

Appendix H. Erosion Control Plan

The following changes between the Draft and Final Environmental Impact Statement were made to Appendix H.

- A revised Appendix H: Erosion Control Plan has replaced the former Erosion Control Plan providing additional Project Design Criteria.

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Table H-1: Fish-bearing Streams Identified for Avoiding Ground Disturbance within them

Stream	Description	
East Fork Coquille River	East Fork Coquille Watershed	place on 2 bridges
Brummit Creek	East Fork Coquille Watershed	directional-drill
China Creek	East Fork Coquille Watershed	in road over culvert
Steel Creek	East Fork Coquille Watershed	place on bridge
Hantz Creek	East Fork Coquille Watershed	in road over culvert
Cherry Creek	East Fork Coquille Watershed	directional-drill
Middle Creek	East Fork Coquille Watershed	place on bridge
North Fork Coquille River	North Fork Coquille Watershed	directional-drill
Panther Creek	Lower Coos River/Coos Bay Watershed	in road over culvert
Cardwell Creek	Lower Coos River/Coos Bay Watershed	in road over culvert
Catching Creek	Lower Coos River/Coos Bay Watershed	directional-drill
Isthmus Slough	Lower Coos River/Coos Bay Watershed	directional-drill
Shinglehouse Slough	Lower Coos River/Coos Bay Watershed	directional-drill
Coal Bank Slough	Lower Coos River/Coos Bay Watershed	directional-drill
Blossom Gulch	Lower Coos River/Coos Bay Watershed	directional drill

Best Management Practices (BMPs)

BMPs are measures used during construction activities to minimize potential impacts to the aquatic environment to the point where those impacts become negligible. The BMPs for the proposed actions are as follows:

Prior to activities, apply an additional lift of rock to the area of road that can influence the stream if rill erosion is evident in the road tread near live stream crossings.

Contain any offsite movement of sediment from the road or ditchflow near streams using silt fence or sediment entrapping blankets. Such control measures must allow for the free passage of water without detention or plugging. These control structures and applications should receive frequent maintenance and will be removed upon completion of that pipeline construction segment.

All construction operations will utilize sediment barriers along the CBW Road corridor where needed and within 100 feet of all streams when working in the utility corridor.

All stream crossings, except Rock Creek, Morgan Creek and Tenmile Creek, and other streams with very low flow, will be directionally-drilled, trenched in road fill or have the pipe placed on bridges to avoid sedimentation impacts.

Environmental Compliance Representative

The County has appointed Paul Slater the Environmental Compliance Representative to administer the ECR. He will specify erosion control plan controls and modifications, and perform environmental monitoring to ensure the BMPs and PDCs of the ECP are being implemented and that water quality is being maintained.

Active Stream Crossing Project Design Criteria (PDC)

PDCs are preventive measures applied to project activities to minimize potential detrimental effects to proposed, listed, or candidate species. For the purpose of this ECP, PDCs are in effect BMPs in order to meet the objectives of the Endangered Species Act (ESA) and the Clean Water Act (CWA).

Minimization and Avoidance

BMPs for surface and shoulder activity types will include Management of Oil, Grease, and Fuels:

- Fuel will not be used as a releasing or cleaning agent.
- A spill containment plan will be in place prior to the start of the project.
- No refueling is permitted within 25 ft. of stream crossings.
- The contractor shall have ample absorbent blankets and other clean-up materials on site in case of an accidental spill.
- Using environmentally sensitive cleaning and releasing agents.
- Using heat sources to heat and clean tack nozzles during operations.
- Carrying adequate erosion control supplies and keep materials out of water bodies.
- Disposing of excess material at appropriate sites, depending upon material being disposed (Disposal would be approved by ECR).

Timing

All stream channel crossing work shall take place during the "In-Water Work Period" of July 1 through September 15. Work outside of streams including excavating, trenching work, re-filling of trenches, clean-up and restoration activities should be completed during the dry season (June-October). Any work undertaken outside of this period will need more substantial ECP controls in order to retain soil material on site and not exceed the State water quality standards.

Transportation Corridor

Excavated soil material should be placed on the outside of the roadway away from the ditch line. Soil material that is stockpiled in this manner for more than 7 days should be covered with plastic sheeting. Silt fence, bio-filter bags or sediment entrapping blankets should be used around all stream channels, springs, wetlands or roadside ditches where disturbance soil material could be mobilized and enter a drainageway or wetland by rainwater. The onsite environmental compliance representative could excuse some of these requirements if no precipitation is forecast for the next seven days (summer conditions). If vegetation is removed from the road shoulders during clean-up of soil material, these areas should be grass seeded, fertilized and mulched with certified weed free straw at the minimum application rate of 2500 lbs. per acre.

The road disturbance areas will be storm proofed by compacting the ditch and road surfacing with crushed rock, such that sediment will not enter ditchlines, catch basins or stream channels. New paving or repaving the Coos Bay Wagon Road will not be completed the same season of disturbance. All disturbed areas will be grass seeded, fertilized and mulched with certified weed free straw at the minimum application rate of 2500 lbs. per acre.

Grade control culverts, removed for pipeline installation, shall be replaced. Inlets and outlets, and a minimum of 50' of ditch line that feeds the culvert should be open, not constricted and free draining.

Soil Material Management on Steep Slopes

Excavated soil material and other disturbance will be managed on steep slopes (>30%) so that land resources will not erode, causing rilling or gullying and/or enter a stream channel. Contour sediment fences will be used where needed. Drivable waterbars or inverted waterbars (referred to as flavels) on the access roads may be needed and frequency will be determined by the slope angle and soil properties. The intent of these controls is to curtail rilling and gullying on the tread of these steep access roads. Soil material that is stockpiled for more than 7 days will be covered with plastic sheeting. Benches developed for pipeline construction will be constructed with regard to natural contours. All disturbed areas will be grass seeded, fertilized and mulched with certified weed free straw at the minimum application rate of 2500 lbs. per acre.

Borrow/Stockpile Sites

All borrow or stockpile sites will be identified prior to the start of the project and cleared by the ECR. Borrow or stockpile sites shall be placed outside of riparian areas as much as possible. Where appropriate, the sites will be graded, seeded, fertilized and mulched at a minimum application rate of 2500 lbs. per acre with certified weed free straw at the closure of the project.

Utility Stream Crossing

Definition: A strategy for crossing small waterways when in-stream utility construction is involved.

Purposes:

- 1) To prevent sediment from entering the stream from construction within approach areas.
- 2) To minimize the amount of disturbance within the stream and riparian area.

Conditions Where Practice Applies: Generally applicable to small perennial and intermittent streams with drainage areas less than 130 hectares (ha), 320 equivalent acres. Methodology for crossing streams with larger drainage areas or to avoid designated sensitive crossings, will be directional-drilled, hanging pipe on bridge or trenching above culverts on CBW Road fill.

Planning Considerations: Directionally-drilling a pipe below the streambed, which would avoid disturbance within the watercourse, is the preferred method if it is practical. However, in cases where it is impractical and where in-stream work is unavoidable, consideration must be given to providing adequate mitigation of sediment loss while minimizing the amount of encroachment and time spent working in the channel. There is some “give and take” as far as the installation of controls.

Sometimes there is less damage to the environment created by providing substantial controls for the approach areas and by refraining from installing extensive measures in the stream itself. However, if the installation of the pipeline within the streambed and its banks will take an extended period of construction time (more than 10 hours), substantial in-stream controls or stream diversion is necessary to prevent excessive sedimentation damage. For the action alternatives, all stream-crossings that will not be directionally-drilled will take far less than the 72-hour recommendation for utility line crossing using the “Bag and Flume” technique. The “Bag and Flume” method utilized in pipeline construction will take approximately 6-8 hours per stream crossing. The following is the method the action alternatives would use for dealing with utility stream crossings; these criteria allow for “work in the dry” conditions to prevent sedimentation in flowing streams:

Crossing Streams

There are four types of stream crossings: 1.) Culvert in Road; 2.) Trench using the bag & flume method, 3.) Bridge; and 4.) Directional Drill.

Stream Crossing Above A Culvert

The Coos Pipeline will be routed along county roads for approximately 33 miles. Those roads cross about 120 inventoried streams, most of which are very small ephemeral drainage channels, 1-3 ft in width and dry most of the year. Approximately 105 of those channels cross the road through culverts, typically 24” corrugated metal pipe (CMP) culverts about 30 ft long.

A few of the culverts have enough soil coverage to allow the pipeline to cross above the culvert. Bills Creek and Hantz Creek are typical examples, where the culvert is 4 to 8 ft below the road surface. This is the preferred method of crossing with the least impact to the drainage channel. When the pipeline can cross above the culvert:

1. Plan to finish a culvert crossing in one day. The culvert must be intact overnight, or when rain is forecast.
2. Excavate pipeline ditch below the road surface, typically 30" wide and deep enough to allow 36" of cover above the pipe.
3. Allow at least 12" clearance between the pipeline and the CMP. The pipeline and CMP must not touch.
4. If 36" of cover above the pipe to the road surface is not practical, then the pipe can be protected with low-strength concrete or other suitable protection. In no case shall the depth of cover be less than 24" to top of pipe. Backfill and compact as necessary to road authority specifications.

Stream Crossing Under A Culvert

Most of the culverts have only 18-24" of soil coverage, which is not enough to allow the pipeline to cross above the culvert. Many of these culverts are in poor condition and would have to be replaced in the next 10 years. When the pipeline does not have clearance to cross above the culvert:

1. Plan to finish a culvert crossing in one day. The culvert must be intact overnight, or when rain is forecast.
2. Excavate normal pipeline ditch to within 15 ft of the culvert. The normal trench is typically 30" wide and deep enough to allow 36" of cover above the pipe.
3. Determine whether or not the culvert should be replaced. Factors include whether the culvert is under-sized (eg less than 24"); bent, crushed or damaged, especially at the ends, and whether the steel pipe is starting to rust and show through the galvanized zinc coating. The ECR will make the decision to replace. If so, the culvert should be replaced with an appropriately sized culvert to match the estimated water flow, and approximately the same length as the existing pipe (as approved by the ECR.)
4. Strip out the old culvert pipe and remove it. This will typically require an excavation 36" wide by the depth of the existing pipe, across the full width of the road. If the existing culvert is adequate and will not be replaced, the pipeline can be tunneled under the culvert.
5. Complete the pipeline ditch through the culvert area, deep enough to allow at least 12" clearance between the pipeline and the CMP.
6. Install the pipeline in the ditch through the culvert area and shade the pipe, with a 12" clearance to the expected finish grade of the culvert. The pipeline and CMP cannot touch.
7. Install the new culvert on the appropriate skew and grade. If necessary, run pipeline test wires to a test station at the uphill side of the road for cathodic protection or line location. Backfill and compact as necessary to road authority specifications.
8. It is desired that, if practical, any new culvert be installed on grade as "fish-friendly". In all such work around culverts existing and new, it is critical that the footprint of the road not be changed. That is, the pipeline construction and culvert replacement work must be done without adding fill to the creek bed.
9. Apply erosion control measures as necessary to the sides of the road and inlet / outlet of the culvert.

Trench Across Stream

If a stream is not flowing water and no immediate rain is forecast, no sediment control is required. If a low flowing stream can be crossed in a manner such that turbidity is not increased for more than 2 hours, no sediment control is required. Otherwise, controls will be put in place before construction begins. If there is no turbidity disturbance downstream in 2 hours, then no bag and flume or any method of sediment control is required. The Environmental Compliance Representative must approve any stream crossing where no sediment control is planned. For such trenched stream crossings, the sides of the stream will be cut back and the stream channel widened to a 1 to 1 ½ slope. After the trench is through the stream, rocks will be installed over the pipe trench if necessary to stabilize the ditch. The stream sides will then be recontoured to original shape.

The stream will be restored within the active stream channel by using the size rock in the streambed that is the typical stream armor layer. Banks above the active channel will be reshaped with like soil material and compacted to the

original configuration. The cross section channel geometry will be similar to the preexisting condition. Bank stabilization may include the use of soil material, rock or large wood or root wads. Where trees or vegetative root structure is removed, tree plantings in the next dormant season may be appropriate.

Any fill or constructed benches within riparian areas or within 100 feet of a stream channel on steep slopes (>30%) will be pulled back to a natural ground configuration.

If a stream crossing involves any amount of water and the crossing time will exceed 2 hours, the "bag and flume" specification will apply. Controls including the rerouting of water will be in place prior to trenching activities. Under DEQ's turbidity water quality guidance, adequate controls will be in place to meet the 401 certification requirements.

- Filter cloth should be used in the construction of the utility crossing.
- If there are trapped fish, the fish should be removed and placed in another part of the stream (ODFW will be contacted to remove fish.).
- Water diverting structures ("Bag and Flume") should be used at all trenching and/or construction road approaches 30 meters (100 feet) on either side of the crossing.

For "Bag-and-Flume" Stream Trenching:

1. The drainage area should be no greater than 130 ha (320 acres).
2. Filter cloth should be used in the construction of the pipeline crossing.
3. If there are trapped fish the fish should be removed and placed in another part of the stream.
4. Water diverting structures should be used at all trenching and/or construction road approaches 30 meters (100 feet) on either side of the crossing.

"Bag and Flume" Construction Specifications: The bag & flume crossing method will be used when in-stream construction will last more than 2 hours and less than 72 hours, and stream is narrow, making "directional-drilling" construction impractical. This will be the method used to trench flowing streams (Figure H-1). If there are trapped fish they should be removed and placed in another part of the stream. Diverted water will be put back into same stream as close to the culvert as possible. The amount of stream to be dry will be the minimum necessary to perform work.

The flume pipe crossing must be made operational prior to the start of construction in the stream. A large flexible flume pipe of an adequate size to support normal water channel flow shall then be installed in the streambed across the proposed action's trench centerline. Sandbags shall be placed close to each end of the flume pipe so as to dam off the creek forcing the water to flow through the flume pipe (Figure H-1).

The entrapped water can then flow from the creek within the dammed-off area and in the trench centerline back into the bypassed stream. The trench can then be dug adjacent to the flume pipe. The pipe sections will then be installed to the proper depth. After pipeline sections are installed, the ditch will be back-filled and restabilization shall be carried out. Turbid water in newly dug trenches will be pumped onto a vegetative floodplain or gentle hillslope, where it can filter-out fine sediments naturally.

The stream will be restored within the active stream channel by using the size rock in the streambed that is the typical stream armor layer. Banks above the active channel will be reshaped with like soil material and compacted to the original configuration. The cross section channel geometry will be similar to the preexisting condition. Bank stabilization may include the use of soil material, rock or large wood or root wads. Where trees or vegetative root structure is removed, tree plantings in the next dormant season may be appropriate.

After completion of back-filling operation and restoration of stream/creek banks and leveling of streambed, the flume pipe can be removed. The gravel can be removed or spread in the streambed depending on permit requirements. Sediment control in approach areas shall not be removed until all construction is completed in the stream/creek crossing area. All ground contours shall be returned to their original condition.

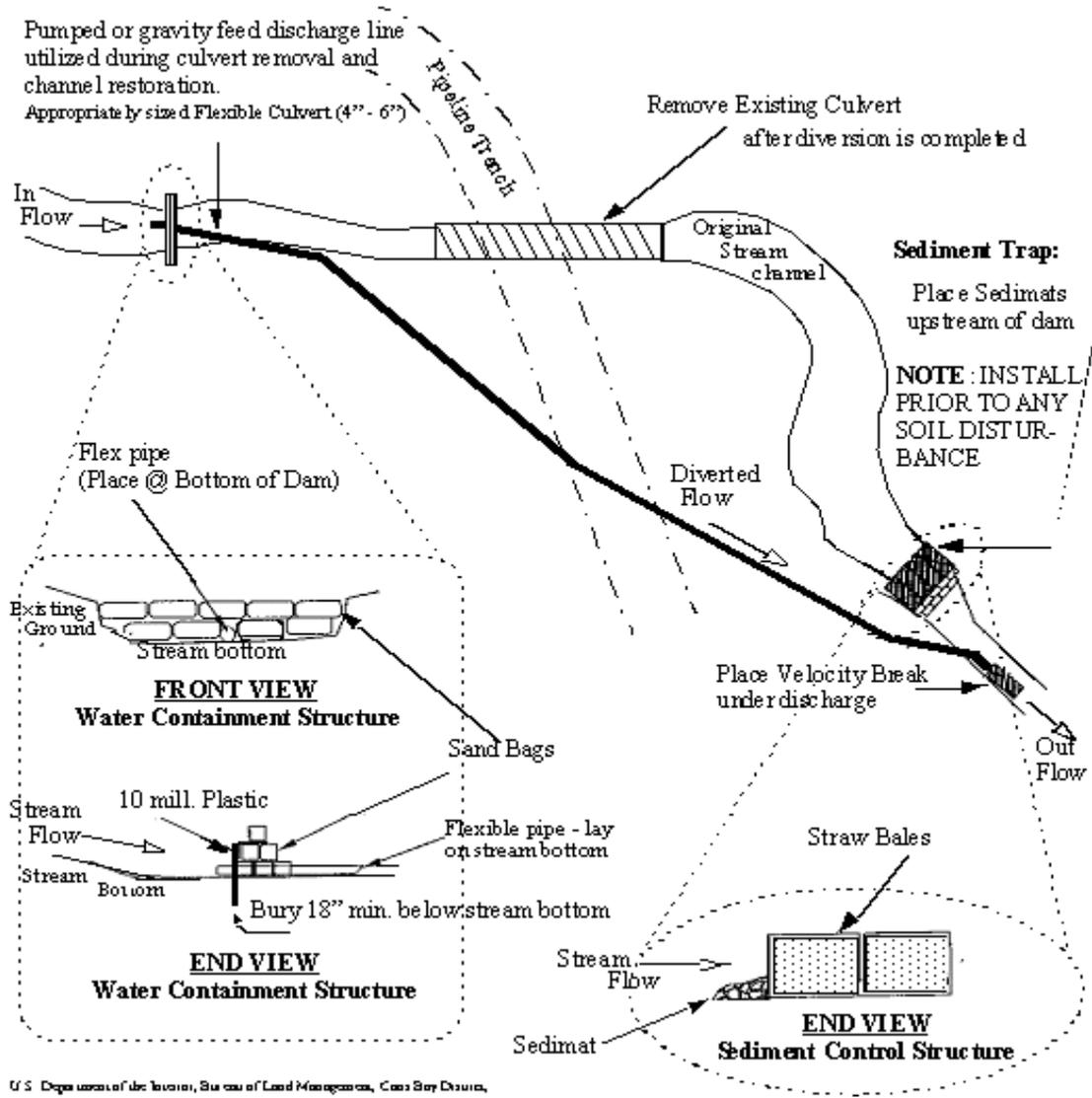


Figure H-1: Stream Crossing: Trenching across an active stream bed

Bridge Crossings

The pipe will be hung by specially designed hangers along side and beneath a bridge at road crossings on fish habitat streams to ensure uninterrupted upstream and downstream movement of all aquatic species. Water velocity is generally the most critical factor during the time of year that fish require access to spawning and rearing areas.

Directional Drilling

Directionally-drilling a pipe below the streambed, which would avoid disturbance within the watercourse, is the preferred method if it is practical. The drilling operations, including fluid pits, will be located well outside of riparian areas. Fluid pits will be lined. Any residual material will be disposed of at an approved upland site. When drilling operations are completed fluid pits will be filled in, recontoured, and revegetated. An illustration of the directional-drilling method is given in Appendix J of the FEIS.

Maintenance

Care must be taken to inspect any stream crossing area at the end of each day to make sure that the construction materials are positioned securely. This will ensure that the work area stays dry and that no construction materials move downstream. The ECR will inspect work periodically to ensure compliance with this ESCP and all local, state, and federal laws.

Project Design Criteria for Culvert Installation and Removal

- The ODFW in-stream work period for the proposed action is shown below. Needs for working outside these time periods would be approved only on a site specific basis with ODFW concurrence. These dates apply to any intermittent or perennial channel showing annual scour, as defined by the Northwest Forest Plan:

Coquille River	July 1 - September 15
Umpqua River	July 1 - September 15

- Bridges, bottomless culverts and pipe arches in descending order of preference should be used at road crossing on fish habitat to ensure uninterrupted upstream and downstream movement of all aquatic species. Water velocity is generally the most critical factor during the time of year that fish require access to spawning and rearing areas. ECR will approve structure type and design specifications on a site specific basis.
- At all “Bag and Flume” stream crossings, the approach will be as near a right angle to the stream as possible to minimize disturbance to streambanks and riparian habitat.
- Road crossings on all fish-bearing streams will be designed to maintain natural streambed substrate and site gradient, while minimizing long-term maintenance needs.
- Width of a crossing structure should be at least as wide as the mean bankfull width at the crossing site; to be measured by the ECR. A structure less than bankfull width will constrict high streamflow and increase water velocity, resulting in scour at the outlet (perching), little to no deposition of streambed substrate in closed bottom structure and possible velocity barrier to fish.
- Divert the streamflow around the work area in a manner (e.g., a pipe or lined ditch) that will minimize stream sedimentation. Stream flow will be returned to channel at first available point on downstream end of work area to minimize the length of dry channel. The diverted stream should not be returned to the channel through the project area until all in-stream work has been completed.
- Reduce movement of sediment downstream from the project site with the use of straw bales, geotextile fabric or coconut fiber logs/bales immediately downstream of the work area.
- Wet or green (wet: fresh enough to flow; green: hardened but less than 21 days old) cement and new or old asphalt have acute and chronic adverse effects on aquatic life and should not be allowed to enter a stream. This includes water used to clean tools. If the stream is de-watered before construction begins, aquatic species will be unaffected.
- Maintain aquatic connectivity on non fish-bearing streams to ensure upstream and downstream movement of other (non-fish) aquatic species.
- Bare soil areas will be mulched with hydro-seeding, weed-free straw, bark chips, etc. and native seed or other

approved seed mix prior to fall rain or when moisture conditions are appropriate to discourage invasion of noxious plant species and to reduce soil erosion.

- Location of stockpile and borrow sites will be confined to dry areas so sediment will not enter aquatic resources. ECR will pre-approve areas before they are used.
- The contractor(s) will be notified that they are responsible for meeting all state and federal requirements for maintaining water quality. Standard contracts will include the following:
- Heavy equipment should be inspected and cleaned as necessary before moving onto the project site in order to remove oil and grease, noxious weeds and excessive soil.
- Hydraulic fluid and fuel lines on heavy mechanized equipment must be in proper working condition in order to minimize leakage into streams
- Waste diesel, oil, hydraulic fluid and other hazardous materials and contaminated soil near the stream will be removed from the site and disposed of offsite and in accordance with DEQ regulations. Areas that have been saturated with toxic materials would be excavated to a depth of 12 inches beyond the contaminated material or as required by DEQ.
- Equipment refueling would be conducted within a confined, secured area outside the stream channel (minimum of 25' away) such that there is minimal chance that toxic materials could enter a stream.
- Use spill containment booms or kits as required by DEQ.
- Equipment containing toxic fluids should not be stored in a stream channel at anytime.
- Construct a control weir at a culvert outlet as insurance that water velocity through a new culvert will not cause "perching": a control weir consists of burying 1-3 foot diameter rock at the culvert outlet across the stream channel to control the stream grade. ECR will approve designs of such structures before they are installed as well as construction of said structures.

Approved Materials for Use - ODOT Construction Manual

Biofilter Bags: Biofilter bags shall be 460 mm x 150 mm x 760 mm minimum bags made of 13 mm plastic mesh, weighing approximately 20 kg, and filled with clean, 100 percent recycled wood-product waste.

Check Dams: Aggregate: Shall meet the requirements of 00330.16 with a maximum diameter from 75 to 150 mm.

- Straw Bale: Standard rectangular bales shall meet the requirements of 00280.10 (n)(6).
- Biofilter Bags: Shall meet the requirements of 00280.10(a).
- Sand Bags: Shall meet the requirements of 00280.10(1).

Construction Entrances: Aggregate shall meet the requirements of 00330.16 with a maximum diameter of 150 mm.

Subgrade geotextile shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).

Diversion Dike/Swale: Aggregate shall meet the requirements of 00330.16 with a maximum diameter of 25 mm to 100 mm.

Seeding shall meet the requirements of Section 01030 for Seeding (Temporary).

Temporary Drainage Curbs: Commercial Grade Concrete shall meet the requirements of 00480.11.

Dust Control: Non-toxic materials shall not have an adverse effect on soil structure or establishment and growth of vegetation, and be approved by Coos County Highway Department Roadmaster and/or the ECR.

Flow Spreader: Shall meet the requirements of 00330.16 with a maximum diameter of 150 mm. Inlet Protection

Inlet Protection

1. Geotextile for Sediment Fence, Supported: Shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).
2. Aggregate: Shall meet the requirements of 00330.16 with a maximum diameter of 25mm to 100mm.
3. Biofilter Bags: Shall meet the requirements of 00280.10(a).

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4. Stakes: Shall be as follows:
 - a) Supported Sediment Fence: Commercial grade metal posts weighing at least 2 kg/m.
 - b) Unsupported Sediment Fence: 38mm x 38mm x 1,200mm minimum wooden posts.
 - c) Bio-filter Bags: 25mm x 50mm x 450mm minimum wooden posts.
 4. Wire Mesh: Shall be one millimeter gauge steel-wire mesh with 10mm x 10mm openings.
 5. Concrete Masonry Unit: Shall be 200mm x 200mm x 400mm, 70kg concrete building blocks with two 140mm x 140mm openings and 25mm minimum outer wall thickness.
 6. Sod: Grass sod shall be grown on agricultural land that is cultivated specifically for turf sod. Sod shall be free of weeds, diseases, nematodes and insects. Sod shall be mature and not less than 10 months old. Sod shall be machine cut to a uniform thickness of 16mm or more, excluding top growth and thatch. Broken pieces and torn or uneven ends will not be accepted. Sod shall be planted within 36 hours of harvest.
 7. Prefabricated Filter Insert: Shall be manufactured specifically for collecting sediment in drainage inlets. The insert shall consist of a porous, geotextile material and include handles and/or fasteners sufficient to keep the insert from falling into the inlet during maintenance and removal of the insert from the inlet (such as rebar, per 02510.0, sewn into the fabric).
 8. Matting: Materials tested by Texas DOT/TTI Hydraulics and Erosion Control Laboratory shall meet the performance criteria for the following categories:
 - a) (Type A) - Slope protection mat for slopes 1:3 or flatter - clay soils
 - b) (Type B) - Slope protection mat for slopes 1:3 or flatter - sandy soils
 - c) (Type C) - Slope protection mat for slopes steeper than 1:3 - clay soils
 - d) (Type D) - Slope protection mat for slopes steeper than 1:3 - sandy soils
 - e) (Type E) - Flexible channel liner for shear stress from 0-96 Pa.
 - f) (Type F) - Flexible channel liner for shear stress from 0-192 Pa.
 - g) (Type G) - Flexible channel liner for shear stress from 0-287 Pa.
 - h) (Type H) - Flexible channel liner for shear stress from 0-383 Pa.
 - i) Check Slot - Shall be as follows:
 - Channel Application: Compacted class 25 riprap shall meet the requirements of Section 00390.
 - Slope Application: Compacted native material.
 - j) Staples: Shall be heavy duty pins or U-shaped wires staples as follows:
 - Staples: 2mm gage steel wires staples. 25mm "U" width with a length of 150 mm for cohesive soils and 200 mm minimum for non-cohesive soils.
 - Pins: 4.75mm diameter steep pin with a 50mm diameter steel washer secured at the head of the pin. The length shall be 450mm minimum. All mat blanket, staple and other materials shall meet or exceed the manufacturer's specifications and recommendations. Provide the manufacturer's material and installation specifications to the Agency prior to installation.
 10. Temporary Mulching: Shall be free of noxious weed seeds, plants and other substances detrimental to plant life. The kind of mulch material(s) acceptable for use will are shown below
 - a) Hydromulching: Cellulose fiber shall be produced from a single, or combination of, virgin wood or straw, or paper fiber product(s) approved by the Agency. Process the wood or straw mulch so that the fibers remain uniformly suspended under agitation in water. The processed mulch shall have the ability to cover and hold grass seed in contact with soil and shall exhibit no growth or germination-inhibiting factors. The wood or straw fiber shall have moisture-absorption and percolation properties to form a blotter-like ground cover. Ship wood or straw cellulose fiber in packages of uniform mass (plus or minus 5 percent) and label with the manufacturer's name and air-dry mass.
 - b) Straw: Straw mulch for non-hydroseeding applications shall be straw from bentgrass, bluegrass, fescue or ryegrass singly or in combination. If no grass seed straw is available, straw from barley, oat, or wheat is
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allowed if approved by the Agency. The straw shall not be moldy, caked, decayed or of otherwise low quality. Submit verification from the supplier that the straw is free of noxious weeds. Acceptable documentation submitted shall show either (1) that the straw source is from an "Oregon Certified Seed" field, or (2) the seed lab test results of the seed harvested from the straw meet minimum Oregon Certified Seed quality for weed seed content. The minimum requirements of Oregon certified seed are as published in the current year's Oregon Certified Seed Handbook available from County Extension Offices or Oregon State University.

- c) Tackifier: Shall be commercially available, containing no agents toxic to plant life. The tackifier shall be either a liquid stabilizing emulsion or a dry powder tackifier complying with the following:
- Liquid Stabilizer Emulsion - Shall be a liquid polyvinyl acetate using emulsion resins and containing 60 percent (plus or minus 1 percent) total solids by mass. When diluted with water, and upon drying, the emulsion shall form a transparent, net-like film having a permeability that allows exchange of air and moisture and has an effective life of one year or more.
 - Dry Powder Tackifier - Shall consist of one or more active hydrocolloids from natural plant sources which will hydrate in water and blend with other slurry materials. Upon application and drying it shall tack the slurry particles to the soil surface, and exhibit no growth or germination-inhibiting factors.
11. Plastic Sheetting: Plastic slope protection, anchor system and erosion protection at the toe of the plastic with a minimum thickness of 0.15 mm. The anchoring system shall have the following standards:
- a) Anchoring weights 30 kg minimum each, with non-puncture characteristics.
 - b) Tethers - Cords or ropes with adequate strength to support the anchoring weights on the slope.
 - c) Chain Link Fence - New or used material shall meet the requirements of 03010.20.
 - d) Stakes - Commercial grade metal posts shall weigh at least 2 kg/m.
 - e) Toe Protection - Class 25 rip rap shall meet the requirements of Section 00390.
12. Sandbags: 610 mm x 300 mm x 150 mm durable, weather-resistant, tightly woven bags sufficient to prohibit leakage of filler material. Bags shall be filled with firmly packed sand filler material weighing at least 34 kg.
13. Temporary Scour Holes: Class 50 riprap shall meet the requirements of Section 00390.
14. Sediment Barriers include the following:
- a) Bio-filter Bag - Shall meet the requirements of 00280.10(a).
 - b) Brush Barrier - Shall consist of woody debris 150 mm in diameter maximum, or topsoil strippings. Sediment Fence Geotextile shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).
 - c) Filter Berm and Rock Filter - Aggregate shall; meet the requirements of 00330.16 with a maximum diameter of 25 mm to 100 mm. Subgrade Geotextile shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).
 - d) Sand Bags - Shall meet the requirements of 00280.10(l).
 - e) Stakes - Shall conform to the following:
 - Biofilter Bags - 25 mm x 50 mm x 450 mm minimum wood posts
 - Brush Barrier - 25 mm x 50 mm x 450 mm minimum wood posts.
 - Straw Bales - 38 mm x 25 mm x 900 mm minimum wood posts.
 - Wattle - 25 mm x 25 mm x 600 mm minimum wood posts.
 - f) Straw Bale - Shall be standard 20 kg to 30 kg rectangular bales that are wire-bound or string-tied. Straw material shall be straw from bentgrass, bluegrass, fescue, or ryegrass singly or in combination. If no grass seed straw is available, straw from barley, oat or wheat is allowed if approved by the Agency. The straw shall not be moldy, caked, decayed or of otherwise low quality. Submit verification from the supplier that the straw is free of noxious weeds. Acceptable documentation submitted shall show either (1) that the straw source is from an "Oregon Certified Seed" field, or (2) the seed lab test results of the seed harvested from the straw meet minimum, Oregon Certified Seed quality for weed seed content./ The minimum requirements of Oregon certified seed are as published in the current year's Oregon Certified Seed Handbook available from County Extension

Offices or Oregon State University.

- g) Wattle - Shall be manufactured from rice or coconut straw and shall be between 200 mm and 260 mm in diameter. The straw shall not be moldy, caked, decayed or of otherwise low quality. Submit verification from the supplier that the straw is free of noxious weeds. Acceptable documentation submitted shall show the seed lab test results of the seed harvested from the straw meet minimum Oregon Certified Seed quality for weed seed content. The minimum requirements of Oregon certified seed are as published in the current year's Oregon Certified Seed Handbook available from County Extension Offices or Oregon State University. The straw shall be wrapped in a tubular plastic netting. The netting shall have a minimum strand thickness of 0.08 mm, a knot thickness of 1.4 mm, and a weight of 32.6 grams per meter (plus or minus 10 percent) and shall be made from 85 percent high density polyethylene, 14 percent ethyl vinyl acetate and 1 percent color for UV inhibition.

15. Sediment fence specifications are as follows:

- a) Geotextile - Shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).
- b) Posts - Shall conform to the following:
- Sediment Fence, Supported - Commercial grade metal posts weighing at least 2 kg/m.
 - Sediment Fence, Unsupported - 38 mm x 38 mm x 1200 mm minimum wooden posts.
 - Wire Mesh - 2 mm gauge steel-wire mesh with 51 mm x 51 mm openings. A perforated polymeric mesh of equivalent grab tensile strength (3100 N), in accordance with ASTM D4632, may be substituted for the steel-wire mesh.

16. Temporary Sediment Trap specifications are as follows:

- a) Geotextile - Shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).
- b) Aggregate and Rock - Shall meet the requirements of 00330.16 with a maximum diameter varying from 19 to 38 mm for aggregate and 75 to 150 mm for rock.

17. Temporary Slope Drains: Shall meet the requirements of Section 02410 for plastic pipe, or Section 02420 for metal pipe. End sections, pipe stubs and elbow sections shall be from 150 to 300 mm in diameter. Refer to the plans and special provisions for contributing area and diameter. If the contributing area is not established, use 300 mm diameter.

18. Slope Berm: Shall be common material used for embankment construction or aggregate. Aggregate Base material shall meet the requirements of 00330.16 with a maximum diameter of 25 mm to 100 mm.

19. Tire Wash Facility specifications are as follows:

- a) Aggregate: Aggregate Base material shall meet the requirements of Sections 00641 and 02630.
- b) Reinforcing Steel: Reinforcing steel shall meet the requirements of 02510.10, with a minimum diameter of 22.2 mm.
- c) Geotextile: Subgrade geotextile shall meet the requirements of Sections 00350 and 02320. Provide written "Level B" documentation according to 02320.10(c).

Mulching Application Specifications

Straw Mulch

Apply on slopes 1:1.5 or flatter. Spread straw mulch by hand or blower. Place approximately 50 mm deep, in loose condition, at a rate between 4.5 and 6.7 Mg/ha of dry mulch. Place straw mulch so that it is loose enough for sunlight to penetrate and air to circulate, but dense enough to shade the ground, reduce water evaporation, and materially reduce soil erosion. Anchor using hydraulically applied tackifier, crimping disc, or sheep's-foot roller approved by the Agency or methods specified in the special provisions.

- Blower - Blower equipment shall use air pressure with an adjustable spout that uniformly applies dry mulch at constantly measured rates. Apply the materials using a sweeping, horizontal motion of the nozzle.

Hydromulch

Place waterborne cellulose fiber material using hydraulic equipment which continuously mixes and agitates the slurry and applies the mixture uniformly through a pressure-spray system providing a continuous, nonfluctuation delivery. Distribution and discharge lines shall be large enough to prevent stoppage and be equipped with a set of hydraulic discharge spray nozzles that will provide a uniform distribution of the slurry. Apply the materials using a sweeping, horizontal motion of the nozzle. Hydraulically apply at the following spread rates:

- Slopes 1:1.5 or flatter - 2.7 Mg/ha based on dry fiber weight.
- Slopes steeper than 1:1.5 - 3.4 Mg/ha cellulose fiber material that includes a tackifier.

Tack - Hydraulically Applied

Hydromulch or straw mulch may be tackified using hydraulically applied liquid stabilizer emulsions or dry powder tacking agents at the following rates of application:

1. Liquid Stabilizer Emulsions - Apply at the following liters per hectare rates unless the manufacturer recommends a greater rate of application
 - a) Long term control of exposed soil surfaces: 325 l/ha diluted at 20:1. For steep slopes with raveling small rocks: 435 l/ha diluted at 10:1.
 - b) Seeding, Fertilizing or Mulching: 270 l/ha diluted at 30:1.
 - c) Dust Control: 270 l/ha diluted with water at a ration of 30:1.
2. Dry Powder Tackifier - Apply at the following kilograms per hectare rates unless the manufacturer recommends a greater rate of application:
 - a) 1:2 slopes and flatter: 67 kg/ha mixed with hydromulch fibers at the rate specified.
 - b) Slopes steeper than 1:2: 112 kg/ha mixed with hydromulch fibers at the rate specified.
 - c) Overspray for tacking pre-applied combinations of or singularly applied straw mulch, seed, or fertilizer: 90 kg/ha with 880 kg of hydromulch fiber.
 - d) Dust control and short term stabilization of exposed soil surfaces: 157 kg/ha.

Tack - Mechanically Applied

1. Straw Mulch may be mechanically tackified using a crimping disk or sheep's-foot roller.
 - a) Crimping Disc - A heavy disk with flat, scalloped discs approximately 6 mm thick, having dull edges and spaced no more than 230 mm apart.
 - b) Sheep's-foot Roller - Modified sheep's-foot roller equipped with straight studs, made of approximately 20 mm steel plate, placed approximately 200 mm apart and staggered. The studs shall not be less than 150 mm long nor more than 150 mm wide and shall be rounded to prevent withdrawing the straw from the soil. The roller shall be of such mass as to incorporate the straw sufficiently into the soil providing a uniform surface cover.

Plastic Sheeting

Place plastic sheeting on disturbed, temporary slopes where immediate protection is required and mulching or other methods of soil stabilization are not feasible. Steep slopes include vertical excavations for retaining walls and other temporary soil excavations and embankments related to structural work. Cover exposed soils and secure tightly in place using an anchoring system consisting of sandbags, chain link fence, or other approved methods. The anchoring system shall not puncture the plastic. Trench plastic at the top of slope and secure adequately to maintain cover during reasonably expected conditions in the area. Direct water away from areas above the plastic to prevent erosion from undermining the plastic. Control drainage from areas covered by the plastic sheeting so that the discharge occurs onto the toe protection.

Table H-2 Specified ODOT Seed Mixture for Coast Range

Botanical Name (Common Name)	Minimum *(PLS) per surface hectare (kg/ha)
<i>Agrostis tenuis</i> (Colonial Bentgrass)	3
<i>Festuca rubra</i> (Creeping Red Fescue)	11
<i>Festuca rura commutata</i> (Chewings Fescue)	11
<i>Lolium perenne</i> (Perennial Ryegrass)	17
<i>Trifolium repens</i> <i>Grassland Huia</i> (New Zealand White Clover)	2
Total	44

*PLS - Pure Live Seed