiple <i>gravel check dams</i> or <i>straw wattles</i> may be necessary to trap sediment and slow water velocity to acceptable speeds.</p> <p>NOTE: Concentrated flows typical of a hydraulic pump can cause severe erosion.</p>	Into a roadway or other paved area,	<p>Install <i>catch basin inserts</i> on the downstream storm inlets receiving the filtered vault water (<i>Figure 1</i>).</p> <p>Install <i>gravel bags</i> or <i>straw wattles</i> against curb upstream of storm inlets to capture sediments. Multiple sets of <i>gravel bags</i> or <i>straw wattles</i> may be necessary to reduce turbidity to acceptable levels.</p> <p>Install protection on additional storm inlets if the discharge water reaches beyond the first stormwater inlet.</p>	Into a roadway or other paved area and the pump intake hose is secured so that sediment is not disturbed during pumping,	Install a <i>fitter sock</i> or <i>sediment bag</i> on the pump discharge hose (<i>Figure 2</i>).
If discharging water . . .	Then . . .								
Into a <i>vegetated strip</i> ,	<p>Use a splash guard (dissipater) on the discharge hose to minimize erosion.</p> <p>Install <i>gravel check dams</i>, <i>straw wattles</i>, and/or <i>silt fence</i> to trap the sediment and prevent erosion (<i>Figure 3</i>).</p> <p>Multiple <i>gravel check dams</i> or <i>straw wattles</i> may be necessary to trap sediment and slow water velocity to acceptable speeds.</p> <p>NOTE: Concentrated flows typical of a hydraulic pump can cause severe erosion.</p>								
Into a roadway or other paved area,	<p>Install <i>catch basin inserts</i> on the downstream storm inlets receiving the filtered vault water (<i>Figure 1</i>).</p> <p>Install <i>gravel bags</i> or <i>straw wattles</i> against curb upstream of storm inlets to capture sediments. Multiple sets of <i>gravel bags</i> or <i>straw wattles</i> may be necessary to reduce turbidity to acceptable levels.</p> <p>Install protection on additional storm inlets if the discharge water reaches beyond the first stormwater inlet.</p>								
Into a roadway or other paved area and the pump intake hose is secured so that sediment is not disturbed during pumping,	Install a <i>fitter sock</i> or <i>sediment bag</i> on the pump discharge hose (<i>Figure 2</i>).								
7	Place the discharge hose as far from the ultimate destination of the discharge water as possible, allowing sediments in the <i>dirty water</i> to be separated before entering <i>waters of the state</i> .								

Continued on next page

Step	Action						
8	<p>Protect the uphill side of the excavation or trench from stormwater flows.</p> <table border="1" data-bbox="581 323 1440 508"> <thead> <tr> <th data-bbox="581 323 963 365">If . . .</th> <th data-bbox="963 323 1440 365">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="581 365 963 508">The work is performed during the <i>wet season</i> or precipitation is expected,</td> <td data-bbox="963 365 1440 508">Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i>.</td> </tr> </tbody> </table>	If . . .	Then . . .	The work is performed during the <i>wet season</i> or precipitation is expected,	Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i> .		
If . . .	Then . . .						
The work is performed during the <i>wet season</i> or precipitation is expected,	Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i> .						
9	<p>Pump the water out of the vault.</p> <p>Continually check the discharge water. If the water appears cloudy or dirty after leaving the sediment traps, install additional barriers until the water exiting the work site is clear.</p> <table border="1" data-bbox="581 716 1440 1312"> <thead> <tr> <th data-bbox="581 716 963 758">If discharging water . . .</th> <th data-bbox="963 716 1440 758">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="581 758 963 1035">Into a <i>vegetated strip</i>,</td> <td data-bbox="963 758 1440 1035">Place additional <i>silt fence</i>, <i>straw wattles</i>, or <i>gravel check dams</i> in the discharge flow to dissipate the water and trap sediment. — OR — Use a Vactor truck for dirty, high velocity, or high volume flows.</td> </tr> <tr> <td data-bbox="581 1035 963 1312">Into a paved area,</td> <td data-bbox="963 1035 1440 1312">Place additional <i>gravel bags</i> or <i>straw wattles</i> against the curb in the downstream gutter to dissipate the water flow and trap sediment. — OR — Use a Vactor truck for dirty, high velocity, or high volume flows.</td> </tr> </tbody> </table>	If discharging water . . .	Then . . .	Into a <i>vegetated strip</i> ,	Place additional <i>silt fence</i> , <i>straw wattles</i> , or <i>gravel check dams</i> in the discharge flow to dissipate the water and trap sediment. — OR — Use a Vactor truck for dirty, high velocity, or high volume flows.	Into a paved area,	Place additional <i>gravel bags</i> or <i>straw wattles</i> against the curb in the downstream gutter to dissipate the water flow and trap sediment. — OR — Use a Vactor truck for dirty, high velocity, or high volume flows.
If discharging water . . .	Then . . .						
Into a <i>vegetated strip</i> ,	Place additional <i>silt fence</i> , <i>straw wattles</i> , or <i>gravel check dams</i> in the discharge flow to dissipate the water and trap sediment. — OR — Use a Vactor truck for dirty, high velocity, or high volume flows.						
Into a paved area,	Place additional <i>gravel bags</i> or <i>straw wattles</i> against the curb in the downstream gutter to dissipate the water flow and trap sediment. — OR — Use a Vactor truck for dirty, high velocity, or high volume flows.						
10	Proceed with the inspection, repair, or installation work.						

Continued on next page

Dewatering Vaults, *continued*

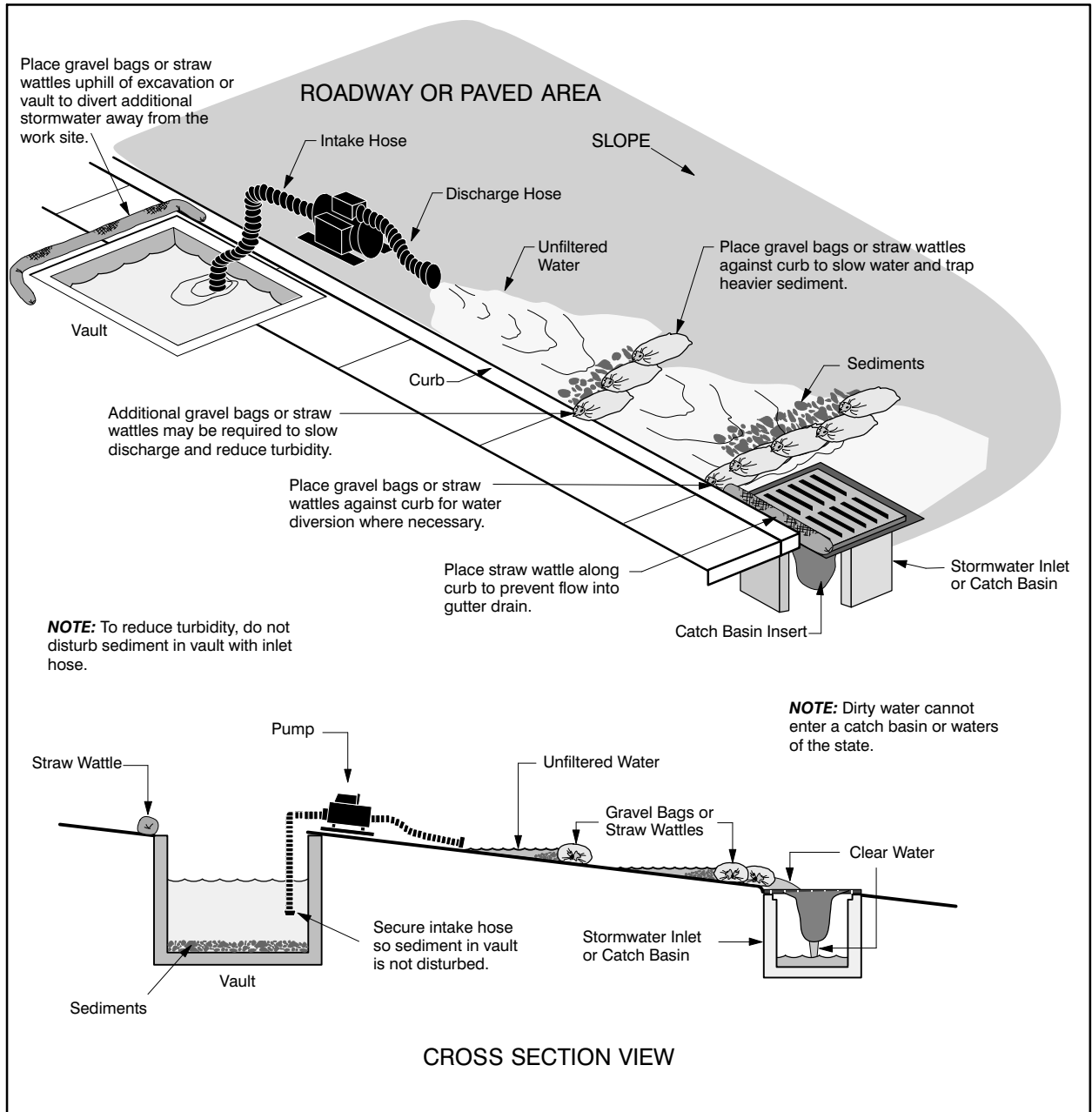
Step	Action						
11	<p>Continue to observe water leaving erosion and sediment control measures. Inspect and maintain all measures.</p> <table border="1" data-bbox="532 415 1393 888"> <thead> <tr> <th data-bbox="532 415 915 455">If . . .</th> <th data-bbox="915 415 1393 455">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 455 915 632">The <i>catch basin insert</i> exceeds 12 in. depth of trapped sediment or the <i>sediment bag/filter sock</i> no longer passes clear water,</td> <td data-bbox="915 455 1393 632">STOP PUMPING. Replace the <i>sediment bag, filter sock, or catch basin insert</i>.</td> </tr> <tr> <td data-bbox="532 632 915 888">The discharge water appears cloudy or dirty,</td> <td data-bbox="915 632 1393 888">STOP PUMPING. Cover any catch basins or storm inlets with a <i>catch basin protector</i>. Implement discharge containment and proper disposal methods with Vector truck to remove <i>dirty water</i> from the work site.</td> </tr> </tbody> </table>	If . . .	Then . . .	The <i>catch basin insert</i> exceeds 12 in. depth of trapped sediment or the <i>sediment bag/filter sock</i> no longer passes clear water,	STOP PUMPING. Replace the <i>sediment bag, filter sock, or catch basin insert</i> .	The discharge water appears cloudy or dirty,	STOP PUMPING. Cover any catch basins or storm inlets with a <i>catch basin protector</i> . Implement discharge containment and proper disposal methods with Vector truck to remove <i>dirty water</i> from the work site.
If . . .	Then . . .						
The <i>catch basin insert</i> exceeds 12 in. depth of trapped sediment or the <i>sediment bag/filter sock</i> no longer passes clear water,	STOP PUMPING. Replace the <i>sediment bag, filter sock, or catch basin insert</i> .						
The discharge water appears cloudy or dirty,	STOP PUMPING. Cover any catch basins or storm inlets with a <i>catch basin protector</i> . Implement discharge containment and proper disposal methods with Vector truck to remove <i>dirty water</i> from the work site.						
12	<p>After dewatering the vault and completion of work, remove barriers and accumulated sediments.</p> <table border="1" data-bbox="532 1010 1393 1419"> <thead> <tr> <th data-bbox="532 1010 915 1050">If the vault is located . . .</th> <th data-bbox="915 1010 1393 1050">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 1050 915 1247">In a vegetated area,</td> <td data-bbox="915 1050 1393 1247">Place sediment with the spoils or dispose properly. <i>Catch basin inserts, filter socks, and sediment bags</i> can be reused or disposed as construction debris.</td> </tr> <tr> <td data-bbox="532 1247 915 1419">In a roadway or other paved area,</td> <td data-bbox="915 1247 1393 1419">Place sediment, soiled <i>catch basin insert, filter sock, or sediment bag</i> in a container and transport it back to the service center for proper disposal as <i>oil-contaminated debris</i>.</td> </tr> </tbody> </table>	If the vault is located . . .	Then . . .	In a vegetated area,	Place sediment with the spoils or dispose properly. <i>Catch basin inserts, filter socks, and sediment bags</i> can be reused or disposed as construction debris.	In a roadway or other paved area,	Place sediment, soiled <i>catch basin insert, filter sock, or sediment bag</i> in a container and transport it back to the service center for proper disposal as <i>oil-contaminated debris</i> .
If the vault is located . . .	Then . . .						
In a vegetated area,	Place sediment with the spoils or dispose properly. <i>Catch basin inserts, filter socks, and sediment bags</i> can be reused or disposed as construction debris.						
In a roadway or other paved area,	Place sediment, soiled <i>catch basin insert, filter sock, or sediment bag</i> in a container and transport it back to the service center for proper disposal as <i>oil-contaminated debris</i> .						
13	<p>All hard surfaces shall be broomed or swept clean. Street washing is allowed only after sweeping is complete. Sediment shall not remain on paved areas at completion of work.</p>						

Figure 1

Typical vault dewatering to street gutter and/or catch basin.

NOTE: This method is *not* approved for trench or excavation dewatering.

This illustrates a typical *gravel bags* or *straw wattle*, and *catch basin insert* installation discharging to a paved street with curb, gutter, and stormwater inlets.



Continued on next page

Dewatering Vaults, *continued*

Figure 2

Typical vault dewatering with a *filter sock* or *sediment bag* when accumulated sediments in the vault are **not** disturbed.

NOTE: This method is **not** approved for trench or excavation dewatering. This method also may not be acceptable to some jurisdictions.

This illustrates a typical *filter sock* or *sediment bag* installation discharging to a paved area with catch basins. The same method can be used in a *vegetated strip* to reduce concentrated flows from the discharge hose and prevent erosion.

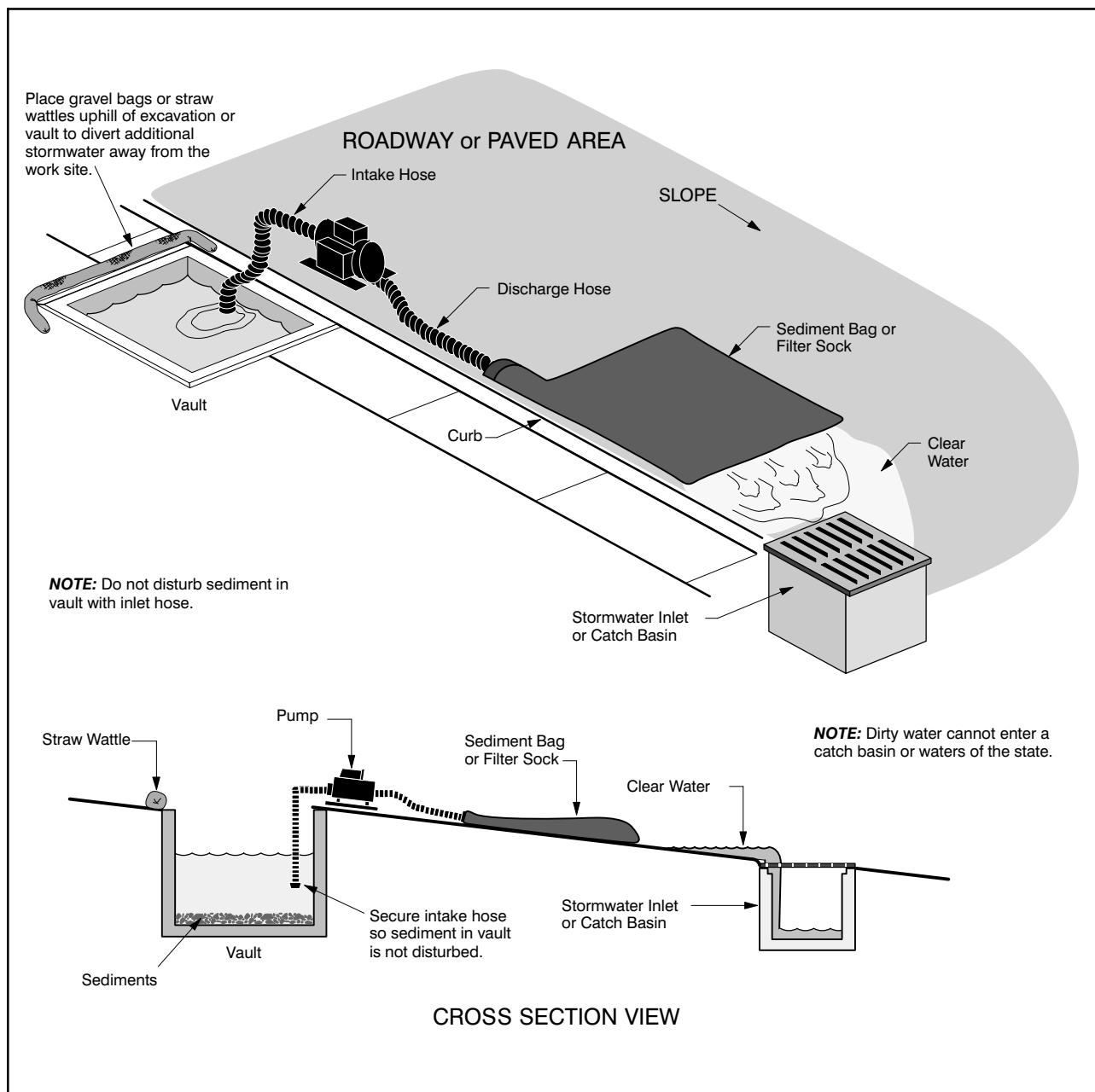
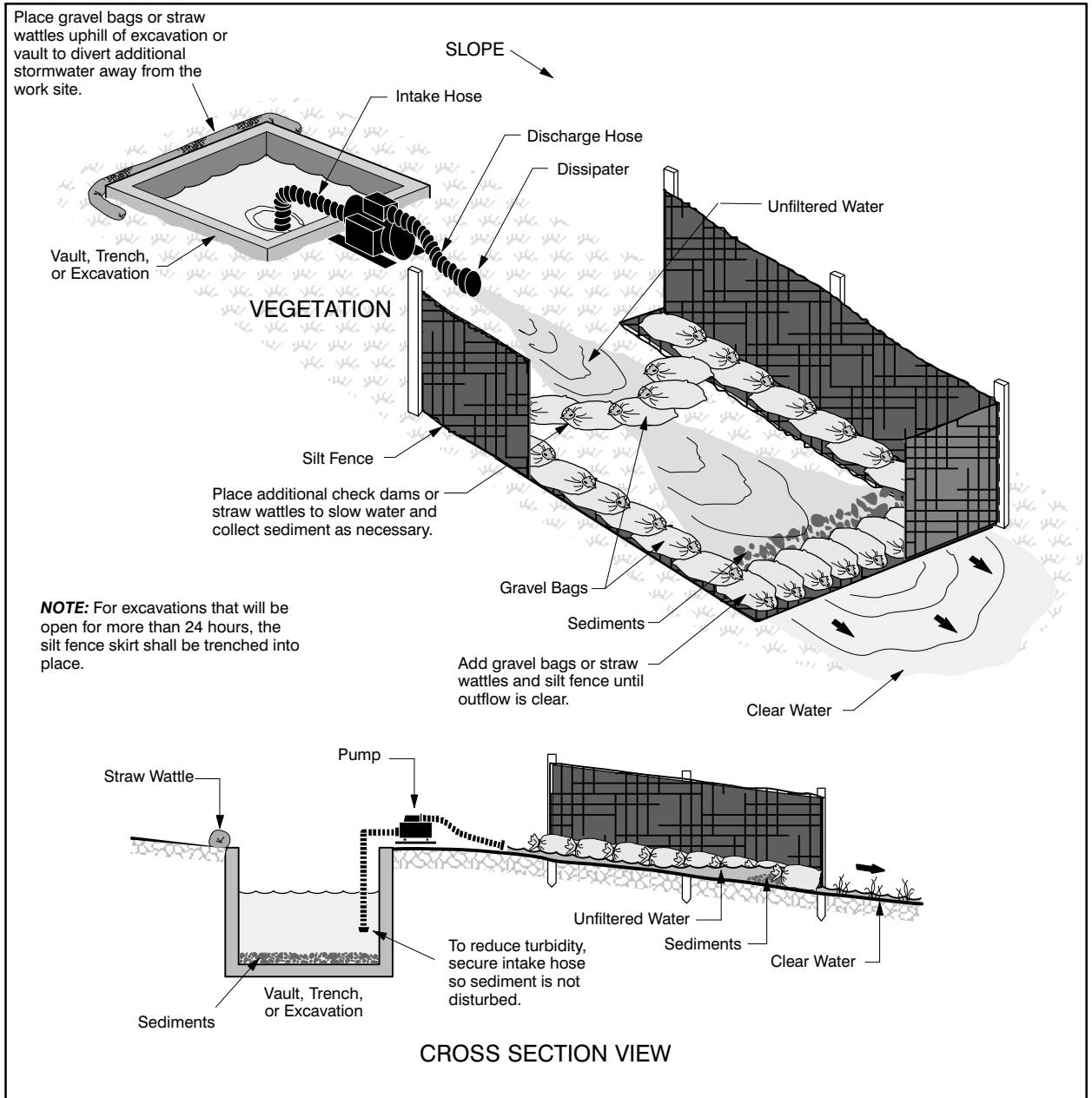


Figure 3

Typical vault, trench, or excavation dewatering to *vegetated strip*.

This illustrates a typical *silt fence* installation in a *vegetated strip* that is between the discharge hose and the nearest *waters of the state*. This installation can be adapted for use with concentrated flows or substantial amounts of overland flows or where erosion is observed at the pump discharge area.



Dewatering Excavations and Trenches

These steps are commonly acceptable to jurisdictions when pumping water (dewatering) from small excavations and trenches. Additional site-specific steps and practices may be required by the responsible jurisdiction and/or by permit.

Terms that appear in *italics* are defined in the Definitions section.

Step	Action					
1	<p>⚠ CAUTION!</p>	<p>During emergency repairs, achieve <i>gas or electric emergency control</i> before installing erosion and sediment control measures.</p> <p>Provide appropriate traffic control according to Standard 0100.4000. Install required shoring according to Standard 0100.3100.</p>				
2	<p>After <i>gas or electric emergency control</i> has been achieved, install erosion and sediment control measures as required before proceeding with repairs or construction.</p>					
3	<p>Check the condition of the water in the trench or excavation. If the water is excessively oily, foul smelling, or shows fluorescent coloration, follow the oil spill cleanup instructions in Standard 0150.3100.</p>					
4	<p>Evaluate the work site and discharge area for appropriate erosion and sediment control.</p>					
5	<p>Prepare the pump intake area.</p> <p>Secure the intake hose so that the sediment at the bottom of the trench or excavation is disturbed as little as possible.</p>					
6	<p>Prepare the discharge area. Do not allow <i>dirty water</i> to enter the <i>waters of the state</i>.</p> <table border="1" data-bbox="532 1234 1393 1776"> <thead> <tr> <th data-bbox="532 1234 914 1287">If discharging into . . .</th> <th data-bbox="914 1234 1393 1287">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 1287 914 1776"> <p><i>A vegetated strip,</i></p> </td> <td data-bbox="914 1287 1393 1776"> <p>Use a splash guard (dissipater) on the discharge hose to minimize erosion.</p> <p>Install <i>gravel check dams, straw wattles, and/or silt fence</i> to trap the sediment and prevent erosion (<i>Figure 3</i>).</p> <p>Multiple <i>gravel check dams</i> or <i>straw wattles</i> may be necessary to trap sediment and slow water velocity to acceptable speeds.</p> <p>NOTE: Concentrated flows typical of a hydraulic pump can cause severe erosion.</p> </td> </tr> </tbody> </table>		If discharging into . . .	Then . . .	<p><i>A vegetated strip,</i></p>	<p>Use a splash guard (dissipater) on the discharge hose to minimize erosion.</p> <p>Install <i>gravel check dams, straw wattles, and/or silt fence</i> to trap the sediment and prevent erosion (<i>Figure 3</i>).</p> <p>Multiple <i>gravel check dams</i> or <i>straw wattles</i> may be necessary to trap sediment and slow water velocity to acceptable speeds.</p> <p>NOTE: Concentrated flows typical of a hydraulic pump can cause severe erosion.</p>
If discharging into . . .	Then . . .					
<p><i>A vegetated strip,</i></p>	<p>Use a splash guard (dissipater) on the discharge hose to minimize erosion.</p> <p>Install <i>gravel check dams, straw wattles, and/or silt fence</i> to trap the sediment and prevent erosion (<i>Figure 3</i>).</p> <p>Multiple <i>gravel check dams</i> or <i>straw wattles</i> may be necessary to trap sediment and slow water velocity to acceptable speeds.</p> <p>NOTE: Concentrated flows typical of a hydraulic pump can cause severe erosion.</p>					

Continued on next page

Step	Action				
6, <i>cont</i>	<table border="1" data-bbox="581 321 1442 720"> <thead> <tr> <th data-bbox="581 321 963 363">If discharging into . . .</th> <th data-bbox="963 321 1442 363">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="581 363 963 720">A paved area,</td> <td data-bbox="963 363 1442 720"> Install a combination of sediment barriers and traps (<i>catch basin inserts, pea gravel bags, straw wattles</i>) to reduce stormwater runoff velocity, prevent erosion, and trap sediment, to meet local jurisdiction requirements. — OR — Pump <i>dirty water</i> to a Vactor truck or Baker tanks for proper disposal. </td> </tr> </tbody> </table> <p data-bbox="581 730 1442 793">NOTE: Any pump discharge without sediment protection directly into a <i>flowing ditch</i> or <i>waters of the state</i> is not allowed.</p>	If discharging into . . .	Then . . .	A paved area,	Install a combination of sediment barriers and traps (<i>catch basin inserts, pea gravel bags, straw wattles</i>) to reduce stormwater runoff velocity, prevent erosion, and trap sediment, to meet local jurisdiction requirements. — OR — Pump <i>dirty water</i> to a Vactor truck or Baker tanks for proper disposal.
If discharging into . . .	Then . . .				
A paved area,	Install a combination of sediment barriers and traps (<i>catch basin inserts, pea gravel bags, straw wattles</i>) to reduce stormwater runoff velocity, prevent erosion, and trap sediment, to meet local jurisdiction requirements. — OR — Pump <i>dirty water</i> to a Vactor truck or Baker tanks for proper disposal.				
7	Place the discharge hose as far from the ultimate destination of the discharge water as possible, allowing sediments in the <i>dirty water</i> to be separated before entering the <i>waters of the state</i> .				
8	<p data-bbox="522 909 1507 961">Protect the uphill side of the excavation or trench from stormwater flows.</p> <table border="1" data-bbox="581 961 1442 1150"> <thead> <tr> <th data-bbox="581 961 963 1003">If . . .</th> <th data-bbox="963 961 1442 1003">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="581 1003 963 1150">The work is performed during the <i>wet season</i> or precipitation is expected,</td> <td data-bbox="963 1003 1442 1150">Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i>.</td> </tr> </tbody> </table>	If . . .	Then . . .	The work is performed during the <i>wet season</i> or precipitation is expected,	Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i> .
If . . .	Then . . .				
The work is performed during the <i>wet season</i> or precipitation is expected,	Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i> .				
9	<p data-bbox="522 1192 1507 1245">Pump the water out of the trench or excavated area.</p> <p data-bbox="522 1245 1507 1287">Continually check the discharge water.</p> <table border="1" data-bbox="581 1287 1442 1570"> <thead> <tr> <th data-bbox="581 1287 963 1329">If discharging water . . .</th> <th data-bbox="963 1287 1442 1329">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="581 1329 963 1570">Appears cloudy or dirty after leaving the installed sediment traps,</td> <td data-bbox="963 1329 1442 1570"> Install additional barriers or traps until the water exiting the work site is clear. — OR — Use a Vactor truck or Baker tank for dirty, high velocity, or high volume flows. </td> </tr> </tbody> </table>	If discharging water . . .	Then . . .	Appears cloudy or dirty after leaving the installed sediment traps,	Install additional barriers or traps until the water exiting the work site is clear. — OR — Use a Vactor truck or Baker tank for dirty, high velocity, or high volume flows.
If discharging water . . .	Then . . .				
Appears cloudy or dirty after leaving the installed sediment traps,	Install additional barriers or traps until the water exiting the work site is clear. — OR — Use a Vactor truck or Baker tank for dirty, high velocity, or high volume flows.				

Continued on next page

Dewatering Excavations and Trenches, *continued*

Step	Action				
10	Proceed with the repair or installation work.				
11	<p>Continue to observe water leaving erosion and sediment control measures. Inspect and maintain all measures.</p> <table border="1" data-bbox="532 457 1393 747"> <thead> <tr> <th data-bbox="532 457 914 497">If . . .</th> <th data-bbox="914 457 1393 497">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 497 914 747">The water appears cloudy or dirty,</td> <td data-bbox="914 497 1393 747"> <p>STOP PUMPING. Cover any impacted storm inlets or catch basins with a <i>catch basin protector</i>.</p> <p>Implement discharge containment and proper disposal methods with Vactor truck or Baker tank to remove <i>dirty water</i> from the work site.</p> </td> </tr> </tbody> </table>	If . . .	Then . . .	The water appears cloudy or dirty,	<p>STOP PUMPING. Cover any impacted storm inlets or catch basins with a <i>catch basin protector</i>.</p> <p>Implement discharge containment and proper disposal methods with Vactor truck or Baker tank to remove <i>dirty water</i> from the work site.</p>
If . . .	Then . . .				
The water appears cloudy or dirty,	<p>STOP PUMPING. Cover any impacted storm inlets or catch basins with a <i>catch basin protector</i>.</p> <p>Implement discharge containment and proper disposal methods with Vactor truck or Baker tank to remove <i>dirty water</i> from the work site.</p>				
12	<p>After dewatering and completion of the work, remove barriers and accumulated sediments.</p> <p>Place sediment with the spoils or dispose properly.</p> <p><i>Catch basin inserts, filter socks, and sediment bags</i> can be reused or disposed as construction debris.</p>				
13	All hard surfaces shall be broomed or swept clean. Street washing is allowed only after sweeping is complete. Sediment shall not remain on paved areas at completion of work.				

Construction Runoff Control Procedure

These steps are commonly acceptable to jurisdictions for controlling runoff from small excavated work sites including utility pole hole excavations and *bore pits*. Additional site-specific steps and practices may be required by the responsible jurisdiction by permit and/or Construction SWPPP.

Terms that appear in *italics* are defined in the Definitions section.

Step	Action				
1	<div style="background-color: #cccccc; padding: 5px; display: inline-block;">⚠ CAUTION!</div> <p>During emergency repairs, achieve <i>gas or electric emergency control</i> before installing erosion and sediment control measures.</p> <p>Provide appropriate traffic control according to Standard 0100.4000. Install required shoring according to Standard 0100.3100.</p>				
2	After <i>gas or electric emergency control</i> has been achieved, install erosion and sediment control measures as required before proceeding with repairs or construction.				
3	<p>Evaluate the work site for appropriate erosion and sediment control. Consider <i>wet season</i> and local jurisdiction requirements.</p> <p style="text-align: center;">— AND —</p> <p>Install erosion and sediment control measures indicated on the work sketch, Construction SWPPP, and/or as required by permit.</p>				
4	<p>Prepare the work site for precipitation and stormwater runoff.</p> <p>Use sediment barriers to protect the entire downgrade portion of the site from <i>dirty water</i>. Include barriers for any <i>flowing ditch</i> or <i>waters of the state</i>.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">If ...</th> <th style="text-align: left;">Then ...</th> </tr> </thead> <tbody> <tr> <td style="vertical-align: top;"> <p>There is a possibility of precipitation before the project is complete,</p> <p style="text-align: center;">— OR —</p> <p>Work is progressing during the <i>wet season</i>,</p> </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> ▪ For any excavation, install a combination of sediment barriers and traps (<i>catch basin inserts, pea gravel bags, straw wattles</i>) to reduce stormwater runoff velocity, prevent erosion, and trap sediment, and meet responsible jurisdiction requirements (<i>Figure 4</i>). ▪ For utility pole excavations, place <i>gravel bags</i> or <i>straw wattles</i> in a semicircle downgrade of the excavation (<i>Figure 7</i>). <p style="text-align: center;">— OR —</p> <ul style="list-style-type: none"> ▪ Use Vector trucks or Baker tanks for proper disposal of <i>dirty water</i>. </td> </tr> </tbody> </table>	If ...	Then ...	<p>There is a possibility of precipitation before the project is complete,</p> <p style="text-align: center;">— OR —</p> <p>Work is progressing during the <i>wet season</i>,</p>	<ul style="list-style-type: none"> ▪ For any excavation, install a combination of sediment barriers and traps (<i>catch basin inserts, pea gravel bags, straw wattles</i>) to reduce stormwater runoff velocity, prevent erosion, and trap sediment, and meet responsible jurisdiction requirements (<i>Figure 4</i>). ▪ For utility pole excavations, place <i>gravel bags</i> or <i>straw wattles</i> in a semicircle downgrade of the excavation (<i>Figure 7</i>). <p style="text-align: center;">— OR —</p> <ul style="list-style-type: none"> ▪ Use Vector trucks or Baker tanks for proper disposal of <i>dirty water</i>.
If ...	Then ...				
<p>There is a possibility of precipitation before the project is complete,</p> <p style="text-align: center;">— OR —</p> <p>Work is progressing during the <i>wet season</i>,</p>	<ul style="list-style-type: none"> ▪ For any excavation, install a combination of sediment barriers and traps (<i>catch basin inserts, pea gravel bags, straw wattles</i>) to reduce stormwater runoff velocity, prevent erosion, and trap sediment, and meet responsible jurisdiction requirements (<i>Figure 4</i>). ▪ For utility pole excavations, place <i>gravel bags</i> or <i>straw wattles</i> in a semicircle downgrade of the excavation (<i>Figure 7</i>). <p style="text-align: center;">— OR —</p> <ul style="list-style-type: none"> ▪ Use Vector trucks or Baker tanks for proper disposal of <i>dirty water</i>. 				

Continued on next page

Construction Runoff Control Procedure, *continued*

Step	Action						
4 <i>cont.</i>	<table border="1"> <thead> <tr> <th data-bbox="532 390 867 424">If . . .</th> <th data-bbox="867 390 1393 424">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 424 867 573">There is a <i>flowing ditch</i> or <i>waters of the state</i> adjacent to or downstream of the intended excavation,</td> <td data-bbox="867 424 1393 573">Install <i>gravel bags</i>, <i>straw wattles</i>, and/or <i>silt fence</i> barrier between the <i>flowing ditch</i> or <i>waters of the state</i> and the intended excavation (<i>Figures 5 and 7</i>).</td> </tr> <tr> <td data-bbox="532 573 867 722">There is a <i>flowing ditch</i> or <i>waters of the state</i> running through the intended excavation site,</td> <td data-bbox="867 573 1393 722">Contact the responsible jurisdiction for job specific requirements for erosion and sediment control.</td> </tr> </tbody> </table>	If . . .	Then . . .	There is a <i>flowing ditch</i> or <i>waters of the state</i> adjacent to or downstream of the intended excavation,	Install <i>gravel bags</i> , <i>straw wattles</i> , and/or <i>silt fence</i> barrier between the <i>flowing ditch</i> or <i>waters of the state</i> and the intended excavation (<i>Figures 5 and 7</i>).	There is a <i>flowing ditch</i> or <i>waters of the state</i> running through the intended excavation site,	Contact the responsible jurisdiction for job specific requirements for erosion and sediment control.
If . . .	Then . . .						
There is a <i>flowing ditch</i> or <i>waters of the state</i> adjacent to or downstream of the intended excavation,	Install <i>gravel bags</i> , <i>straw wattles</i> , and/or <i>silt fence</i> barrier between the <i>flowing ditch</i> or <i>waters of the state</i> and the intended excavation (<i>Figures 5 and 7</i>).						
There is a <i>flowing ditch</i> or <i>waters of the state</i> running through the intended excavation site,	Contact the responsible jurisdiction for job specific requirements for erosion and sediment control.						
5	<p>Protect the uphill side of the excavation or trench from stormwater flows.</p> <table border="1"> <thead> <tr> <th data-bbox="532 800 867 833">If . . .</th> <th data-bbox="867 800 1393 833">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 833 867 982">The work is performed during the <i>wet season</i> or precipitation is expected,</td> <td data-bbox="867 833 1393 982">Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i>.</td> </tr> </tbody> </table>	If . . .	Then . . .	The work is performed during the <i>wet season</i> or precipitation is expected,	Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i> .		
If . . .	Then . . .						
The work is performed during the <i>wet season</i> or precipitation is expected,	Install <i>gravel bags</i> or <i>straw wattles</i> on the uphill side of the excavation to prevent additional stormwater from entering and becoming <i>dirty water</i> .						
6	Remove obstructions. In <i>landscaped areas</i> , store sod, beauty bark, plantings, and other landscape materials in a separate area for replacement after construction.						
7	Prepare the spoils storage area, if needed and if allowed by the responsible jurisdiction. Place excavated material up grade from the trench or excavation where practical.						
8	<p>Proceed with excavation.</p> <p>NOTE: Open trench excavations should be limited to that distance which can be reasonably managed under existing weather and soil conditions. Jurisdictions commonly specify maximums allowed.</p> <table border="1"> <thead> <tr> <th data-bbox="532 1367 867 1400">If excavated material is . . .</th> <th data-bbox="867 1367 1393 1400">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="532 1400 867 1528">Removed from the site,</td> <td data-bbox="867 1400 1393 1528">Place spoils directly into the haul truck for disposal (may be the only option allowed by some jurisdictions).</td> </tr> <tr> <td data-bbox="532 1528 867 1864">Stored on-site,</td> <td data-bbox="867 1528 1393 1864"> <p>Place the spoils in location allowed by jurisdiction. Protect work site and excavated material as required.</p> <p>During the <i>wet season</i> or if precipitation is expected, protect uphill side of spoils storage to prevent stormwater from becoming <i>dirty water</i>.</p> <p>During the <i>wet season</i>, cover spoils if they are going to be stored for 48 hrs or longer.</p> </td> </tr> </tbody> </table>	If excavated material is . . .	Then . . .	Removed from the site,	Place spoils directly into the haul truck for disposal (may be the only option allowed by some jurisdictions).	Stored on-site,	<p>Place the spoils in location allowed by jurisdiction. Protect work site and excavated material as required.</p> <p>During the <i>wet season</i> or if precipitation is expected, protect uphill side of spoils storage to prevent stormwater from becoming <i>dirty water</i>.</p> <p>During the <i>wet season</i>, cover spoils if they are going to be stored for 48 hrs or longer.</p>
If excavated material is . . .	Then . . .						
Removed from the site,	Place spoils directly into the haul truck for disposal (may be the only option allowed by some jurisdictions).						
Stored on-site,	<p>Place the spoils in location allowed by jurisdiction. Protect work site and excavated material as required.</p> <p>During the <i>wet season</i> or if precipitation is expected, protect uphill side of spoils storage to prevent stormwater from becoming <i>dirty water</i>.</p> <p>During the <i>wet season</i>, cover spoils if they are going to be stored for 48 hrs or longer.</p>						

Step	Action						
9	<p>Throughout construction activity, observe water leaving erosion and sediment control measures.</p> <p>If water appears dirty, STOP PUMPING, cover any catch basins or storm outlets with a <i>catch basin protector</i>. Implement discharge containment and proper disposal methods with Vactor trucks or Baker tanks to remove <i>dirty water</i> from the work site.</p>						
10	Proceed with the repair or installation work.						
11	<p>Continue to monitor the sediment control structures if the excavation is open for more than 24 hours.</p> <table border="1" data-bbox="581 632 1442 831"> <thead> <tr> <th data-bbox="581 632 915 678">If work is during . . .</th> <th data-bbox="915 632 1442 678">Then . . .</th> </tr> </thead> <tbody> <tr> <td data-bbox="581 678 915 751">The dry season,</td> <td data-bbox="915 678 1442 751">Inspect and repair sediment control structures weekly or after storm events.</td> </tr> <tr> <td data-bbox="581 751 915 831">The <i>wet season</i>,</td> <td data-bbox="915 751 1442 831">Inspect and repair sediment control structures daily.</td> </tr> </tbody> </table>	If work is during . . .	Then . . .	The dry season,	Inspect and repair sediment control structures weekly or after storm events.	The <i>wet season</i> ,	Inspect and repair sediment control structures daily.
If work is during . . .	Then . . .						
The dry season,	Inspect and repair sediment control structures weekly or after storm events.						
The <i>wet season</i> ,	Inspect and repair sediment control structures daily.						
12	Backfill the excavation as required.						
13	Immediately broom off or sweep hard surfaces or rake/shovel soft surfaces. Street washing is allowed only after sweeping is complete. Sediment shall not remain on hard surfaces at completion of work.						
14	<p>Restore disturbed areas including vegetation or landscaping as required and/or per jurisdiction requirements.</p> <ul style="list-style-type: none"> ▪ For <i>landscaped areas</i>, replace previously stored landscape materials. ▪ Place <i>mulch</i> on seeded or disturbed areas per jurisdiction requirements. <i>Straw wattles</i> can be cut open and used as mulch. Dispose of netting property. ▪ For nonlandscaped vegetated areas, seed with erosion control seed mix meeting the requirements of the responsible jurisdiction and/or Ecology requirements. 						
15	<p>Remove erosion control measures after the work site is vegetated or otherwise permanently stabilized. Dispose of collected sediment and used erosion control materials appropriately as construction debris.</p> <p>NOTE: For excavation sites in unpaved areas, some erosion control measures may need to be maintained and remain in place for several months until vegetation is reestablished. Inspect and maintain measures at inactive sites a minimum of once per month or within 48 hours following a major storm event.</p>						

Construction Runoff Control Procedure, *continued*

Figure 4

Typical erosion and sediment control for dry vegetated work sites where a *vegetated strip* is between the site and the nearest *waters of the state*. This installation can be adapted for use with concentrated flows or substantial amounts of overland flows.

NOTE: Gravel check dams cannot be placed in streams, creeks, or flowing ditches. See Figure 5.

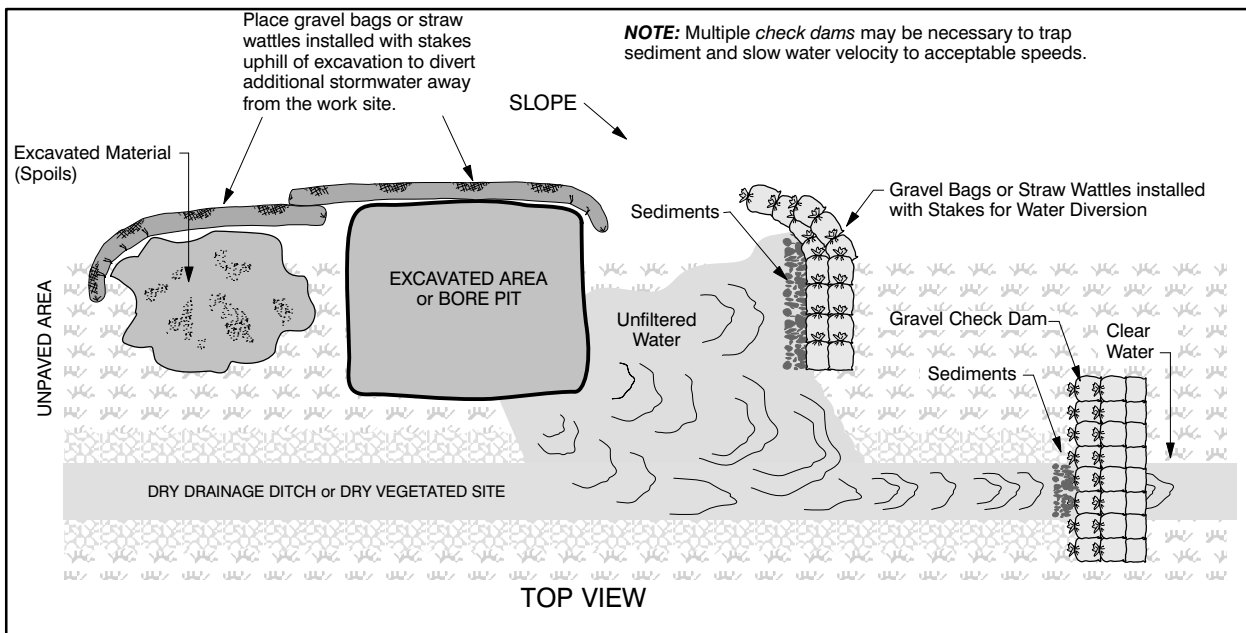


Figure 5

Typical erosion and sediment control for work sites with a *flowing ditch* or adjacent *waters of the state*.

NOTE: Additional measures may be required by the responsible jurisdiction.

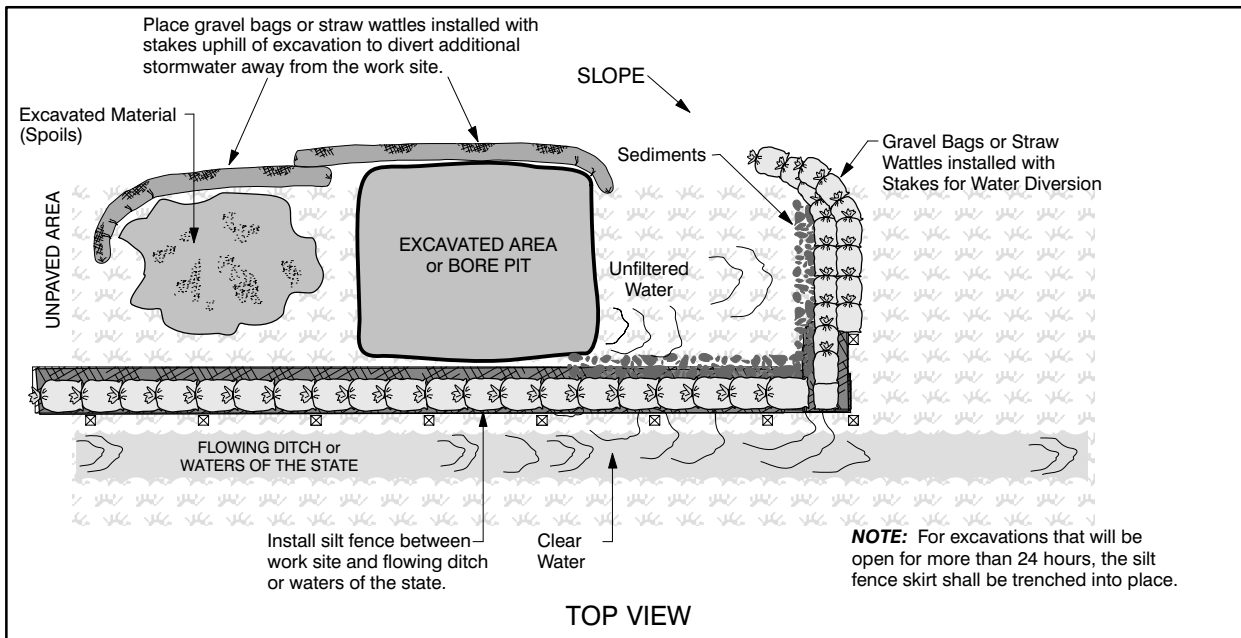


Figure 6 Typical erosion and sediment control for utility pole work sites.

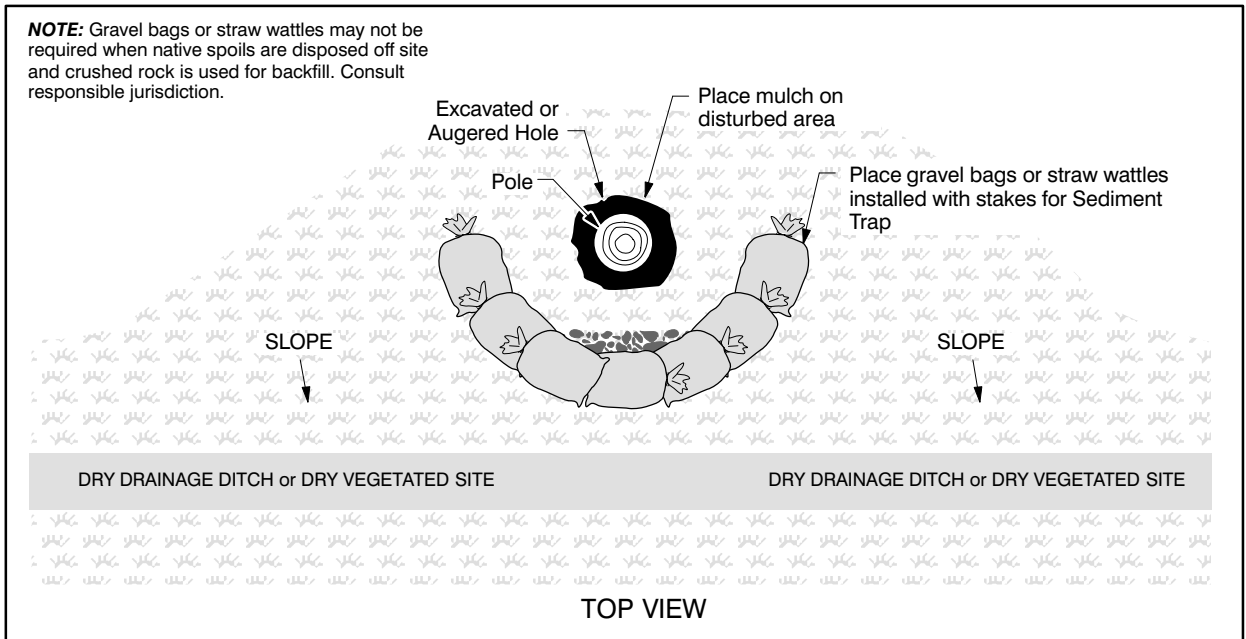
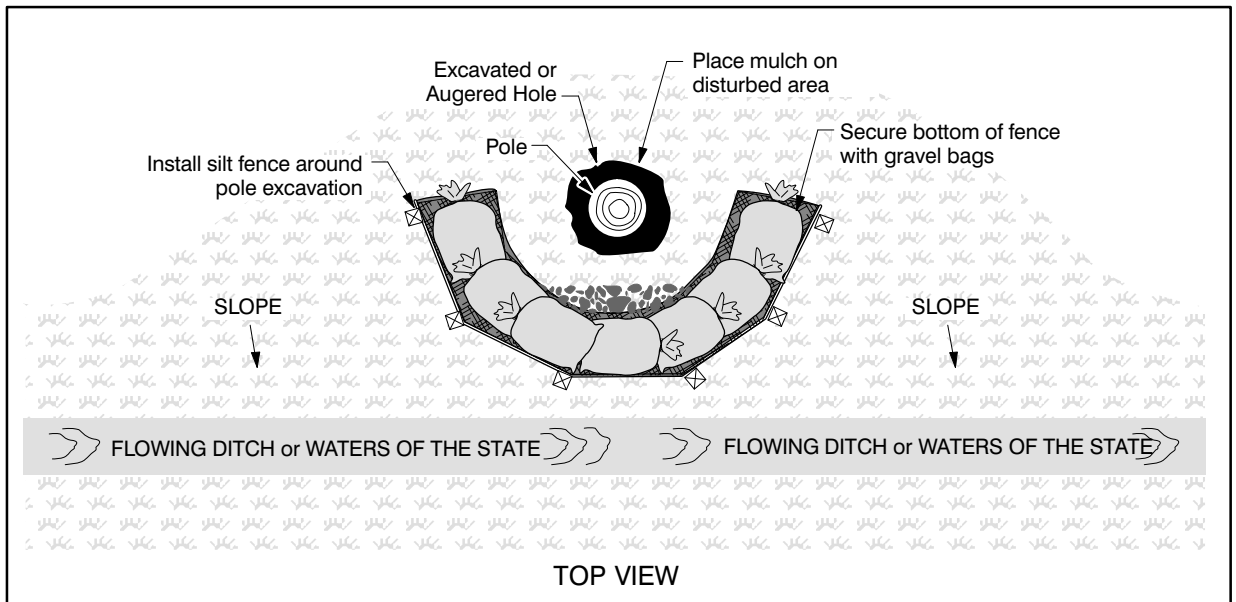


Figure 7 Typical erosion and sediment control for utility pole work sites adjacent to *flowing ditches* or *waters of the state*.



Controlling Sediment due to Heavy Equipment or Concrete Work

These guidelines are commonly acceptable to jurisdictions. Additional site-specific steps and practices may be required by the responsible jurisdiction by permit and/or Construction SWPPP.

Concrete Handling

- Any tools or equipment that come in contact with concrete shall **only** be washed out in formed areas awaiting installation of concrete or asphalt.
- When no formed areas are available or equipment cannot be easily moved, washwater and leftover product shall be contained in a lined container. Containers shall be checked for holes in the liner daily during concrete pours and repaired the same day. Check with responsible jurisdiction for disposal requirements.
- Washwater from concrete handling shall **never** drain directly into paved areas, *waters of the state*, vegetated areas, or be allowed to leave the work site.
- Unused concrete remaining in the truck and pump shall be returned to the originating batch plant for recycling or otherwise contained for proper disposal.

Concrete Sawcutting

- Slurry and cuttings shall be vacuumed during cutting and surfacing operations.
- Slurry and cuttings shall not remain on permanent concrete or asphalt pavement overnight.
- Slurry and cuttings shall **never** drain directly into paved areas, *waters of the state*, vegetated areas, or be allowed to leave the work site.
- Check with responsible jurisdiction for disposal requirements for process water that is generated during hydro-demolition or similar operations.
- If the saw cut area is swept with a pick-up sweeper, the material shall be hauled to an appropriate disposal site. Check with responsible jurisdiction for other disposal requirements for cleaning waste material and demolition debris.

Heavy Equipment Handling

- Any tools or equipment used in earthworks or drilling shall **only** be washed into contained areas for disposal. Check with responsible jurisdiction for disposal requirements.
- Washwater from earthworks or drilling equipment shall **never** drain directly into paved areas, *waters of the state*, vegetated areas, or be allowed to leave the work site.

Dust Control

Wind erosion is a significant cause of soil movement from construction sites in Eastern Washington. Dust control prevents wind transport of dust from disturbed soil surfaces onto paved surfaces and into *waters of the state*.

- Lower speed limits; high vehicle speed increases the amount of dust stirred up from unpaved surfaces.
- Encourage the use of paved routes, if available.
- Restrict use by tracked vehicles and heavy trucks to prevent damage to road surface and base.
- Use vacuum street sweepers.
- Remove mud and other dirt promptly so it does not dry and then turn into dust.
- Limit dust-causing work on windy days.

NOTE: The local Air Pollution Control Authority should be contacted for guidance on dust control measures if it is apparent that dust will be an issue. Compliance with the local Air Pollution Control Authority constitutes Ecology compliance.

References

The following Puget Sound Energy documents apply to this standard:

0100.3100	Excavation and Shoring Requirements
0100.4000	Traffic Control
0150.3100	Cleanup of Oil Spills

Sources

Ecology Stormwater Management Manual for Eastern Washington, Chapter 7
(Publication No. 04-10-076)

- Section 7.2.2, Requirements for Construction SWPPP
- Section 7.2.3, Construction SWPPP Checklist
- Section 7.3, Standards and Specifications for Best Management Practices
- Section 7.3.1 & 7.3.2, List of Best Management Practices

Ecology Stormwater Management Manual for Western Washington, Volume II
(Publication No. 05-10-30)

- Section 3.2, Requirements for Construction SWPPP
- Section 3.3, Construction SWPPP Checklist
- Section 4.0, Standards and Specifications for Best Management Practices
- Section 4.1, List of Best Management Practices

King County Stormwater Management Manual

Washington State Administrative Code (WAC 173-201A)

Washington State Highway Runoff Manual

Scope

This standard covers ready-mixed concrete delivered in a freshly mixed and unhardened state. This standard does not cover the placement, consolidation, or protection of the concrete during or after delivery to the site.

References

Concrete shall meet the requirements of the latest revision of the following applicable national standards:

- ASTM C33/C33M – Standard Specification for Concrete Aggregates
- ASTM C94/C94M – Standard Specification for Ready-Mixed Concrete
- ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete

Requirements**1. General**

- 1.1 This standard specifies the requirements when ready-mixed concrete is used for structural applications.
- 1.2 A copy of this standard specification shall be furnished to the concrete supplier when ordering concrete.
- 1.3 All inquiries shall be directed to Puget Sound Energy, Substation Engineering Department, Civil/Structural Group, Bellevue, Washington.

2. Material

- 2.1 Minimum cement content shall be 517 pounds per cubic yard (5-1/2 bags per cubic yard).
- 2.2 Maximum coarse aggregate size shall be 1-1/2 inches or 3/4 inch in accordance with ASTM C33/C33M, size number 4 or size number 6, respectively.
- 2.3 Air entrainment shall be added to all mixes.
 - A. The 1-1/2-inch maximum coarse aggregate size air entrainment mixture shall provide an air content of $4.5 \pm 1.5\%$ and shall meet or exceed ASTM C260. Other admixtures are not allowed without PSE review and approval.
 - B. The 3/4-inch maximum coarse aggregate size air entrainment mixture shall provide an air content of $5 \pm 1.5\%$ and shall meet or exceed ASTM C260. Other admixtures are not allowed without PSE review and approval.
- 2.4 Slump shall be 4 ± 1 inches at the point of delivery.

3. Test

- 3.1 Ready-mixed concrete shall conform to the latest revision of ASTM C94/C94M.
- 3.2 Required minimum compressive strength is 3000 psi at 28 days.
- 3.3 Option C, Section 4 of ASTM C94/C94M and the requirements of this specification shall be the basis of determining the proportions of the concrete to produce the required quality. The ready-mixed concrete supplier assumes responsibility for the selection of the proportion for the concrete mixture in accordance with these requirements.

Scope

This standard specifies the requirements for deformed steel bars and the types used in concrete reinforcement at Puget Sound Energy (PSE).

References

Deformed steel bars shall meet or exceed the requirements of the latest revision of the following applicable national standards.

ASTM A615 – Deformed and Plain Billet-Steel Bars for Concrete Reinforcement

Where conflicts exist between PSE’s specifications and national standards, the following order of precedence shall apply:

1. PSE Purchase Order
2. PSE Standard Specifications
3. Referenced National Standards

Requirements

1. Marking

- 1.1 Standard bar markings are shown in *Figure 1*. Bars are identified with marks rolled into the surface of one side of the bar. Manufacturers use either the line system or the number system.
- 1.2 Bars are marked in the following order:
 - A. Producing mill (usually an initial)
 - B. Bar size number (*see Table 1, #3 through #11*)
 - C. Type:
 1. “N” for New Billet
 2. “A” for Axle
 3. “I” for Rail
- 1.3 Grade Markings

Grade Type	Grade Line Markings	
	Line System	Number System
Grades 40 or 50	None	None
Grade 60	one line	60
Grade 75	two lines	75

- 1.4 Grade mark lines are smaller and are located between the two main ribs. Grade mark lines continue for at least five deformation spaces.
- 1.5 Grade mark numbers may be placed within separate consecutive deformation spaces to read vertically or horizontally.

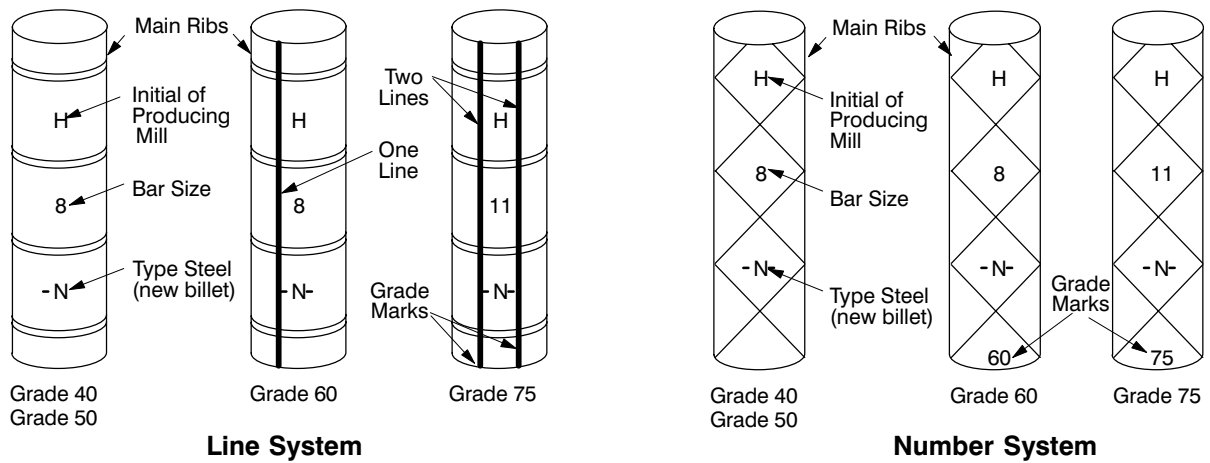


Figure 1 Standard bar grade markings

2. Dimensional

2.1 Use Table 1 to identify the bar sizes, grades, weight, and dimensions of the bars. Bar identification marks may also be read horizontally (90° angle to those shown in Figure 1.)

Table 1 Bar sizes, grades, weights, and dimensions.

Bar Size Designation	Grade	Weight Pounds/Foot	Nominal Dimensions — Round Sections		
			Diameter Inches	Cross-Sectional Area-Sq Inches	Perimeter Inches
# 3	40	.376	.375	.11	1.178
# 4	40	.668	.500	.20	1.571
# 5	40	1.043	.625	.31	1.963
# 6	60	1.502	.750	.44	2.356
# 7	60	2.044	.875	.60	2.749
# 8	60	2.670	1.000	.79	3.142
# 9	60	3.400	1.128	1.00	3.544
#10	60	4.303	1.270	1.27	3.990
#11	60	5.313	1.410	1.56	4.430

Scope

This standard covers the quality and size of aggregate to be used as a base course for substation and driveway construction.

References

Aggregate shall meet the requirements of the latest revision of the following applicable national standards:

AASHTO T176 – Standard Method of Test for Plastic Finer in Graded Aggregates and Soils by Use of the Sand Equivalent Test

Requirements

1. General

1.1 Base course shall consist of naturally occurring or screened gravel. It shall be substantially free from various types of wood and organic waste, and other extraneous or objectionable material. It shall have such characteristics of size and shape that it is readily compactible.

2. Gradation

2.1 When tested by means of laboratory sieves, grain size distribution shall conform to the requirements in *Table 1*.

Table 1: Grain size distribution requirements

US Standard Sieve	Percent Passing (by weight)
3"	100
3/4"	70 to 90
3/8"	60 to 80
1/4"	50 to 70
No. 40	< 30
No. 200	5 maximum

2.2 Sand equivalent as determined by AASHTO T176 shall be greater than 45.

3. Material Approval

- 3.1 Sources of base course shall be inspected and approved by Puget Sound Energy prior to delivery of material.
- 3.2 Acceptance of material at the supplier's plant will not constitute final acceptance. Any material delivered to the job site or designated stock piles not meeting the specification requirements shall be rejected.

Scope

This standard covers the quality and size of crushed stone to be used as a top course surfacing material for substation driveways or similar areas.

References

Aggregate shall meet the requirements of the latest revision of the following applicable national standards:

- AASHTO T96 – Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact
- AASHTO T104 – Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
- AASHTO T176 – Standard Method of Test for Plastic Fines in Graded Aggregates and Soils
- WSDOT 9–03.9 (3) – Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction, “Crushed Surfacing”

Requirements

1. General

This material is generally consistent with “Top Course and Keystone” as specified in the Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction, 9-03.9 (3), “Crushed Surfacing.” Top course shall be manufactured from ledge rock, talus, or gravel. The materials shall be uniform in quality and free from wood, roots, bark, and other extraneous material.

2. Physical Properties

- 2.1 Wear shall not exceed 35 percent, Los Angeles Abrasion Test (AASHTO T96).
- 2.2 When the crushed surfacing is subjected to five alternations of the sodium sulphate soundness test (AASHTO T104) the weighted loss shall not exceed 12 percent by weight.
- 2.3 When the crushed surfacing is separated on 5/8-inch, 1/4-inch, and U.S. No. 10 sieves, not less than 75 percent by weight of the particles retained on each sieve shall have at least one fractured face produced by mechanical crushing.

3. Gradation

- 3.1 When tested by means of laboratory sieves, grain size distribution shall conform to the following requirements:

US Standard Sieve Size	Percent Passing (by weight)
3/4"	100
1/4"	55 to 75
No. 40	8 to 24
No. 200	10 maximum

- 3.2 Sand equivalent as determined by AASHTO T176 shall be greater than 32.

4. Material Approval

- 4.1 Sources of base course shall be inspected and approved by Puget Sound Energy prior to delivery of material.
- 4.2 Acceptance of material at the supplier's plant will not constitute final acceptance. Any material delivered to the job site or designated stock piles not meeting the specification requirements shall be rejected.

■ Indicates additions or changes

Scope

This standard covers the quality and size of crushed rock to be used as a surfacing material for substation yards or similar area.

References

Aggregate shall meet the requirements of the latest revision of the following applicable national standards:

- AASHTO T96 – Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- AASHTO T104 – Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
- ASTM C131 – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- ASTM C136 – Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- ASTM D75/D75M – Standard Practice for Sampling Aggregates

Additional test requirements are identified by the following procedure:

- BPA ELMM-004 – Rock Resistivity Test Procedure

Requirements

1. General

- 1.1 Yard course shall consist of clean, tough, durable fragments of crushed aggregate from quarry rock, free from an excess of flat, elongated, soft, or disintegrated pieces. It shall be of uniform quality and free from rock coated with dirt or other objectionable matter.

2. Physical Properties

- 2.1 Wear shall not exceed 30% in accordance with AASHTO T96 and ASTM C131.
- 2.2 When the crushed rock is subjected to 5 alternations of the sodium sulfate soundness test in accordance with AASHTO T104, the weighted loss shall not exceed 12% by weight.

3. Gradation

- 3.1 Sample aggregate shall be in accordance with ASTM D75/D75M.
- 3.2 When tested by means of laboratory sieves according to ASTM C136, grain size distribution shall conform to the requirements in *Table 1*.

Table 1: Grain size distribution requirements

US Standard Sieve Size	Percent Passing (by weight)
1-1/2"	100
1"	60 to 100
3/4" or 5/8"	0 to 35
3/8"	0 to 5

4. Fractured Faces

- 4.1 Only fractured quarry rock shall be used.

5. Resistivity

- 5.1 The minimum electrical resistivity shall be 3000 ohm meters when tested in accordance with the Bonneville Power Administration's ELMM-004, "Rock Resistivity Test Procedure," dated January 1, 1993.

6. Material Approval

- 6.1 Sources of crushed rock surfacing for use as yard course shall be inspected and approved by Puget Sound Energy prior to delivery of material.
- 6.2 Acceptance of material at the supplier's plant will not constitute final acceptance. Any material delivered to the job site or designated stock piles not meeting the specification requirements shall be rejected.
 - A. Taking material from the bottom of the supplier's stockpile shall be avoided to prevent an excess of small particles in the yard course.

Scope

This standard covers the quality and size of aggregate to be used for bedding drain pipes and culverts.

References

Aggregate shall meet the requirements of the latest revision of the following applicable national standards:

- AASHTO T176 - Standard Method of Test for Plastic Fines in Graded Aggregates and Soils
- WSDOT 9-03.12 (3) - Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction, "Crushed Surfacing"

Requirements

1. General

Gravel backfill for pipe bedding shall consist of crushed, processed, or naturally-occurring granular material. It shall be free from various types of wood waste and other extraneous or objectionable materials. It shall have such characteristics of size and shape that it will readily compact. This material is generally consistent with Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction, "Crushed Surfacing" 9-03.12 (3).

2. Gradation

2.1 When tested by means of laboratory sieves, grain size distribution shall conform to the following requirements:

US Standard Sieve Size	Percent Passing (by weight)
1"	100
1/4"	25 to 80
No. 200	15 maximum

2.2 Sand equivalent as determined by AASHTO T176 shall be greater than 27.

3. Material Approval

- 3.1 Sources of gravel backfill for pipe bedding shall be inspected and approved by Puget Sound Energy prior to delivery of material.
- 3.2 Acceptance of material at the supplier's plant will not constitute final acceptance. Any material delivered to the job site or designated stock piles not meeting the specification requirements shall be rejected.

■ Indicates additions or changes

Scope

This standard covers the quality and size of aggregate to be used as a filter backfill for perforated drains, dry wells, and other applications where free draining and filtering characteristics are required.

Requirements

1. General

Gravel backfill for drains shall consist of crushed or naturally occurring granular material. It shall be washed, if necessary, to render the particles free from clay. It shall not contain more than 1 percent clay lumps or other readily decomposed material.

2. Gradation

2.1 When tested by means of laboratory sieves, grain size distribution shall conform to the following requirements:

US Standard Sieve Size	Percent Passing (by weight)
2-1/2"	95 to 100
1/4"	30 to 60
No. 8	20 to 50
No. 30	8 to 30
No. 50	3 to 12
No. 200	0 to 1.2

2.2 That portion of the material retained on a 1/4 in. square sieve shall contain not more than 0.05 percent organic material by weight.

3. Material Approval

3.1 Sources of gravel backfill for drains shall be inspected and approved by Puget Sound Energy prior to delivery of material.

3.2 Acceptance of material at the supplier's plant will not constitute final acceptance. Any material delivered to the job site or designated stock piles not meeting the specification requirements shall be rejected.

■ Indicates additions or changes

Sand for Substation Oil Retention Area or Control Cable Installation

1275.1370

Scope

This standard covers the quality and size of sand to be used in constructing a substation oil spill retention area or installing around direct-bury control cables.

References

Sand shall meet the requirements of the latest revision of the following applicable standard:

WSDOT 9-03.1 (2) - Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction, "Fine Aggregate for Portland Cement Concrete" Class 1

Requirements

1. Material

- 1.1 Sand shall consist of well-graded inert material.
- 1.2 The material specified is generally comparable to fine aggregate for Portland cement concrete as specified in Washington State Department of Transportation Standard Specification for Road, Bridge, and Municipal Construction, "Fine Aggregate for Portland Cement Concrete" 9-03.1 (2), Class 1.

2. Gradation

- 2.1 Sand shall be well-graded from coarse to fine and, when separated by means of laboratory sieves, shall conform to the following requirements:

US Standard Sieve Size	Percent Passing (by weight)	
	Minimum	Maximum
3/8" Square	100	--
No. 4	95	100
No. 8	68	86
No. 16	47	65
No. 30	27	42
No. 50	9	20
No. 100	0	7
No. 200	0	2

3. Material Approval

- 3.1 Sources of sand shall be inspected and approved by Puget Sound Energy prior to delivery of material.
- 3.2 Acceptance of material at the contractor's plant shall not constitute final acceptance. Any material delivered to the job site or designated stock piles not meeting the specification requirements shall be rejected.

■ Indicates additions or changes

Scope

This standard specifies the sand to be used in backfill operations for gas pipe.

Standards

Sand shall meet the latest revision of the following applicable national standards:

- ASTM C33 – Standard Specification for Concrete Aggregates
- ASTM C40 – Standard Test Method for Organic Impurities in Fine Aggregates
- ASTM C136 – Standard Test Method for Sieve Analysis for Fine and Coarse Aggregates
- ASTM D2419 – Standard Test Method for Sand Equivalent Value of Soils and Fine Aggregates
- ASTM D2774 – Standard Practice for Underground Installation of Thermoplastic Pressure Piping
- Title 49 CFR – Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards

Requirements

1. Material

- 1.1 Sand shall consist of inert granular material, either naturally occurring or processed. It shall be free from wood waste, refuse, frozen soils, or other extraneous or objectionable materials.
 - A. The material shall not include recycled glass products.
 - B. Unwashed beach sand is not permitted.
- 1.2 The Sand Equivalent of the material shall not be less than 20.
- 1.3 Organic matter, by colorimetric test, shall not be darker than the referenced standard color (organic plate No. 3) in ASTM C40, unless another test proves a darker color to be harmless.

2. Gradation

- 2.1 Sand shall be well graded from course to fine. When separated by means of laboratory sieves, grain size distribution shall conform to the ASTM C33 “Fine Aggregate” requirements in *Table 1*.
 - A. Sand meeting ASTM C33 is commonly referred to as “Builder’s Sand” or “Building Sand” at supplier locations within the PSE service territory.
- 2.2 Material having no greater than 10 percent of its mass passing through the U.S. No. 200 sieve is permitted as an exception to ASTM C33.

Table 1: Grain size distribution

Sieve Size	Percent Passing (by weight)	
	Minimum	Maximum
3/8"	100	--
U.S. No. 4	95	100
U.S. No. 8	80	100
U.S. No. 16	50	85
U.S. No. 30	25	60
U.S. No. 50	5	30
U.S. No. 100	0	10
U.S. No. 200	0	7

3. Inspection and Material Acceptance

- 3.1 Gradation test results for sand shall be provided to Puget Sound Energy upon request.
- 3.2 Acceptance of material at the supplier’s plant will not constitute final acceptance. Any material delivered to the site or designated stock piles not meeting the specification requirements shall be rejected.

Scope

This standard covers the proper mixing and placement of flowable grout for non-dynamic structural base plates.

Safety

Wear a respirator or dust mask when mixing grout. Grout contains silica sand which is harmful if breathed into the lungs. Be careful not to breathe the dust.

Do not let grout contact skin as it can cause alkali burns. If contact occurs, wash with soap and water to remove from skin.

Do not wear contact lenses when mixing grout.

If grout or dust from the grout enters the eyes, flush with water for 15 minutes and seek medical attention.

Remove clothing that has contacted grout and wash before re-use, to avoid prolonged grout contact with skin.

Tools, Equipment, and Materials

- Grout – Master Builders Construction Grout or Masterflow 928, or approved equivalent
 - Curing Compound – BASF Kure-N-Seal WB, or approved equivalent
 - Water – suitable for drinking
 - Forms – wood, aluminum, or steel angle
-

Requirements

Remove all laitance (white surface scum) down to sound concrete.

Surface to receive grout shall be rough, reasonably level, and saturated with water 24 hours prior to grouting.

Remove all oil, grease, dirt, standing water, and loose particles from the surface of the concrete, the anchor bolts, and the underside of the baseplate.

Procedures

Building the Form

Follow these steps to build a form.

Step	Action
1	Build a strong, tight form from non-absorbent material, braced so it will not leak or buckle under the weight of the grout. Typical form construction examples are shown in <i>Figures 2 through 5</i> . <i>NOTE:</i> The form must be water-tight at the base when using grout at a fluid consistency. The following caulking compounds are acceptable: damp sand, styrene beading, grout mixed at a damp pack consistency, commercial caulking, silicon-sealant, or putty.
2	Allow a minimum horizontal clearance of 1 in. between the form and the baseplate on all sides to allow for expulsion of air and saturation water.
3	Extend the form vertically 1 to 2 in. above the underside of the baseplate; except extend the placing side 6 in.
4	Mount a 45° slanted header board on the placing side (<i>Figure 2</i>).

Vertical pressure shall be applied to the form to keep it from rising while placing the grout.

Mixing the Grout

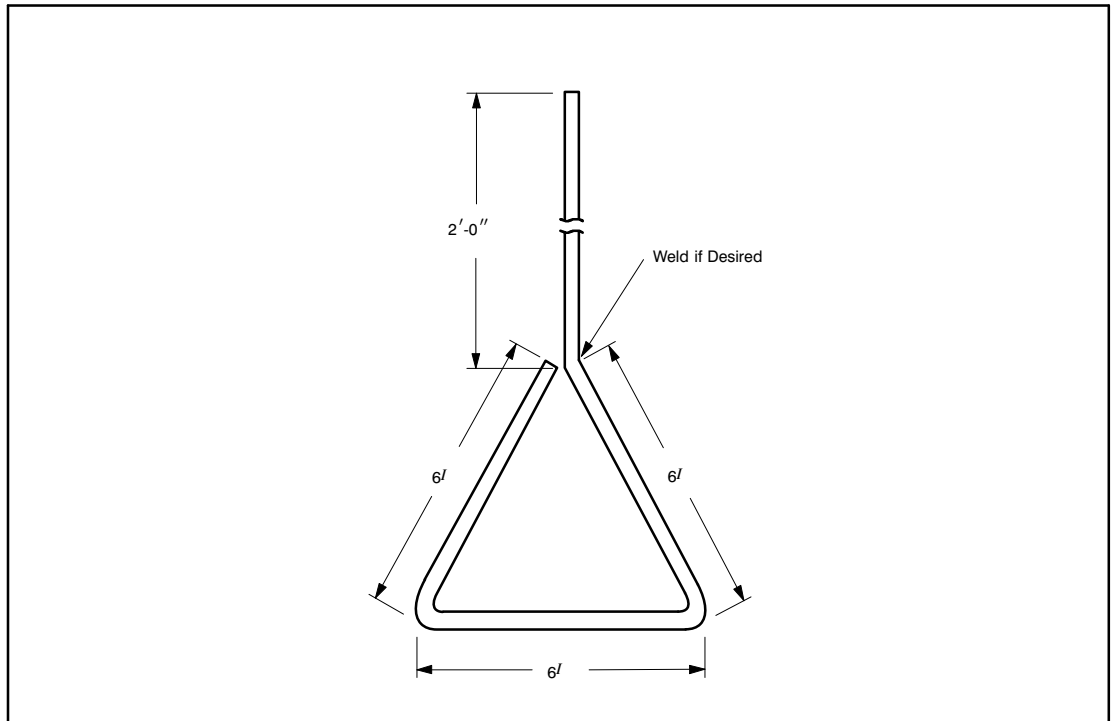
Follow these steps to mix the grout. Be sure to:

- Have enough mixers on hand to maintain continuous pouring despite a breakdown.
- Mix as closely to the grouting area as possible. Provide easy access; placing *must* be continuous once it starts.

Step	Action
1	Put all water in a mixer or pail and add grout in a <i>slow</i> , steady stream. <i>NOTE:</i> Do not exceed the manufacturer's recommended amount of water in any situation. Water temperature must be between 50° and 80° F.
2	Using a variable speed drill with a mixing bit made from ½-in. round stock or #4 rebar (<i>Figure 1</i>), mix the grout. <i>Do not mix by hand!</i> Mix grout a minimum of 5 minutes after all material and water is in the mixer. <i>NOTE:</i> Never re-temper grout.

Figure 1

Mixing bit detail



Placing the Grout

Follow these steps to place the grout.

NOTE: Place grout at temperatures between 50° and 80°F, and maintain for a period of 24 hours; thereafter, maintain above 40° F for another 24 hours. Newly placed grout must not freeze.

Step	Action
1	All free standing water shall be removed from the foundation surface.
2	Pour grout onto the slanted form (headboard) to prevent entrapment of air under the baseplate. Place grout from one side only to prevent air or water entrapment. Apply vertical pressure to the form to keep it from rising while placing the grout. Do <i>not</i> pour grout to a level above the bottom of the baseplate. The airway to the interior of the structural column must remain open to allow accumulated moisture to drain.
3	NOTE: Never vibrate or overwork grout. If strapping is necessary, insert steel strap from the header board to the opposite side and from other points as needed to encourage grout flow as the form fills.
4	Remove the header board after the grout reaches its initial set.

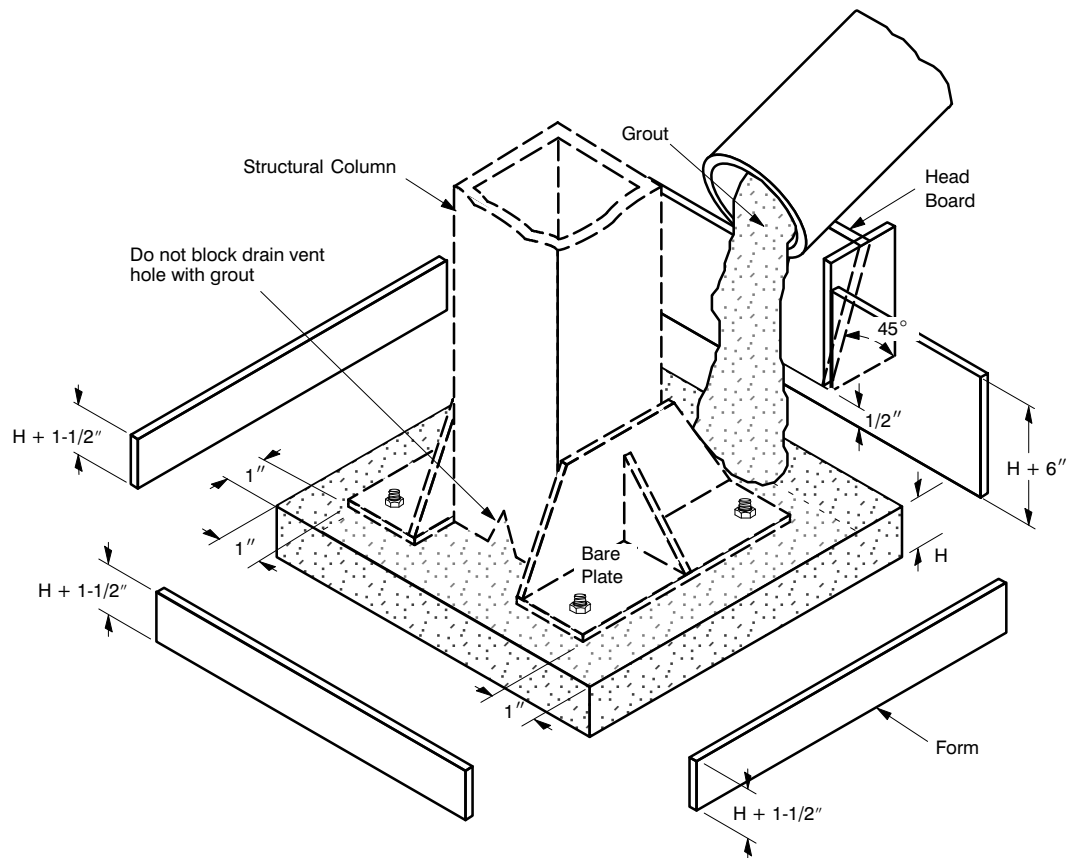
Curing the Grout

Follow these steps to cure the grout.

Step	Action
1	Cover exposed grout with clean, wet rags and maintain this moisture for 24 hours. Curing paper or plastic sheeting may be used to help maintain moisture.
2	Cure the grout a minimum of 48 hours.
3	Strip the forms.
4	Apply an approved curing compound with a short-napped roller or sprayer, according to the manufacturer's recommendations.

Figure 2

Structure with angle baseplate



Grout Edge Detail

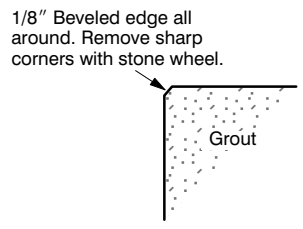


Figure 3

Structure with solid, square, or rectangular baseplate, i.e., with no opening through baseplate to interior of structural column.

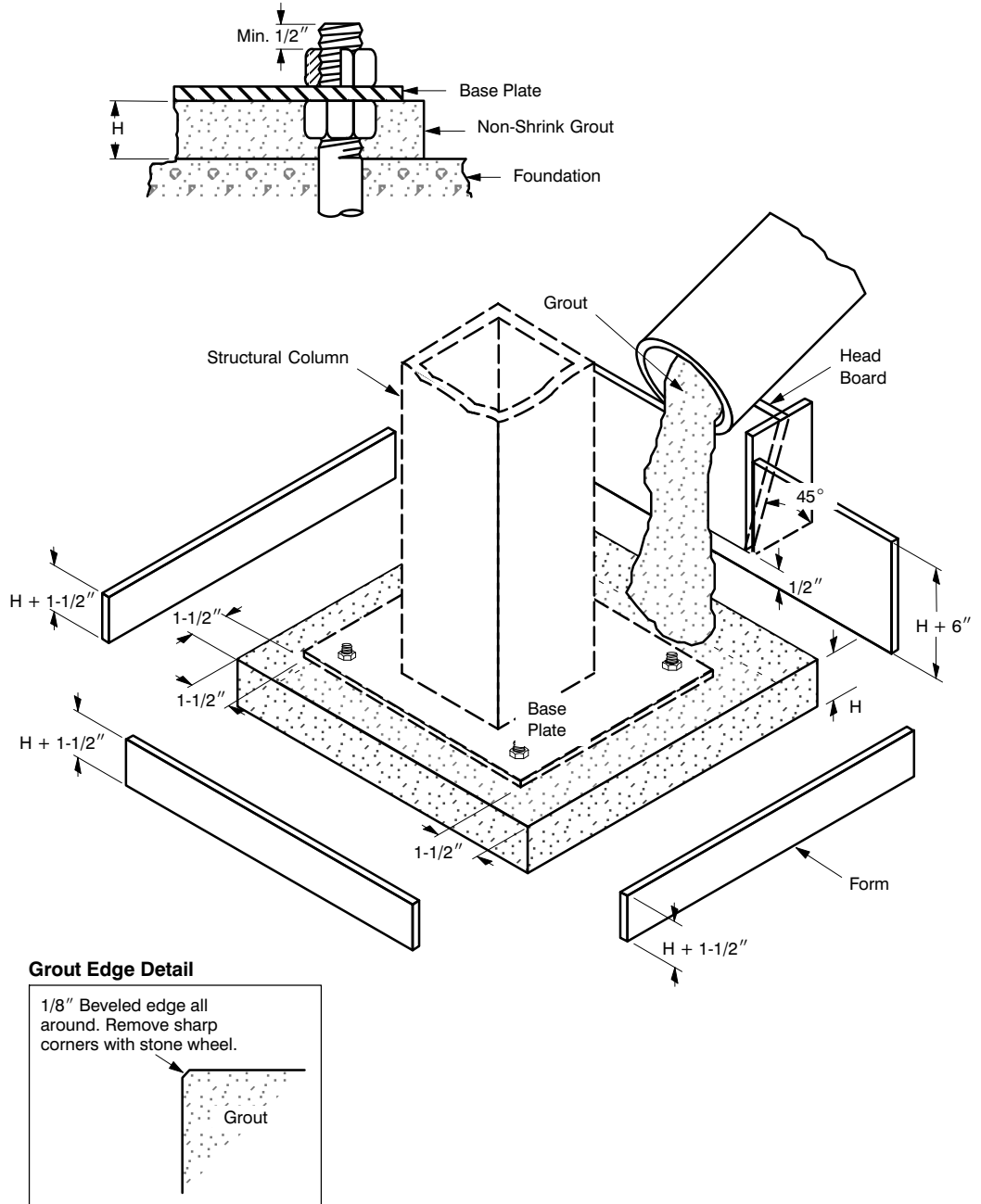


Figure 4

Structure with open, square, or rectangular baseplate

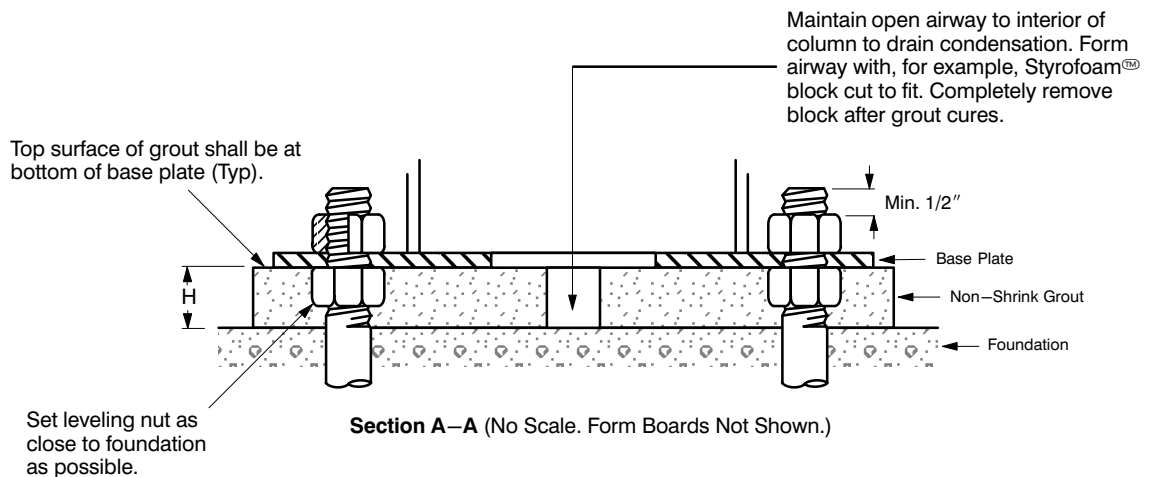
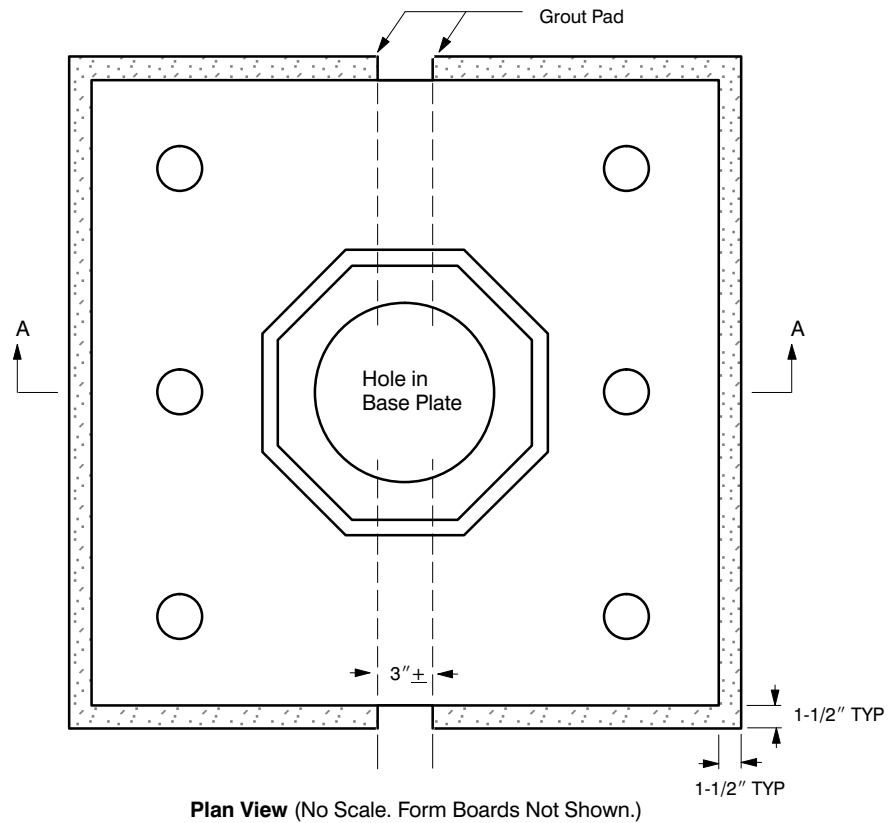
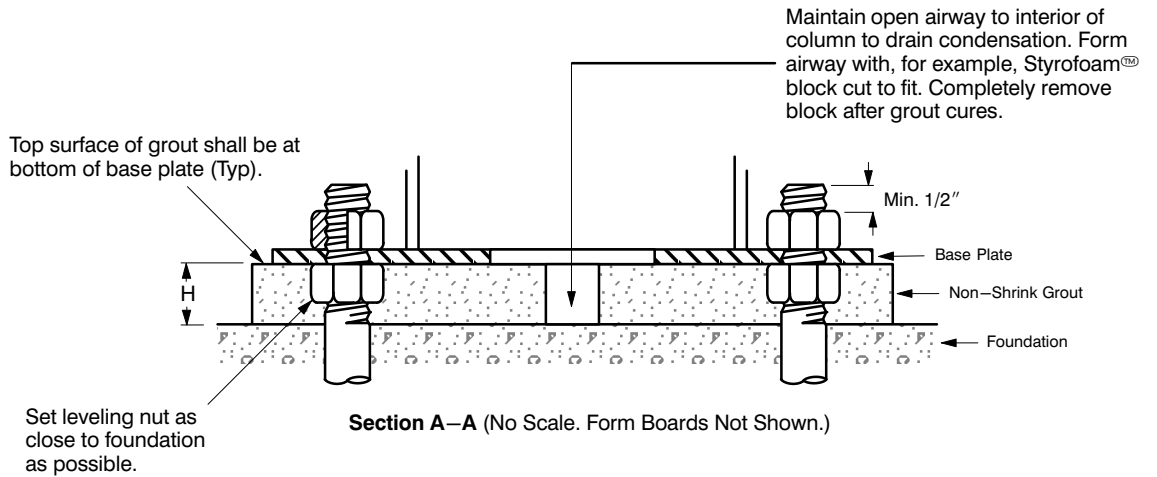
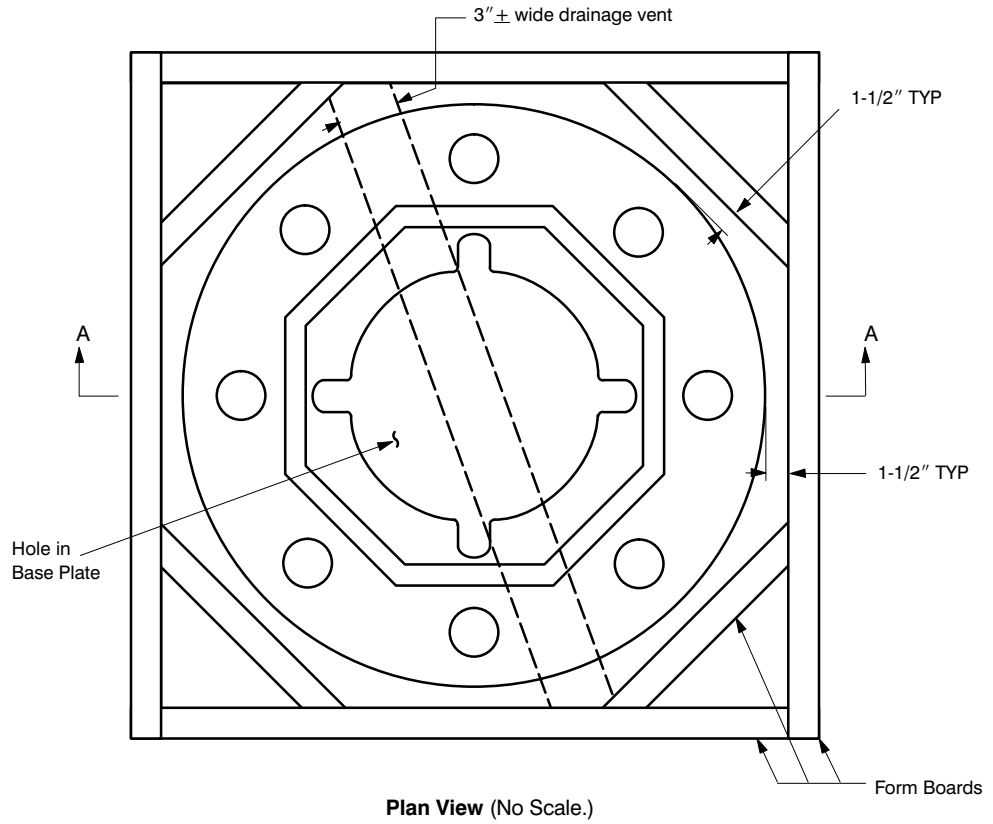


Figure 5

Structure with open, circular baseplate



Installation Requirements for Deformed Steel Reinforcing Bars

8350.2150

Scope

This standard covers the installation requirements for deformed steel reinforcing bars in reinforced concrete or masonry construction.

Requirements

All reinforcing bars used for this application shall conform to the latest revision of ASTM A-615 and shall be Grade 60 unless otherwise specified in PSE standards or drawings.

Fabrication tolerances, bending, and placement of reinforcing bars shall be in compliance with the latest revisions of ACI 318 and the CRSI Code of Standard Practice.

Reinforcing bars shall be free from loose mill scale, flaking rust, mud, oil, grease, or paint at the time of installation.

Reinforcing bars shall be supported in the position shown on the drawing by means of concrete blocks or steel chairs designed for this purpose.

Reinforcing bars shall be tied with steel wire to maintain the spacing and clearance shown on PSE standards or drawings.

There shall be no welding of reinforcing bars at laps or intersections unless specified on PSE standards or drawings.

References

The following Puget Sound Energy document applies to this standard:

8350.2200 Installing Concrete

Sources

ACI 318
ASTM A-615
CRSI Code of Standard Practice

Scope

This standard covers the installation of anchor bolts to be used for securing structures to concrete foundations.

Requirements

General Requirements

All anchor bolts used in this application shall conform to ASTM specifications, including grade, diameter, and length specified on design drawings. Each anchor bolt shall be supplied with heavy hexagon nuts as specified on design drawings.

Anchor bolts and nuts shall be hot-dip galvanized according to the latest revision of ASTM A153. The entire bolt shall be galvanized, unless otherwise specified on design drawings. Welding shall not be permitted on anchor bolts unless specifically required on the design drawing.

Enlargement of base plate anchor bolt holes or bending of the anchor bolts shall not be permitted.

Installation Requirements

The entire portion of the anchor bolt projecting above the surface of the concrete shall be threaded. Anchor bolts shall be accurately located to within 1/16 in. of their design locations prior to the placement of the concrete.

Templates shall be used to maintain bolt locations within 1/16 in. during concrete placement. Bolts shall be secured in a vertical position by nuts above and below the template.

Concrete shall be placed so as not to tilt or laterally displace the anchor bolts (i.e., vibrators may be used to consolidate the concrete but shall not be used to transport it laterally within the forms).

References

The following Puget Sound Energy documents apply to this standard:

8350.2150	Installation Requirements for Deformed Steel Reinforcing Bars
8350.2200	Installing Concrete

Sources

ASTM A153

Scope

This standard covers the requirements for placing ready-mix structural concrete.

Requirements**Site Conditions**

The depth of foundation belowgrade is shown on the plans as a minimum dimension.

In all cases, the foundation shall be set on firm soil, and the excavation shall be completely dewatered. Unsuitable material or frozen soil shall be removed and replaced with compacted select structural fill or crushed rock.

Foundation Forms

Forms shall be coated with form oil, braced to prevent any motion during the placing of concrete, and shall be at the correct grade and orientation shown on the plans.

The entire depth of the foundation shall be formed unless otherwise shown on drawings.

Remove forms after concrete has set for a minimum of 24 hours, or as directed by the Engineer.

Aluminum Conduit

Aluminum conduit and other aluminum materials corrode in concrete and shall not be used.

Mixing and Placing

Concrete shall be mixed and placed in accordance with the latest standards of the American Concrete Institute, Specification ACI 318, which shall be adhered to in addition to any local building codes.

As a general rule, concrete shall be placed and consolidated within 1-1/2 hours after the introduction of the mixing water.

Per the latest version of ATSM C1064, should more than 1-1/2 hours be required, the temperature of the concrete continuously observed shall not exceed 90°F prior to placement and consolidation. Concrete not meeting this criteria shall be rejected.

Finish and Cure

Concrete shall be evenly distributed along the form and shall be vibrated to work the concrete into corners of the form and around all steel and anchor bolts. Excessive vibration shall be avoided to prevent segregation of the materials in the concrete.

The foundation shall be finished with a wood screed and tooled along the edges. After the initial set has occurred, apply a light broom finish to provide a non-slip surface.

After finishing and brooming the concrete surface, apply an approved concrete curing agent. This prevents moisture from escaping the surface too rapidly during the curing process and ensures the concrete properly develops strength.

Additionally, in windy or hot weather conditions, securely cover the foundation with white plastic sheeting. Keep covered for three days unless directed otherwise.

If there is any possibility of the ambient temperature going below the freezing point within three days after placing the concrete, securely cover the top and sides of the foundation with insulating blankets.

References

The following Puget Sound Energy documents apply to this standard:

8350.2150	Installation Requirements for Deformed Steel Reinforcing Bars
8350.2200	Installing Concrete

Sources

ACI	318-05	Building Code Requirements for Structural Concrete
------------	--------	--

ATSM	C1064	Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete
-------------	-------	---

APPENDIX B

SUBMITTAL LOG

Submittal Log

Project: Long Lake Substation
 Contractor: _____
 PSE CM: Randy Walls/Tom Kerfonta

Updated: 02/13/2012

Note: Submittals are due at least two weeks prior to installation.

Submittal #	Spec Section	Review Engr	Description	** Due Date	Date Received	Response Date	Response Action	Comments
Refer to General Requirements								
	1300		Submittals					
	1600		Schedule of receipt of OWNER furnished material					Not applicable
	1600		Plan for loading & unloading the transformer, MPAC &/or switchgear					Not applicable
	1640		Substitutions and product options (Civil construction based)					
Refer to Civil Technical Specification								
	2220		Subbase fill (embankment)					
	2225		Pipe bedding					
	2231		Base Course					
	2231		Yard Course					
	2231		Top Course					
	2275		Riprap					
	2722		Storm pipe					
	2722		Perforated pipe					
	2722		Catch basins, metal frame and grate if desired					
	2731		Rock containment system					
	2810		Landscaping and Irrigation Systems					Not applicable
	2831		Chain link fence and gates (all materials, posts, wire fabric, etc.)					Not applicable
	3200		Rebar shop drawings					
	3300		Concrete mix design					
	3300		Concrete curing agent					
			Thermal backfill (for feeder conduits)					Not applicable
			Geotextile					Not applicable
	3602		Non-Metalic Grout					
	5091		Welder's Qualifications					Not applicable
	9905		Galvanizing Repair					
	PC29		Construction Record Drawings					
Refer to Electrical Technical Specification								
	16124	Electric	Cable Pulling Calculations					Not applicable
	16999	Electric	Detailed Test Procedures					Not applicable
	16999	Electric	Test Reports					Not applicable

Note: This list may not be all inclusive and the contractor is responsible for all submittals required under their contract with PSE.