

APPENDIX D

Baker County

Mason Dam Hydroelectric Project
FERC No. P-12686

Erosion and Sediment Control Plan

February 2011

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I. Introduction

Baker County has applied to the Federal Energy Regulatory Commission (FERC) to develop hydroelectric energy at the existing Mason Dam. Mason Dam is located along the Powder River in Baker County, Oregon approximately 15 miles southwest of Baker City off of State Highway 7 and in the Wallowa-Whitman national Forest.

Mason Dam was built by the US Bureau of Reclamation (BOR) on the Powder River for irrigation, water delivery, and flood control. Mason Dam is 173 feet high, 895 feet long and 875 feet wide from toe to toe. Phillips Reservoir is formed from Mason Dam and covers 2,235 acres, has a total of 95,500 acre-feet, with 90,500 acre-feet being active. Water is stored behind Mason Dam in Phillips Reservoir, and is released during the irrigation season by Baker Valley Irrigation District (BVID). Water is generally stored between October and March and released April through September.

The intake of Mason Dam is located within a 17 x 17 x 13.3 foot high barrier with large bars, spaced 6 inches apart that act as a trash rack. There are two pipes that can be used to release water. One is a 56 inch diameter pipe and the other is a 12 inch diameter pipe. The 56 inch pipe is split into two 33 inch, high pressure gates, that are located in the valve house to control the release into the stilling basin via the tail race. The 12 inch pipe uses a sleeve/weir type valve to release water into the stilling basin. The outlet works consists of a tunnel controlled by the two high pressure gates with hydraulic hoists that have a capacity of 875 cfs at a reservoir elevation of 4070.5 feet. The spillway has an uncontrolled crest and is concrete lined with a maximum capacity of 1,210 cfs at a reservoir elevation of 4077.25 feet. The spillway and outlet works share a common stilling basin.

The proposed hydroelectric plant will contain a single horizontal shaft Francis turbine connected to a 3.4 MW 60 hertz, 12,640 volt generator with a brushless exciter. It will operate efficiently over a head range of 10 to 150 feet, and flows from 120 to 300 cfs. An extended downward tilted draft tube will discharge into the tailrace. The draft tube will be fitted with aeration fittings to provide aspiration of air to increase dissolved oxygen in the river. Plant controls will include a synchronous bypass to initiate the operation of the Reclamation slide gates during turbine shut down. A new hydraulic power unit (HPU) will be provided to increase the rate of the slide gates opening to more closely match the rate of flow lost when the turbine shuts down. Power generated will sent to the substation .8 miles away from the powerhouse. The current plan is for the line to be overhead following the Black Mountain Road.

1.0 Purpose and Scope

The purpose of the erosion and sediment control plan is to provide instruction and procedures to control and manage erosion, dust, and soil movement within the project area. For the Mason Dam Hydroelectric Project there will be three main ground disturbing activities that will require erosion and sediment control.

Excavation for the powerhouse and tailrace

The powerhouse and tailrace excavation will occur beginning near the bank of the existing tailrace pool as shown in drawing SK-1 (Attachment 7.1). The excavation will incorporate a portion of the existing tailrace shoreline and extend outward into the tailrace pool. The entire excavation area will be approximately 50 ft x 50 ft, with a maximum depth of about 15 ft below the tailrace high water elevation drawing SK-2 (Attachment 7.2). The powerhouse foundation, retaining wall, and a tailrace floor will be constructed within this excavation and the material excavated will be used as backfill. A cofferdam will be constructed to isolate the powerhouse/tailrace excavation area from the remainder of the tailrace pool so that excavation can occur under dewatered conditions. During this portion of construction, water releases from the dam will be routed around the excavation into the Powder River. Erosion control measures will be used around all excavations and temporary spoil stockpiles to prevent sediment from entering the Powder River.

Construction of the powerhouse

During construction of facilities associated with the powerhouse (penstocks, turbines, etc.) erosion control measures will be used along the bank of the tailrace pool to prevent sediment from entering the Powder River. These measures will be kept in place until the area has been stabilized by revegetation or placement of gravel at the end of construction.

Construction of the power line and substation

During excavation of holes for power pole placement and the foundation for the substation, erosion control measures will be used whenever there is potential for sediment to enter running water or wetland areas. These measures will remain in place until the area has been stabilized by revegetation at the end of construction.

Appropriate erosion control measures will be selected from standard measures Best Management Practices as identified in Attachments 7.4, 7.5, and 7.6.

2.0 References

2.1 Erosion and Sediment Control Manual

Prepared for Oregon Department of Environmental Quality by GeoSyntec Consultants in April 2005 and it is available online at <http://www.deq.state.or.us/wq/stormwater/escmanual.htm>

3.0 Definitions

- 3.1 Limit Ground Disturbance: All ground disturbing activities will be planned to limit soil disturbance in an effort to reduce the potential for erosion.
- 3.2 Sediment Barriers: Are barriers such as silt fence, hay bales, and fiber wattles used in conjunction with berms, dikes, sand bag or rock dams, that will take any surface water collected and remove any sediment prior to reaching any undesirable area.
- 3.3 Revegetation: If an area has been disturbed revegetation will be used for temporary and permanent soil stabilization. Baker County will work with the Forest Service to determine the seed mixture used for revegetation.
- 3.4 Implementation Schedule: Once construction plans have been finalized and the construction phase begins, all ground disturbing activities will be discussed and reviewed by the selected contractor to ensure steps are taken to limit soil disturbance. Sediment Barriers will be installed prior to and modified to if needed during construction. As soon as possible, revegetation will occur to stabilize all ground disturbing activities.

4.0 Responsibilities

Baker County will ensure that the contractor(s) fully understand and implement this plan for all construction activities.

5.0 Procedures

- 5.1 Installation of silt fences, hay bales, swales (sediment barriers) shall be installed prior to project construction. Additional methods such as sand bag dams and sediment traps will be incorporated if deemed necessary. BMPs used to control and manage erosion, dust, and soil movement include but are not limited to the following:

Attachment 7.4

RC-8 Minimizing TSS During Instream Construction

RC-9 Instream Diversion Techniques

RC-10 Instream Isolation Techniques

Attachment 7.5

EP-1 Scheduling

EP-2 Preservation of Existing Vegetation

EP-6 Permanent Seeding and Planting

EP-13 Wind Erosion Control

Attachment 7.6

SC-1 Sediment Fence

SC-2 Sand Bag Barrier

SC-3 Gravel Bag Berm

SC-4 Straw Bale Dike

- SC-6 Compost Berms and Socks
- SC-7 Fiber Rolls or Wattles
- SC-10 Entrance/Exit Tracking Controls
- SC-11 Entrance/Exit Tire Wash

5.2 The contractor selected for project construction shall perform weekly inspections of the BMPs while construction activities are occurring. These inspections will check the adequacy of the BMPs to ensure their effectiveness and repairs or replacement will also be done at this time if needed.

5.3 The designated BMP inspector will maintain a log book/journal of weekly inspections including observations or current conditions and if any improvements are needed.

6.0 Summary of Mitigation Measures

6.1 All displaced soil/material will be utilized on-site as backfill

6.2 Incidental travel outside of approved construction areas would be prohibited

6.3 Silt fences and or fiber rolls would be installed between construction areas and adjacent wetlands to streams to prevent construction sediment from entering these areas.

6.4 Tailrace construction within the Powder River would occur under dewatered conditions, with a cofferdam placed immediately downstream of the construction area to prevent downstream sedimentation. The construction schedule has yet to be determined at this time. The instream work window is July 1 – October 31. If an extension is needed Baker County would work with ODF&W on any issues involved.

6.5 All disturbed areas would be reseeded with native and desirable non-native seed mixes to benefit wildlife and to prevent erosion and the spread of noxious weeds. The seed mix will be determined through consultation with the Forest Service and ODF&W.

7.0 Attachments

7.1 SK – 1 Preliminary Construction Drawings

7.2 SK – 2 Preliminary Construction Drawings

7.3 SK – 3 Preliminary Construction Drawings

7.4 Erosion and Sediment Control Manual Appendix D: Runoff Control BMPS

7.5 Erosion and Sediment Control Manual Appendix E: Erosion Prevention BMPS

7.6 Erosion and Sediment Control Manual Appendix F: Sediment Control BMPS

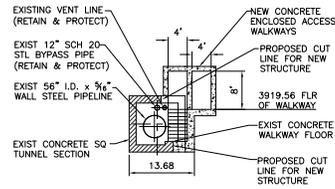
7.7 Oregon Guidelines for Timing of In-water work to Protect Fish and Wildlife Resources (Powder River mouth to Phillips Reservoir page 11)

7.8 Agency Consultation Record

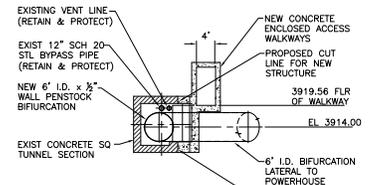
Attachment 7.8

Agency Consultation Record

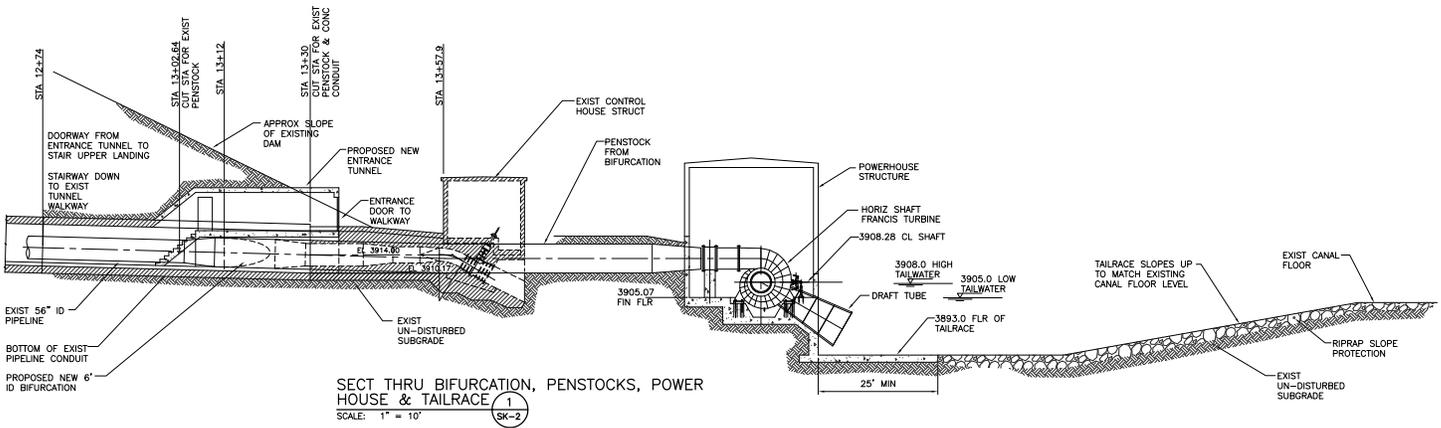
Attachment 7.2



SECT THRU TUNNEL ACCESS
STAIR & WALKWAY (2)
SCALE: 1" = 1'-0"



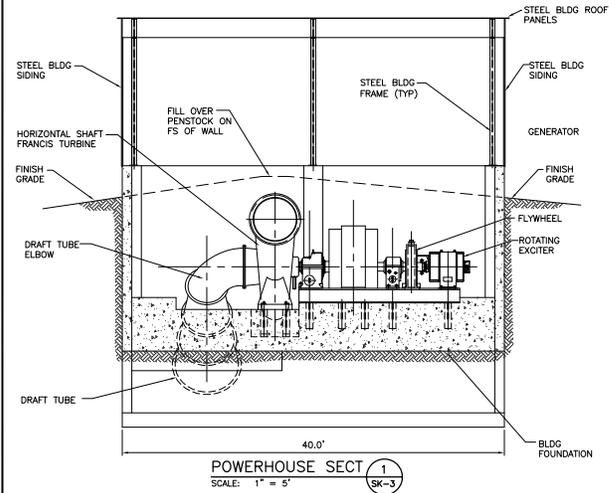
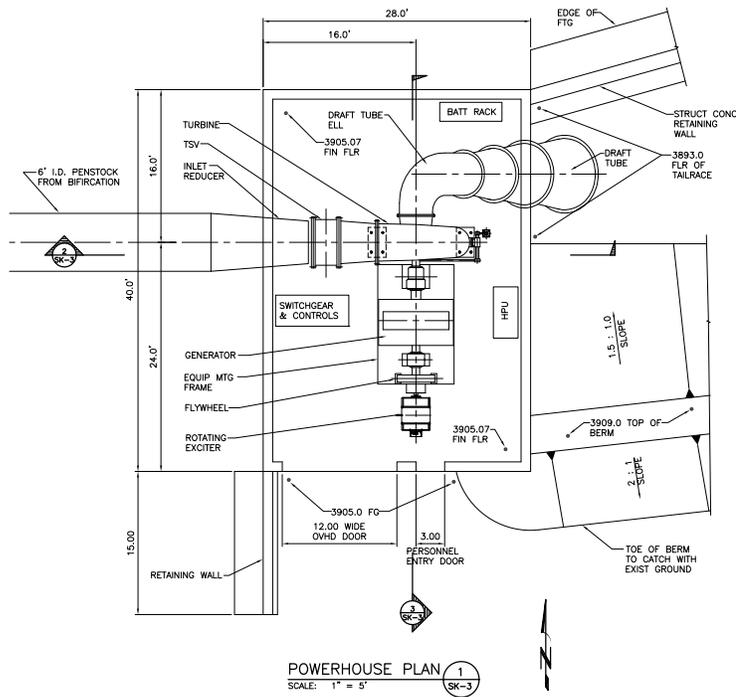
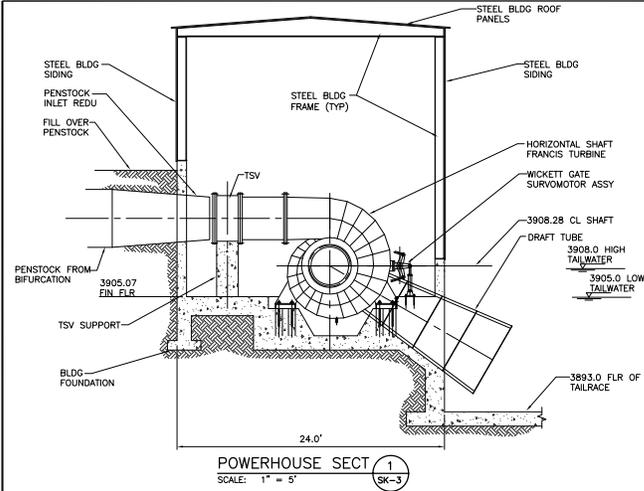
SECT THRU BIFURCATION,
& WALKWAY (3)
SCALE: 1" = 1'-0"



SECT THRU BIFURCATION,
HOUSE & TAILRACE (1)
SCALE: 1" = 10'

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408	SEP 2043
409	OCT 2043



APPENDIX D

RUNOFF CONTROL BMPS

RC-1	Slope Drain
RC-2	Energy Dissipator
RC-3	Diversion of Run-on
RC-4	Temporary Diversion Dike
RC-5	Grass-lined Channel (Turf Reinforcement Mats)
RC-6	Trench Drain
RC-7	Drop Inlet
RC-8	Minimizing TSS During Instream Construction
RC-9	Instream Diversion Techniques
RC-10	Instream Isolation Techniques
RC-11	Check Dams

MINIMIZING TOTAL SUSPENDED SOLIDS (TSS) RC-8

Construction Specifications

Whatever technique you decide to implement, an important thing to remember is that dilution can sometimes be the solution. A probable “worst time” to release high TSS into a stream system might be when the stream is very low; summer low flow, for example. During these times, the flow may be low while the biological activity in the stream is very high. Conversely, the addition of high TSS or sediment during a big storm discharge might have a relatively low impact, because the stream is already turbid, and the stream energy is capable of transporting both suspended solids, and large quantities of bedload through the system. The optimum time to “pull” in-stream structures may be during the rising limb of a storm hydrograph.

Techniques to Minimize Total Suspended Solids (TSS)

Padding

Padding, usually manufactured from coir and or other natural fibers, that is laid in the stream below the work site may trap some solids that are deposited in the stream during construction. After work is done, the padding is removed from the stream, and placed on the bank to assist in revegetation.

Clean, washed gravel

Clean, washed gravel can be placed on the stream bottom both during and after construction to minimize re-mobilizing the “fines”. Clean gravel or spawning gravel can often be specified to mitigate or enhance the existing substrate. Therefore, gravel “injection” can minimize TSS during construction while providing environmental and habitat enhancements with long-term benefits.

Excavation using a large bucket

Each time a bucket of soil is excavated or placed in the stream, a portion is of the soil is suspended. The resulting amount of sediment suspended increases proportionally to the number of scoops rather than the total of excavated soil. Therefore, using a large excavator bucket instead of a small one will reduce the total amount of soil that is suspended and available to wash downstream. Each time a bucket of soil is placed in the stream, a portion is suspended. Approximately the same amount is suspended whether a small amount of soil is placed in the stream, or a large amount.

Use of dozer for backfilling

Using a dozer for backfilling instead of a backhoe follows the same principles – the fewer times soil is deposited in the stream, the less soil will be suspended.

Partial dewatering with a pump

Partially dewatering a stream with a pump reduces the amount of water, and thus the amount of water that can suspend sediment.

How to know if you have high TSS:

Some commonly accepted standards for high TSS are:

- 50 mg/l or
- 10 mg/l above background TSS or,
- 10% above background TSS.

These standards are very stringent, and are very difficult to achieve in many situations. The background + 10 % (mg/l) is probably the most realistic and reasonable standard for protecting the aquatic resources, while allowing a restoration project to be implemented. Check with local ordinances for standards.

MINIMIZING TOTAL SUSPENDED SOLIDS (TSS) RC-8

Inspection and Maintenance

- Inspect the stability and performance of all erosion and sediment control measures during construction.
- Monitor TSS levels before, during and after construction.

IN-STREAM DIVERSION TECHNIQUES RC-9

Construction Specifications

A stream diversion is a temporary bypass through a pipe, flume, or excavated channel that carries water flow around work areas. Stream diversion is commonly used during culvert installation or replacement. Where possible, a stream diversion should be the first choice to control erosion and sediment during the construction of culverts or other in-stream structures. During construction in a watercourse, particularly culvert installation and repair, these temporary water bypass structures are an effective sediment and erosion control technique. Check with local, state and federal regulatory authorities for permitting and design requirements.

Design Considerations

The selection of which stream diversion technique to use will depend upon the type of work involved, physical characteristics of the site, and the volume of water flowing through the project.

Advantages of a pumped diversion include:

- Downstream sediment transport can almost be eliminated
- De-watering of the work area is possible
- Pipes can be moved about to allow construction operations
- The dams can serve as temporary access.
- Increased flows can be managed by adding more pumping capacity.

Some disadvantages of a pumped diversion are:

- Flow volume is limited by pump capacity
- Requires 24-hour monitoring of pumps
- Sudden rain could overtop dams
- Minor in-stream disturbance to install and remove dams

Advantages of excavated channels and flumes are:

- Isolates work from water flow and allows dewatering
- Can handle larger flows than pumps

Disadvantages of excavated channels and flumes are:

- Bypass channel or flume must be sized to handle flows, including possible floods
- Channels must be protected from erosion
- Flow diversion and then re-direction with small dams causes in-stream disturbance and sediment

Stream diversions should not be used:

- Without identifying potential impacts to the stream channel
- In or adjacent to water bodies until all necessary permits have been obtained

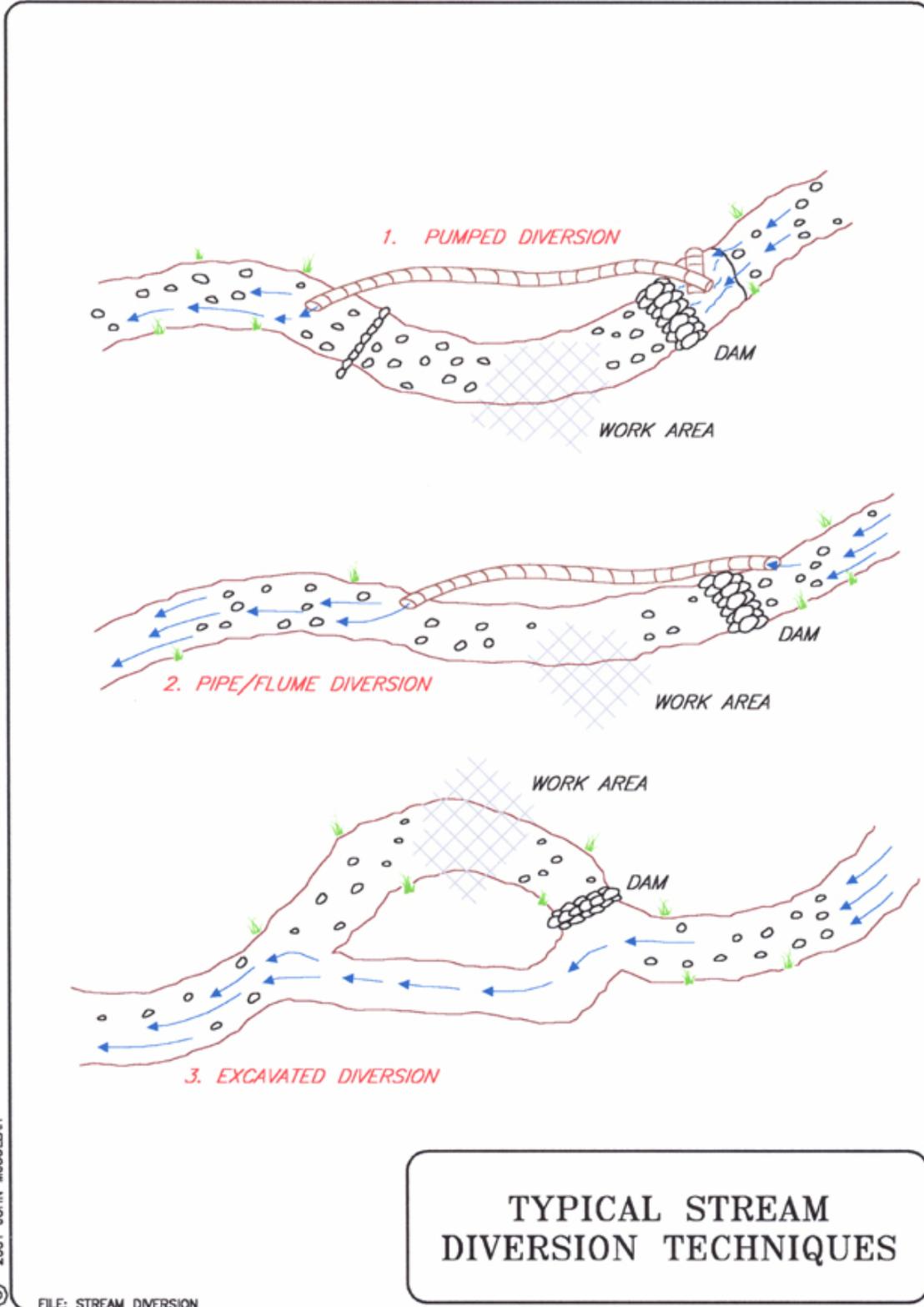
Installation

- The pumped diversion is suitable for intermittent and low flow streams that can be pumped. Pump capacity must be sufficient for design flow. The upper limit is about 10ft³/sec (0.28 m³/sec), the capacity of two 8 inch (20 cm) pumps.
- A temporary dam is constructed upstream and downstream of the work area and water is pumped through the construction project in pipes. Dam materials should be selected to be erosion resistant, such as steel plate, sheetpile, sandbags, continuous berms, inflatable water bladders, etc.
- A temporary bypass channel can also be constructed by excavating a temporary channel or passing the flow through a heavy pipe (called a “flume”), and excavating a trench under it. Typical stream sizes are less than 20 ft (6 m) wide and less than 100 ft³/sec (2.8 m³/sec).

IN-STREAM DIVERSION TECHNIQUES RC-9

Inspection and Maintenance

- All stream diversions must be closely maintained and monitored
- Pumped diversions require 24-hour monitoring of pumps
- Upon completion of the work performed, the stream diversion should be removed and flow should be re-directed through the new culvert or back into the original stream channel.



INSTREAM ISOLATION TECHNIQUES RC-10



Portable dams installed in Santa Cruz Ca. and in Alberta Canada.

Construction Specifications

An instream isolation technique is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in or adjacent to water. The structures may be made of rock, sand bags, wood or water-filled geotextiles (aqua barriers). During construction in a watercourse, these structures are designed to reduce turbidity and sediment discharge, allowing contractors to follow clean water regulations.

Design Considerations

Isolation structures may be used in construction activities such as streambank stabilization, culvert installation, bridges, piers or abutments. It may be used in combination with other methods such as clean water bypasses and/or pumps.

This technique should not be used:

- If there is insufficient streamflow to support aquatic species.
- In deep water unless designed or reviewed by an engineer.
- To completely dam streamflows.

Installation

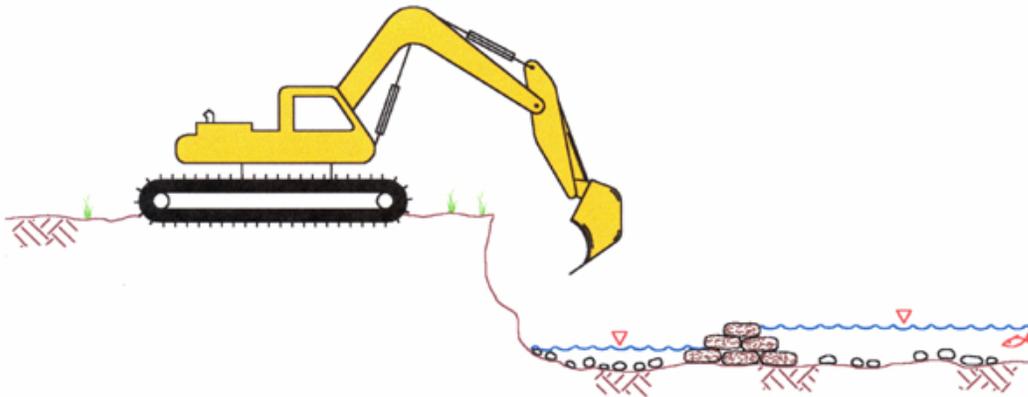
When used in watercourses or streams, cofferdams must be used in accordance with permit requirements. Materials for cofferdams should be selected based on ease of maintenance and complete removal following construction activities.

Inspection and Maintenance

- During construction, inspect daily.
- Schedule additional inspections during storm events.
- Immediately repair any gaps, holes or scour.
- Upon construction completion, the structure is removed.
- Remove sediment buildup.
- Remove structure. Recycle or re-use if applicable.
- Revegetate areas disturbed by cofferdam removal if applicable.

BENEFITS/LIMITATIONS

- Difficult to dewater
- Inexpensive
- Labor intensive to install and remove
- Sand may be deposited in stream if bags break, better to use clean gravel



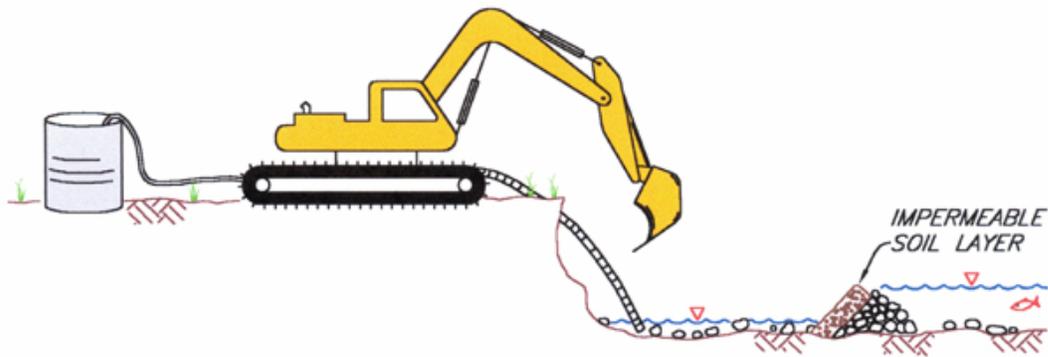
SAND BAG/GRAVEL BAG TECHNIQUE

INSTREAM EROSION AND SEDIMENT
CONTROL ISOLATION TECHNIQUES

INSTREAM ISOLATION TECHNIQUES RC-10

BENEFITS/LIMITATIONS

- Allows partial dewatering*
- Relatively inexpensive*
- Useful for small streams*
- Minimal TSS when removed*



NOTES:

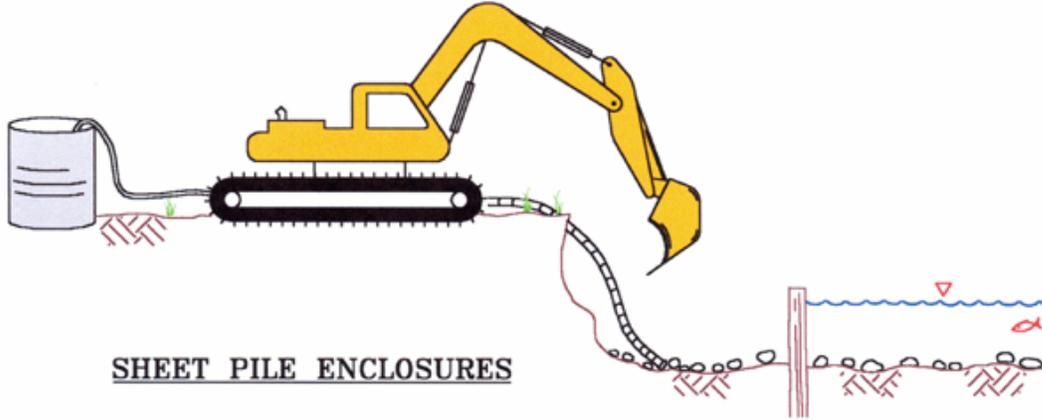
- Step 1. Install clean gravel*
- Step 2. Place impermeable soil*
- Step 3. Do work*
- Step 4. Decommission berm by removing soil layer first*
- Step 5. Pump work area. Head differential will cause turbid water to flow into work area through gravel*
- Step 6. Remove or spread gravel*

GRAVEL/SOIL BERM INSTREAM ISOLATION TECHNIQUE

INSTREAM ISOLATION TECHNIQUES RC-10

BENEFITS/LIMITATIONS

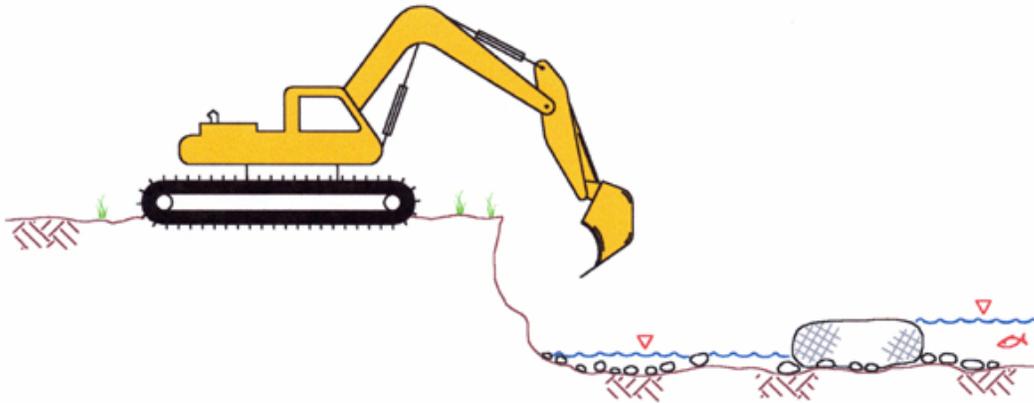
- Allows full dewatering
- Relatively expensive
- Useful in large rivers, lakes, high velocity
- Not really appropriate for small streams
- Requires staging and heavy equipment access areas



SHEET PILE ENCLOSURES

BENEFITS/LIMITATIONS

- Allows partial dewatering
- Moderately expensive
- Ease of installation and removal unknown
- Can be designed for small streams to large rivers



WATER-FILLED GEOTEXTILE (AQUA DAM)

INSTREAM EROSION AND SEDIMENT CONTROL ISOLATION TECHNIQUES

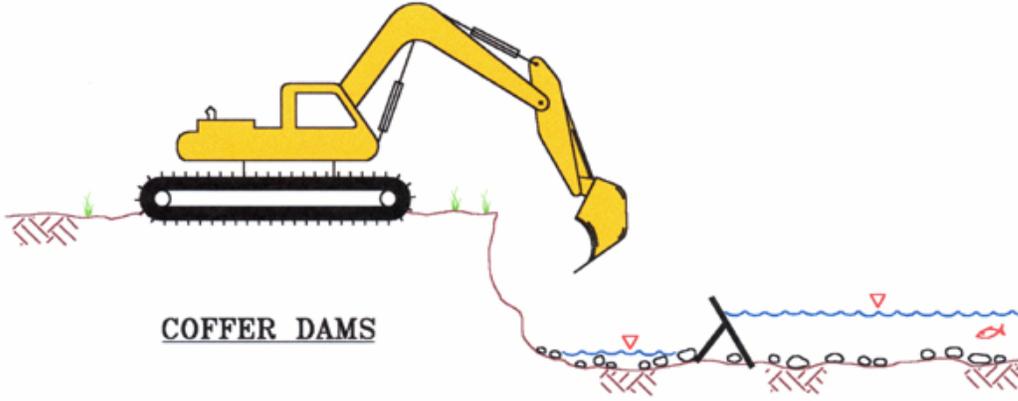
© 2001 JOHN McCULLAH

FILE: INSTREAM TECHNIQUES2

INSTREAM ISOLATION TECHNIQUES RC-10

BENEFITS/LIMITATIONS

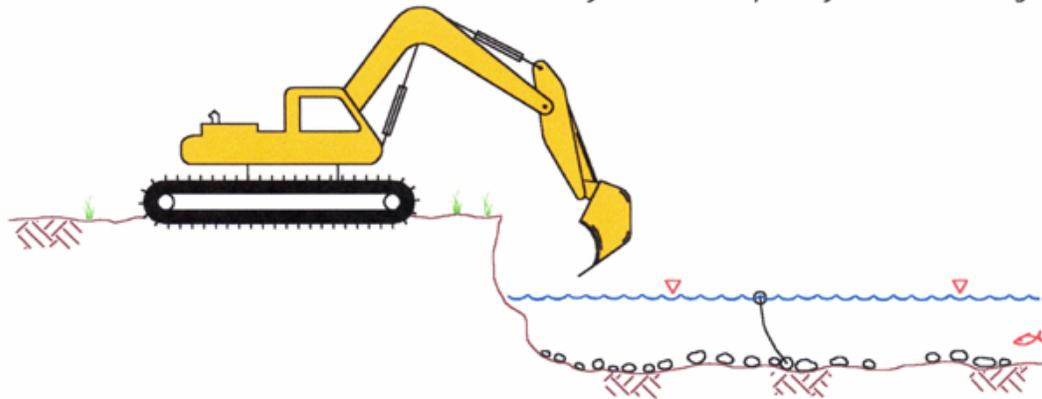
- Allows partial dewatering
- Many different types available
- Relatively expensive
- Can be designed for large and small streams
- Ease of installation and removal unknown



COFFER DAMS

BENEFITS/LIMITATIONS

- Does not allow dewatering
- Inexpensive
- Used in slow water or lakes only
- Not very effective especially when removing



GEOTEXTILES, SILT BARRIERS, CURTAINS

INSTREAM EROSION AND SEDIMENT CONTROL ISOLATION TECHNIQUES

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FILE: INSTREAM TECHNIQUES1



APPENDIX E

EROSION PREVENTION BMPS

EP-1	Scheduling
EP-2	Preservation of Existing Vegetation
EP-3	Surface Roughening
EP-4	Topsoiling
EP-5	Temporary Seeding and Planting
EP-6	Permanent Seeding and Planting
EP-7	Mycorrhizae / Biofertilizers
EP-8	Mulches
EP-9	Compost Blankets
EP-10	Erosion Control Blankets and Mats
EP-11	Soil Binders
EP-12	Stabilization Mats
EP-13	Wind Erosion Control
EP-14	Live Staking
EP-15	Pole Planting
EP-16	Live Fascines and Brush Wattles
EP-17	Brush Box
EP-18	Fascines with Subdrains
EP-19	Live Pole Drains
EP-20	Brush Packing or Live Gully Fill Repair
EP-21	Sodding

SCHEDULING – EP-1

Scheduling involves sequencing construction activities and the installation of erosion and sediment control measures to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff and vehicle tracking. The timing of soil-disturbing activities and the timing of implementation of BMPs are both critical to the prevention of accelerated erosion and transport of sediment off-site. The scheduling of grading should take into account the rainy season and should minimize the length of the time that soils are left exposed, and reduce the total area of exposed soil during the rainy season. Consideration should be given to phasing the grading and construction so that critical areas (such as highly erodible soils, areas adjacent to receiving waters, etc.) are not disturbed until the non-rainy season, and so the entire area that is disturbed at any one time is kept to a size that can be controlled effectively.

Construction Specifications:

- The optimum grading period is when the chance for precipitation is minimized (e.g., the non-rainy season), particularly for the critical areas. If precipitation is likely during grading, minimize the length of time that soils are exposed, and the total area of exposure.
- Materials used for erosion and sediment control shall be on site at all times.
- Take the following measures when precipitation is forecast:
 - Minimize the length of time that the soils are left exposed.
 - Reduce the total area of exposed soil.
 - Protect critical areas such as drainage channels, streams, and natural water courses.
 - Stabilize exposed areas quickly.
- The schedule shall clearly show how regional precipitation trends relate to soil-disturbing and re-stabilization activities. The construction schedule shall be incorporated into the Erosion and Sediment Control Plan.
- The schedule shall include detail on the implementation and deployment of temporary soil stabilization measures, temporary sediment controls, tracking controls, wind erosion controls, non-storm water pollution controls (including waste management and materials pollution controls).
- The schedule shall also include dates for significant long-term operations or activities that may have planned non-storm water discharges such as dewatering, saw cutting, grinding, drilling, boring, crushing, blasting, painting, hydro-demolition, mortar mixing, bridge cleaning, etc.
- Develop the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, pouring foundations, installing utilities, etc., to minimize the active construction area during the rainy season.
- Schedule major grading operations when the chances of precipitation are minimized when practical.
- Schedule the installation, removal, or modification of run-on controls and flow conveyance structures for the non-rainy season or when there is a low probability of precipitation to reduce the likelihood of uncontrolled flow across and from the site.
- Stabilize non-active areas after the cessation of soil-disturbing activities or prior to the onset of precipitation in accordance with local requirements.
- Monitor the weather forecast for rainfall.
- When rainfall is predicted, adjust the construction schedule to allow the implementation of soil stabilization and sediment controls and sediment treatment controls on all disturbed areas prior to the onset of rain.
- Be prepared year-round to deploy soil stabilization and sediment control practices. Erosion may be caused during dry seasons by unseasonable rainfall, wind, and vehicle tracking. Keep the site stabilized year-round, and retain and maintain sediment trapping devices in operational condition.
- Sequence trenching activities so that most open portions are closed before new trenching begins.
- Incorporate staged seeding and re-vegetation of graded slopes as work progresses.
- Consider scheduling when establishing permanent vegetation (appropriate planting time for specified vegetation).

Inspection and Maintenance:

SCHEDULING – EP-1

- Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions.
- Amend the schedule when changes are warranted.
- Amend the schedule to show updated information on the deployment and implementation of construction site BMPs.

PRESERVATION OF EXISTING VEGETATION / BUFFER STRIPS – EP-2

Maintaining existing vegetation or placing vegetative buffer strips can have numerous benefits for stormwater quality, erosion and sediment control, as well as landscape beautification, dust control, noise reduction, shade and watershed protection.

Construction Specifications:

Preservation of Existing Vegetation:

Timing

- Preservation of existing vegetation shall be provided prior to the commencement of clearing and grubbing operations or other soil-disturbing activities in areas identified on the plans to be preserved, especially on areas designated as Environmentally Sensitive Areas (ESAs) or where no construction activity is planned or will occur at a later date.
- Limits of clearing and grubbing should be clearly marked prior to any grading or clearing activities.
- Preservation of existing vegetation shall conform to scheduling requirements and local permitting agency requirements.

Design and Layout

- Mark areas to be preserved with temporary fencing made of orange polypropylene that is stabilized against ultraviolet light. The temporary fencing shall be at least 3.2 ft (1 meter) tall and shall have openings not larger than 2 in by 2 in (50 mm by 50 mm).
- Fence posts shall be either wood or metal as appropriate for the intended purpose. The post spacing and depth shall be adequate to completely support the fence in an upright position.
- Minimize the disturbed areas by locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling.
- Consider the impact of grade changes to existing vegetation and the root zone.
- Construction materials, equipment storage, and parking areas shall be located where they will not cause root compaction.
- Keep equipment away from trees to prevent trunk and root damage at least to drip line.
- Maintain existing irrigation systems.
- Employees and subcontractors shall be instructed to honor protective devices. No heavy equipment, vehicular traffic, or storage piles of any construction materials shall be permitted within the drip line of any tree to be retained. Removed trees shall not be felled, pushed, or pulled into any retained trees. Fires shall not be permitted within 100 ft (30 m) of the drip line of any retained trees. No toxic or construction materials (including paint, acid, nails, gypsum board, chemicals, fuels, and lubricants) shall be stored within 50 ft (15 m) of the drip line of any retained trees, nor disposed of in any way which would injure vegetation.

Trenching and Tunneling

- Trenching shall be as far away from tree trunks as possible, usually outside of the tree drip line or canopy. Curve trenches around trees to avoid large roots or root concentrations. If roots are encountered, consider tunneling under them. When trenching and/or tunneling near or under trees to be retained, tunnels shall be at least 18 in (450 mm) below the ground surface, and not below the tree center to minimize impact on the roots.
- Tree roots shall not be left exposed to air; they shall be covered with soil as soon as possible, protected, and kept moistened with wet burlap or peat moss until the tunnel and/or trench can be completed.

PRESERVATION OF EXISTING VEGETATION / BUFFER STRIPS – EP-2

- The ends of damaged or cut roots shall be cut off smoothly.
- Trenches and tunnels shall be filled as soon as possible or in accordance with local requirements. Careful filling and tamping will eliminate air spaces in the soil which can damage roots.
- Remove any trees intended for retention if those trees are damaged seriously enough to affect their survival.
- After all other work is complete, fences and barriers shall be removed last. This is because protected trees may be destroyed by carelessness during the final cleanup and landscaping.

Vegetative Buffer Strips:

- Vegetated buffer strips (vegetated filter strips, filter strips, and grassed filters) are vegetated surfaces that are designed to treat sheet flow from adjacent surfaces. Filter strips function by slowing runoff velocities and allowing sediment and other pollutants (e.g., total and dissolved metals) to settle and partially infiltrate into underlying soils. With proper design and maintenance, filter strips can provide relatively high pollutant removal.
- Designate watercourse buffer-filter strips on the site design plan.
- The width of a buffer strip (i.e., flow path length) shall be maximized to the extent feasible with a 15 foot suggested minimum width. Buffer strips shall be sized in accordance with site conditions and local requirements.

PERMANENT SEEDING AND PLANTING EP-6

Permanent seeding involves the establishment of a permanent, perennial vegetative cover on disturbed areas from seed. Refer to BMP EP-21 for installation of sod. Planting of shrubs, trees, and container plants should be conducted in accordance with project landscaping specifications and local requirements.

The use of native, indigenous, or naturally-occurring grasses is recommended for biotechnical works. These “native” grasses have evolved in a manner that will not compete with or preclude the establishment, or natural recruitment, of naturally-occurring woody vegetation. Establishment of permanent vegetation provides natural erosion and sediment control by trapping particulates, slowing runoff velocities and enhancing infiltration. Permanent vegetation also is beneficial for long-term aesthetics and wildlife habitat.

Construction Specifications

Conditions Where Practice Applies

- Graded, final-graded or cleared areas where permanent vegetative cover is needed to stabilize the soil. Permanent seeding with perennial grasses is recommended when fibrous and deeply rooted are needed to provide slope and soil reinforcement.
- Slopes designated to be treated with erosion control blankets should be seeded first.
- Grass-lined channels or waterways designed to be treated with turf reinforcement mats, fiber roving systems, or other channel liners will require special grass blends.

Materials

Proper seed selection is very important. Choose climatically adapted perennial species that are long-lived, hearty and require low inputs of fertilizer, irrigation and mowing. You may consider a locally occurring species for native grass establishment. Consider seed blends because they are more adaptable.

Use seeds appropriate to the season and site conditions. Use a seed blend, which include annuals, perennials and legumes. Legumes should be inoculated with the proper rhizobium bacteria before planting. Pellet inoculated seed can be purchased or inoculation can be done in the field. Unless otherwise specified by local requirements, use seed rates based on minimum pure live seed (PLS) of 80%. When PLS is below 80% adjust rates accordingly. Consult a local seed supplier, landscape architect, or erosion control specialist for appropriate seed blends. Seed should be selected in accordance with local regulations.

Installation

The probability of successful plant establishment can be maximized through good planning, knowledge of soil characteristics, selection of appropriate seed blends for the site, good seedbed preparation, and timely planting. Prior to seeding, install necessary erosion control practices such as diversion dikes, channels, and sediment basins. Site area should be at final grade and not be disturbed by future construction activities.

Timing

- Apply permanent seeding on areas left dormant for 1 year or more.
- Apply permanent seeding when no further disturbances are planned.
- To determine optimum seeding schedule, consult a local agronomist or erosion control specialist.
- Apply permanent seeding before seasonal rains or freezing weather is anticipated.
- Use dormant seeding for late fall or winter seeding schedules.

Seed Mixes

- Use seeds appropriate to the season and site conditions.
- Consult local agronomist or erosion control specialists for seed mix.
- Use a seed blend to include annuals, perennials and legumes.

PERMANENT SEEDING AND PLANTING EP-6

- Use seed rates based on pure live seed (PLS) of 80%. When PLS is below 80% adjust rates accordingly.

Site Preparation

- Bring the planting area to final grade and install the necessary erosion control BMPs (i.e., sediment basins and temporary diversion dikes).
- Divert concentrated flows away from the seeded area.
- Conduct soil test to determine pH and nutrient content. Roughen the soil by harrowing, tracking, grooving or furrowing.
- Apply amendments as needed and permitted by local municipalities to adjust pH to 6.0-7.5. Incorporate these amendments into the soil. Prepare a 3-5 in (76-127 mm) deep seedbed, with the top 3-4 in (76-102 mm) consisting of topsoil. The seedbed should be firm but not compact. The top three inches of soil should be loose, moist and free of large clods and stones. The topsoil surface should be in reasonably close conformity to the lines, grades and cross sections shown on the grading plans.

Planting:

- Seed to soil contact is the key to good germination.
- Seed should be applied immediately after seedbed preparation while the soil is loose and moist. If the seedbed has been idle long enough for the soil to become compact, the topsoil should be harrowed with a disk, spring tooth drag, spike tooth drag, or other equipment designed to conditions the soil for seeding.
- Harrowing, tracking or furrowing should be done horizontally across the face of the slope.
- Always apply seed before applying mulch, unless using a hydraulic matrix or bonded fiber matrix where seed is mixed with mulch prior before application.
- Apply seed at the rates specified using calibrated seed spreaders, cyclone seeders, mechanical drills, or a hydroseeder so the seed is applied uniformly on the site.
- Broadcast seed should be incorporated into the soil by raking or chain dragging, and then lightly compacted to provide good seed-soil contact.
- Apply fertilizer as specified and allowed by local municipalities.
- Apply mulch or erosion control blanket, as specified, over the seeded areas.

Inspection and Maintenance

- Newly seeded areas need to be inspected frequently to ensure the grass is growing.
- If the seeded area is damaged due to runoff, additional stormwater measures may be needed.
- Spot seeding can be done on small areas to fill in bare spots where grass did not grow properly.
- Irrigation/watering should be used as necessary and recommended to establish vegetation in accordance with local regulations.

WIND EROSION / DUST CONTROL – EP-13

Daily dust control shall be provided as needed to stabilize soil from wind erosion and to reduce dust generated by construction activities. Special attention shall be paid to stockpiled materials. Covering of small stockpiles or areas is an alternative to applying water or other dust palliatives.

Construction Specifications:

- Dust control shall be provided daily or more often (as deemed necessary based on wind conditions, time of year, and physical conditions of the site) by application of water alone or with addition of magnesium chloride or calcium chloride in accordance with manufacturer's specifications.
- Acrylic co-polymers or other biodegradable products (soil stabilizers/tackifiers) may be used for daily dust control if approved by the project engineer and local regulators.
- Water applied for dust control should be applied evenly and without over-watering which generates runoff and may result in erosion.
- Oil or other petroleum-based products shall not be used for dust control because the oil may migrate into drainage ways or seep into the soil.
- Dust control must be implemented in accordance with local air quality requirements.
- Non-potable water should not be conveyed in tanks or drainpipes that will be used to convey potable water and there should be no connection between potable and non-potable supplies. Non-potable tanks, pipes and other conveyances should be marked "NON-POTABLE WATER – DO NOT DRINK."

Inspection and Maintenance

- Check areas protected to ensure appropriate coverage.
- Reapply water or maintain covers, as necessary to maintain their effectiveness.



APPENDIX F

SEDIMENT CONTROL BMPS

SC-1	Sediment Fence
SC-2	Sand Bag Barrier
SC-3	Gravel Bag Berm
SC-4	Straw Bale Dike
SC-5	Rock or Brush Filters
SC-6	Compost Berms and Socks
SC-7	Fiber Rolls or Wattles
SC-8	Storm Drain Inlet Protection
SC-9	Temporary Sediment Basin
SC-10	Entrance/Exit Tracking Controls
SC-11	Entrance/Exit Tire Wash
SC-12	Undercut Lots

SEDIMENT FENCE – SC-1

Construction Specifications:

Local municipality requirements should be checked to determine if local requirements differ from this BMP with respect to specific types of sediment fence allowed and methods of installation.

Prefabricated Sediment Fence

Prefabricated fence fabric shall consist of material approved by its manufacturer for use in sediment fence applications and shall include pre-fabricated pockets for stake installation. Select standard duty or heavy duty prefabricated sediment fence based on criteria shown below:

Standard Duty Sediment Fence

- Slope of area draining to fence is 4H:1V or less - Use is generally limited to less than five months
- Area draining to fence produces moderate sediment loads
- Use prefabricated standard duty sediment fence.
- Layout in accordance with typical layout - Install in accordance with attached detail.

Heavy Duty Sediment Fence

- Slope of area draining to fence is 1H:1V or less
- Use generally limited to eight months. Longer periods may require fabric replacement
- Area draining to fence produces moderate sediment loads
- Use prefabricated heavy duty sediment fence. Heavy duty sediment fences typically have the following physical characteristics:
 - Fence fabric has greater tensile strength than other fabric types available from manufacturer
 - Fence fabric has a greater permittivity than other fabric types available from manufacturer
 - Fence fabric may be reinforced with a backing or additional support to increase fabric strength
 - Posts may be spaced closer together than other pre- manufactured sediment fence types available from manufacturer.
- Layout in accordance with attached typical layout.
- Install in accordance with attached standard details.

Installation

- Install sediment fence along a level contour, with the last 6 ft of fence turned up slope. Except for the ends, the difference in elevation between the highest and lowest point along the top of the sediment fence shall not exceed one-third the fence height.
- Generally, should be used in conjunction with erosion source controls up slope to provide effective control.

Minimum BMP standards that apply to Prefabricated Sediment Fence are provided on the attached details.

Common Reasons/Circumstances for Failure

- The most common reasons for sediment fence failure are due to improper installation and poor maintenance. In particular, the toe must be securely trenched into the slope and accumulated sediment should be removed when accumulation reaches 1/3 of the fence height.

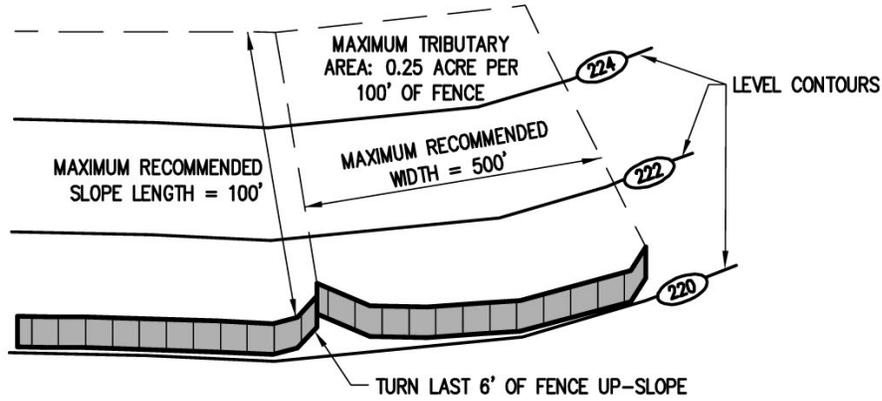
Inspection and Maintenance:

- Repair undercut sediment fences.

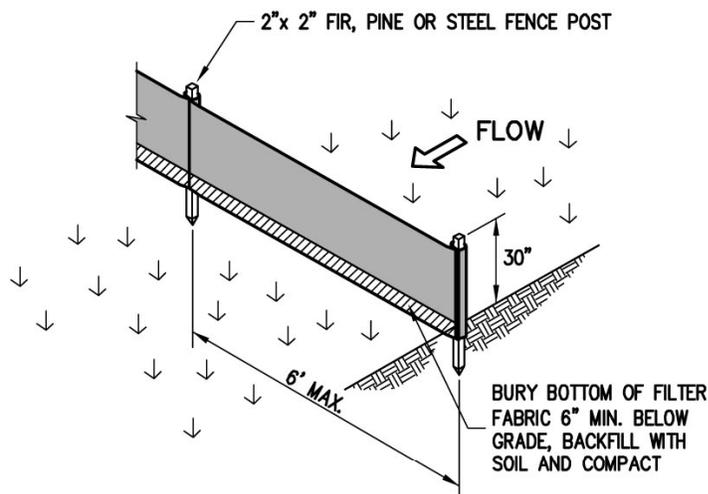
SEDIMENT FENCE – SC-1

- Repair or replace split, torn, slumping, or weathered fabric.
- Inspect sediment fence before, during, and after storm events.
- Any required repairs shall be performed as soon as possible.
- Remove sediment when accumulation reaches 1/3rd the fence height.
- The removed sediment shall be incorporated in the project, disposed of properly, or appropriately stabilized with vegetation.
- Remove sediment fence when no longer needed and upslope area has been stabilized. Fill and compact post holes and anchorage trench, remove sediment accumulation, and grade fence alignment to blend with adjacent ground.

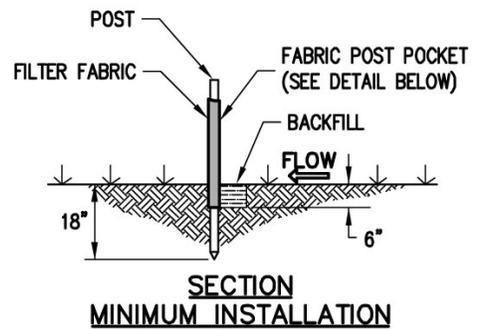
SEDIMENT FENCE – SC-1



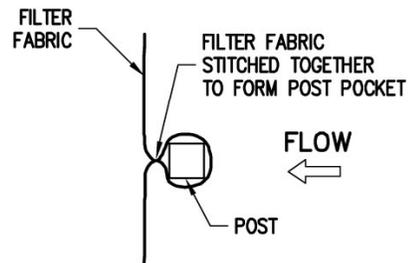
TYPICAL PREFABRICATED SEDIMENT FENCE LAYOUT



TYPICAL PREFABRICATED SEDIMENT FENCE LAYOUT



**SECTION
MINIMUM INSTALLATION**



**DETAIL
FABRIC POST POCKET**

NOTES:

- 1.) INSPECT AND REPAIR FENCE AFTER EACH STORM EVENT AND REMOVE SEDIMENT WHEN NECESSARY.
- 2.) REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND CAN BE PERMANENTLY STABILIZED.
- 3.) SEDIMENT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
- 4.) STITCHED POCKETS TO BE INSTALLED ON UPHILL SIDE OF SLOPE.

SAND BAG BARRIER – SC-2

Construction Specifications:

Sand bag barriers are intended to block and divert flow. They are not intended to be used as filtration devices.

Materials

- Sand bag Material: Sand bag shall be polypropylene, polyethylene or polyamide woven fabric, minimum unit weight four ounces per square yard (135 g/m²), mullen burst strength exceeding 300 psi (2,070 kPa) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355. Use of burlap is not acceptable since it rots and deteriorates easily.
- Sand bag Size: Each sand-filled bag shall have a length of 18 in (450 mm), width of 12 in (300 mm), thickness of 3 in (75 mm), and mass of approximately 33 lb. (15 kg). Bag dimensions are nominal, and may vary based on locally available materials. Alternative bag sizes shall be submitted to the engineer for approval prior to deployment.
- Fill Material: All sand bag fill material shall be non-cohesive, Class 1 or Class 2 permeable material free from clay and deleterious material, conforming to the provisions in Caltrans Standard Specifications Section 68-1.025 “Permeable Material”. The requirements for the Durability Index and Sand Equivalent do not apply. Fill material is subject to approval by the engineer.
- Only use sandbag barriers when diverting runoff or run-on.

Installation

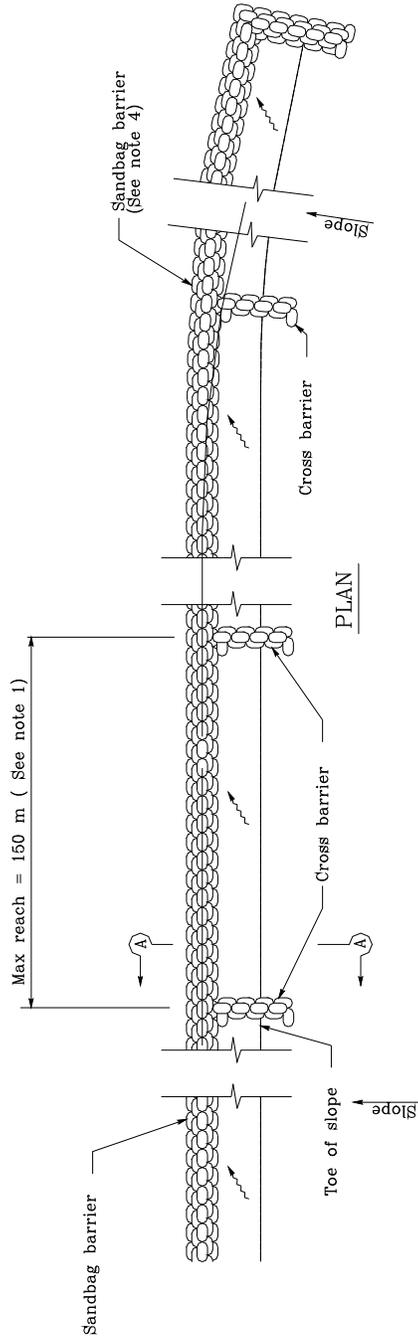
- Install along a level contour.
- Turn ends of sand bag row up slope to prevent flow around the ends.
- Generally, sand bag barriers shall be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.
- Construct sand bag barriers with a set-back of at least 3 ft (1m) from the toe of a slope. Where it is determined to be not practical due to specific site conditions, the sand bag barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practicable.

Minimum BMP standards are provided on the following details.

Inspection and Maintenance:

- Inspect sand bag barriers before, during, and after each rainfall event, and weekly throughout the rainy season.
- Reshape or replace sand bags as needed.
- Repair washouts or other damages as needed.
- Inspect sand bag barriers for sediment accumulations and remove sediment when accumulation reaches 1/3rd the barrier height. Removed sediment shall be incorporated in the project at locations designated by the engineer or shall be disposed of properly.
- Remove sand bags when no longer needed. Remove sediment accumulation, and clean, re-grade, and stabilized the area.

SAND BAG BARRIER – SC-2



TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SANDBAG)

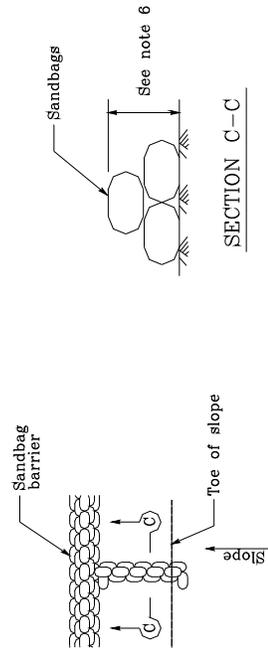
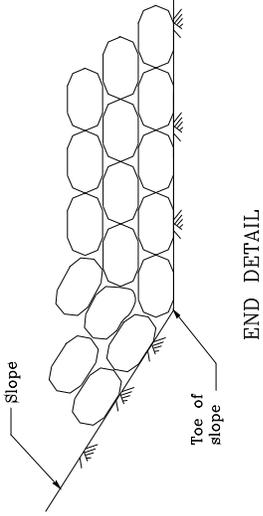
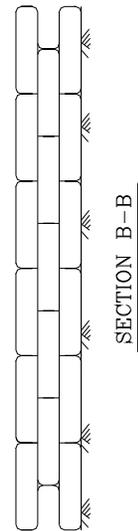
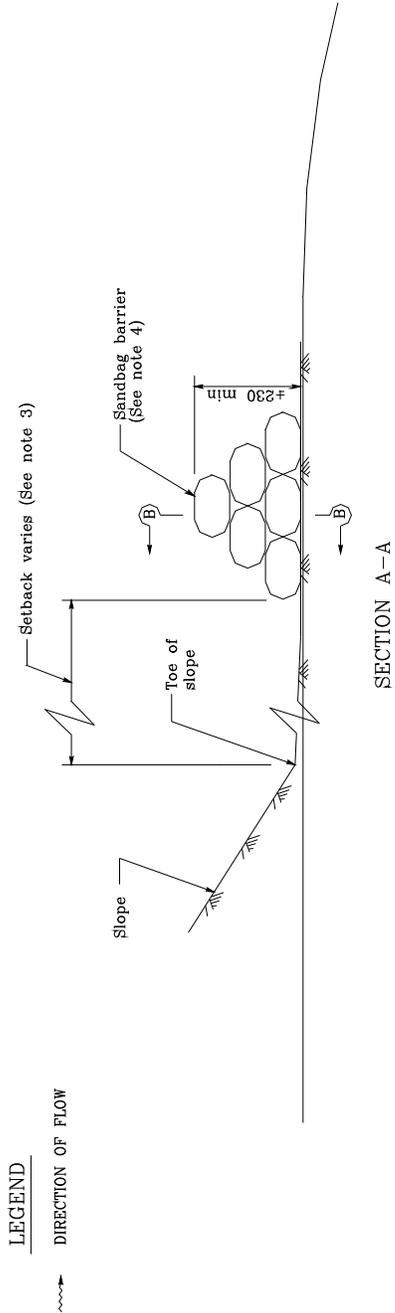
NOTES

1. Construct the length of each reach so that the change in base elevation along the reach does not exceed 1/2 the height of the linear barrier. In no case shall the reach length exceed 150 m.
2. Place sandbags tightly.
3. Dimension may vary to fit field condition.
4. Sandbag barrier shall be a minimum of 3 bags high.
5. The end of the barrier shall be turned up slope.
6. Cross barriers shall be a min of 1/2 and a max of 2/3 the height of the linear barrier.
7. Sandbag rows and layers shall be staggered to eliminate gaps.

TEMPORARY LINEAR SEDIMENT BARRIER (TYPE SANDBAG)

NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

SAND BAG BARRIER – SC-2



TEMPORARY LINEAR SEDIMENT BARRIER
(TYPE SANDBAG)

NO SCALE
ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

GRAVEL BAG BERM – SC-3

Construction Specifications:

Unlike sand bag barriers that divert flow, gravel bag berms are intended to intercept and filter sediment-laden storm water runoff from disturbed areas, retaining the sediment and releasing the water.

Materials

- **Bag Material:** Bags shall be woven polypropylene, polyethylene or polyamide fabric, minimum unit weight four ounces per square yard (135 g/m²), mullen burst strength exceeding 300 psi (2,070 kPa) in conformance with the requirements in ASTM designation D3786, and ultraviolet stability exceeding 70% in conformance with the requirements in ASTM designation D4355.
- **Bag Size:** Each gravel-filled bag shall have a length of 18 in (450 mm), width of 12 in (300 mm), thickness of 3 in (75 mm), and mass of approximately 33 lb (15 kg). Bag dimensions are nominal, and may vary based on locally available materials. Alternative bag sizes shall be submitted to the engineer for approval prior to deployment.
- **Fill Material:** Gravel shall be between 0.4 and 0.8 inch (10 mm and 20 mm) in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be between 28 and 48 lb (13 kg and 22 kg) in mass. Fill material is subject to approval by the engineer.

Installation

- When used as a linear control for sediment removal:
 - Install along a level contour.
 - Turn ends of gravel bag row up slope to prevent flow around the ends.
 - Generally, gravel bag barriers shall be used in conjunction with temporary soil stabilization controls up slope to provide effective erosion and sediment control.
- When used for concentrated flows:
 - Stack gravel bags to required height using a pyramid approach.
 - Upper rows of gravel bags shall overlap joints in lower rows.
- Construct gravel bag barriers with a set-back of at least 1m from the toe of a slope. Where it is determined to be not practicable due to specific site conditions, the gravel bag barrier may be constructed at the toe of the slope, but shall be constructed as far from the toe of the slope as practicable.
- A certificate of compliance for the gravel and bags shall be provided.

Inspection and Maintenance:

- Inspect gravel bag berms before, during, and after each rain event, and weekly throughout the rainy season. More frequent inspections may be required by local municipalities.
- Reshape or replace gravel bags as needed.
- Repair washouts or other damages as needed.
- Inspect gravel bag berms for sediment accumulations and remove sediments when accumulation reaches 1/3rd of the berm height. Removed sediment shall be incorporated in the project.
- Remove gravel bag berms when no longer needed. Remove sediment accumulations and clean, re-grade, and stabilize the area.

STRAW BALE DIKE – SC-4

Construction Specifications:

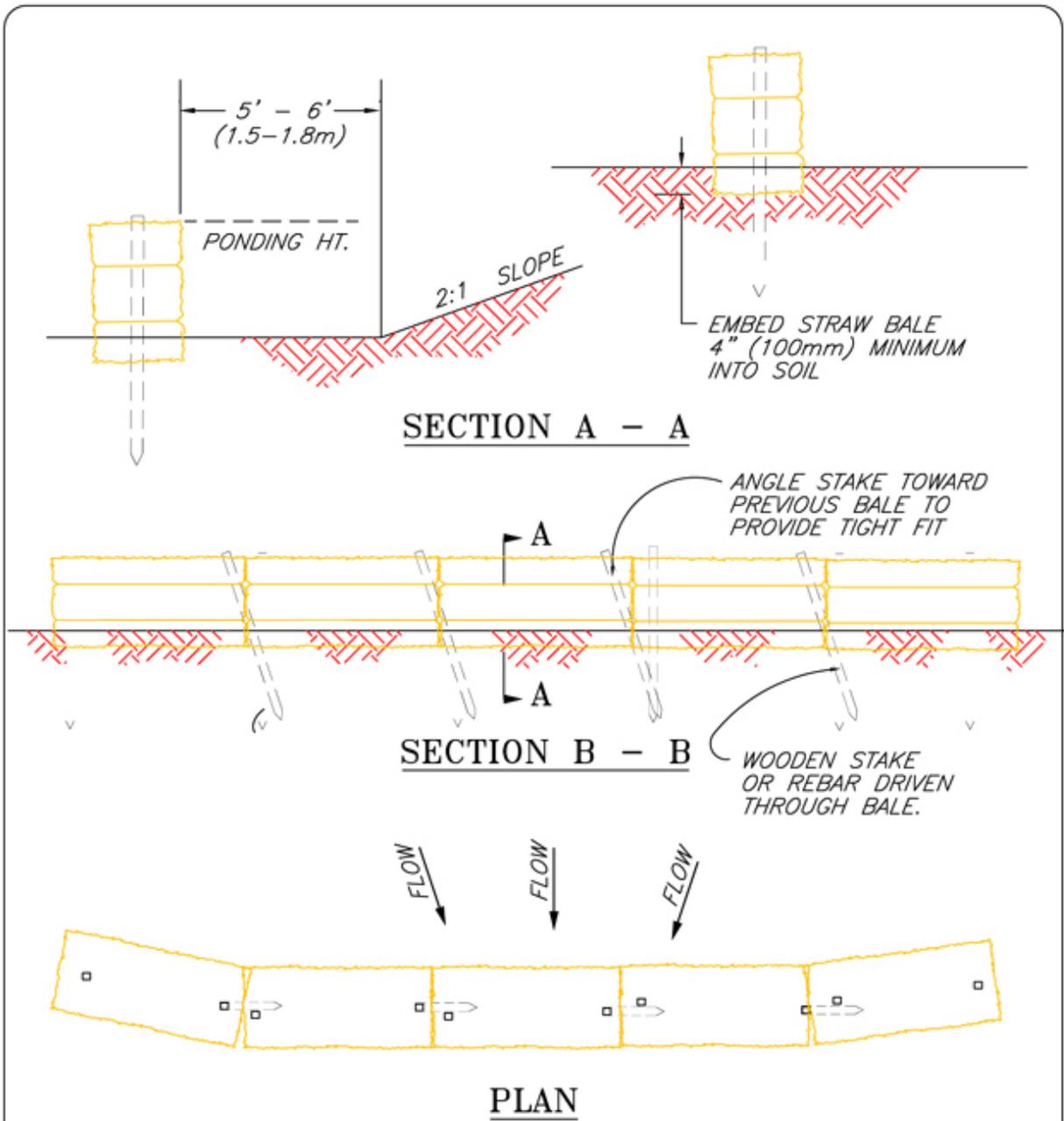
- Some local municipalities may only allow the use of straw bale dikes on an emergency basis; local requirements should be reviewed and followed.
- The bales shall be placed on the slope contour at the base of the slope or around the perimeter of the construction site. If the dike is constructed at the toe of a slope, place it 5-6 feet (1.5-1.8 m) away from the slope if possible.
- Do not construct the dike more than one bale high.
- Bales shall be placed in a row with the ends tightly abutting.
- Each bale shall be embedded in the soil a minimum of 4 inches (101 mm). Use straw, rocks, or filter fabric to fill any gaps between the bales and tamp the backfill material to prevent erosion under or around the bales.
- If the bales are wire bound, they should be oriented so the bindings are around the sides rather than along the top and bottom. Wire bindings that are placed in contact with the soil soon disintegrate and may allow the bale to fall apart.
- The bales shall be securely anchored in place by two wooden stakes or rebar driven through the bales. The first stake in each bale shall be driven toward the previously laid bale to force the bales tightly together. Drive the stakes at least 18 inches (0.5 m) into the ground.
- The straw bales do not need to be anchored if the bales are used on a relatively flat construction area with slope lengths less than 100 feet and the straw bale dike is inspected regularly. The trapped sediment should be removed when required, and repairs made promptly. The bales also do not need to be anchored if they are to be removed and replaced daily to facilitate construction.

Minimum BMP standards are provided on the following detail.

Inspection and Maintenance:

- The straw bale dikes shall be inspected before, during, and after each rain event.
- Straw bales should be replaced if they have decomposed.
- In wet areas, bales may require replacement every 6 to 9 weeks during the rainy season.
- Repairs and/or replacement shall be made promptly. Replacement bales shall be in good condition, not previously exposed to weather.
- Remove sediment behind the barrier when it reaches a depth of 6 inches (0.2 m).
- Remove the straw bales when the upslope areas have been permanently stabilized.
- Sediment shall be removed and deposited in an area that will not contribute sediment offsite.

STRAW BALE DIKE – SC-4



NOTES:

1. THE STRAW BALES SHALL BE PLACED ON SLOPE CONTOUR.
2. BALES TO BE PLACED IN A ROW WITH THE ENDS TIGHTLY ABUTTING.
3. KEY IN BALES TO PREVENT EROSION OR FLOW UNDER BALES.

**STRAW BALE
DIKE**

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FILE: STRWDIKE

COMPOST BERMS AND SOCKS SC-6



Construction Specifications

A compost filter berm is a trapezoidal berm applied by a blower and a compost sock is compost material encased in mesh to form a tube/roll. Both techniques intercept sheet flow and pond runoff, allowing sediment to fall out of suspension, and often filtering sediment as well. Compost berms and socks provide an environmentally-sensitive and cost-effective alternative to sediment fence.

Advantages

- Compost berms and compost socks made from biodegradable mesh sometimes offer a better solution than sediment fence and other sediment control methods, because compost does not require any special trenching, construction, or removal, unlike straw bales, sediment fence or coir rolls. This makes the technique very cost-effective.
- Compost is organic, biodegradable, renewable, and can be left onsite. This is particularly important below embankments near streams, as re-entry to remove or maintain the berm can cause additional disturbance. Sediment fence has to be disposed of in landfills and is often left abandoned on jobsites.
- Compost does not leach nutrients. Field tests in Connecticut have shown that run-off from compost treated sites has very low soluble salts, and all metals and nutrients are well within pollution leaching limits.
- Compost berms can be easily and quickly fixed should something happen to them in the course of construction. Compost socks withstand heavy machinery, but frequent disturbance can decrease the effectiveness of the sock.
- Mechanical compost spreaders for compost berms are commercially available and are widely used in the Pacific Northwest.
- When properly made, compost is full of nutrients and micro-organisms that stimulate turf and increase resistance to diseases. Compost binds heavy metals and can break down hydrocarbons into carbon, salts and other innocuous compounds.



COMPOST BERMS AND SOCKS SC-6

Design Considerations

Compost filter berms and socks should be used at the base of slopes 2:1 or less. There are many types of compost, all with different properties, so it is best to determine what application the compost is being used for. For compost berms and socks, compost should have the following specifications:

- Compost needs to be stable and mature.
- Particle size: Compost should consist of both large and small pieces for maximum filtration. Finer grades (screened through 3/8-1/2") are better for vegetation establishment, long term plant nutrients, and increased infiltration rates. The coarser grades (screened 2-3") are better for increased filtration, and are less likely to be disturbed by rainfall and runoff. For berms, the ratio of coarse and fine material should be 1:1. No particle should be greater than 3".
- The recommended moisture content ranges from 20-50%. Compost that is too dry is harder to apply, while that which is too wet is heavier and harder to transport. In drier areas, use compost with a higher moisture content; in wet areas, use the drier compost, as it will absorb water.
- Organic matter content: The percentage of carbon based materials in finished compost should range between 40-70%. However, Texas DOT specifies no less than 70%.
- The pH should be between 5.0 and 8.5.
- Nitrogen Content: 0.5-2.0%.
- Compost should have a minimum of soluble salts, as these can inhibit vegetation establishment. These levels should be between 4.0 and 6.0 mmhos/cm.
- Compost must be weed and pesticide free, with manmade materials comprising less than 1%.

Construction Specifications

- For compost berms on slopes of 3:1 or less, install a compost berm 1-2 ft high and 2-4 ft wide at the base. For maximum filtration properties, install berm in a trapezoidal shape, with a 4-6 ft base, and a 2-3 ft wide top. Larger berms should be used for steeper slopes. The basic rule of thumb is that the base should be twice the height of the berm.
- Typically, compost socks can handle the same water flow or slightly more than sediment fence. However, the installation technique is especially important for them to work effectively. For most applications, standard sediment fence is replaced with 12" compost socks.
 - When placed on level contours sheet flow of water should be perpendicular to the compost sock at impact and un-concentrated.
 - Place compost socks at a 5' or greater distance away from the toe of slopes to maximize space available for sediment deposition.
 - In order to prevent water flowing around the ends of compost socks, point the ends upslope to place them at a higher elevation.



COMPOST BERMS AND SOCKS SC-6

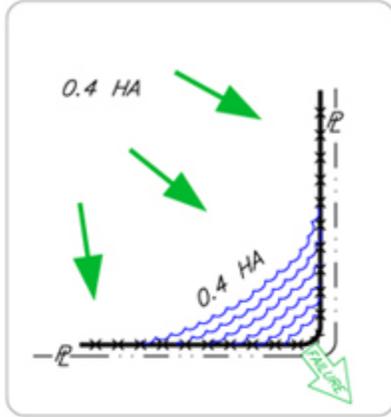


- Compost Berms and Socks can be placed around the perimeter of affected areas, if the area is flat or the perimeter is on contour. Berms and socks should be placed using ‘smiles’ and j-hooks. Do not place berms and socks where they cannot pond water.
- For steeper slopes, an additional berm or sock can be constructed on the top of the slope.
- Compost berms and socks can be seeded during application. However, field tests indicate that it is best to have only a thin layer of compost over the seed in compost berms. Slopes seeded with 2- 4” of compost over the seed had less vegetation establishment than slopes with less compost over the seed.
- Do not use compost berms and socks in areas of concentrated flow, as they are intended to control and filter sheet flow only.
- Tackifiers may be applied to berms if needed to enhance performance.

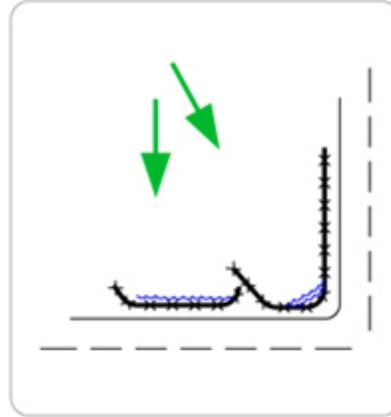
Inspection and Maintenance

- Compost berms and socks shall be inspected after each storm event and reapplied if necessary.
- Sediment retained by the berm or sock shall be removed when it has reached 1/3 of the exposed height of the berm. Alternatively, the sediment and berm or sock can be stabilized with vegetation at the end of construction.
- Berms can be left onsite and seeded, or spread out in place as a soil enhancement.

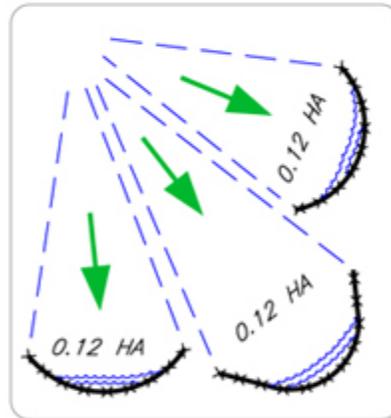
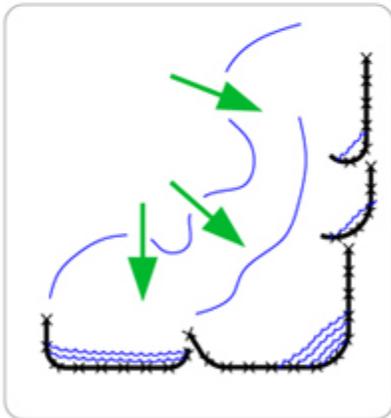
COMPOST BERMS AND SOCKS SC-6



Incorrect – Do Not layout "perimeter control" compost berms along property lines. All sediment laden runoff will concentrate and overwhelm the system.



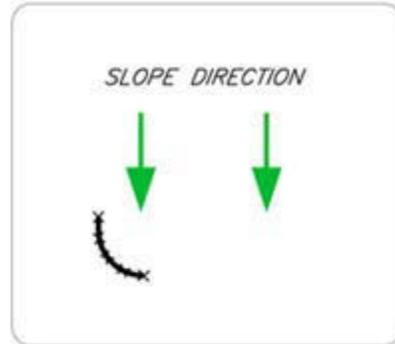
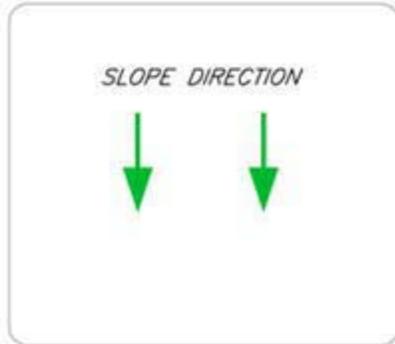
Correct – Install J-hooks



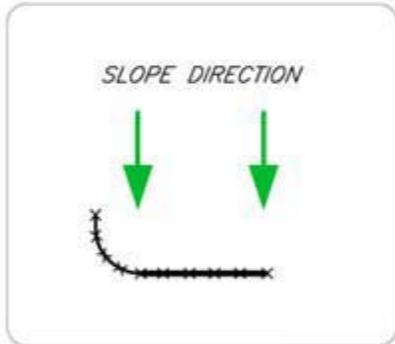
Discreet segments of compost berms, installed with J-hooks or 'smiles' will be much more effective.

COMPOST BERM PLACEMENT FOR PERIMETER CONTROL

COMPOST BERMS AND SOCKS SC-6



STEP 1 - CONSTRUCT LEG



STEP 2 - CONSTRUCT DAM

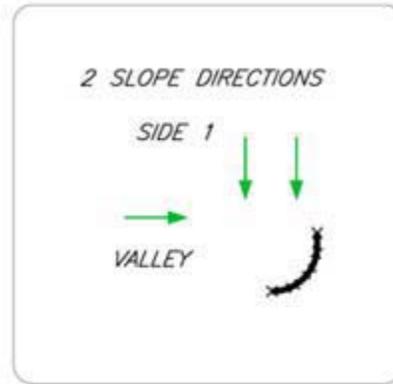
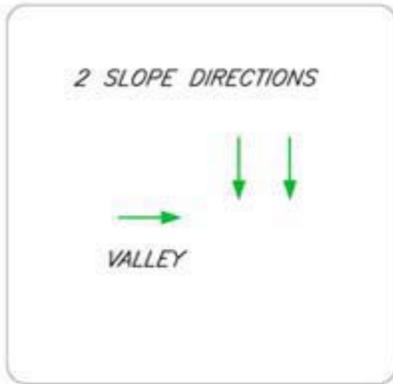


STEP 3 - CONSTRUCT LEG 2

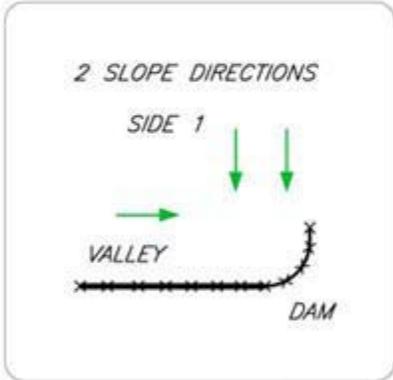
INSTALLATION WITH J-HOOKS OR 'SMILES' INCREASE COMPOST BERM EFFICIENCY.

COMPOST BERM
TYPICAL PLACEMENT-ONE SLOPE

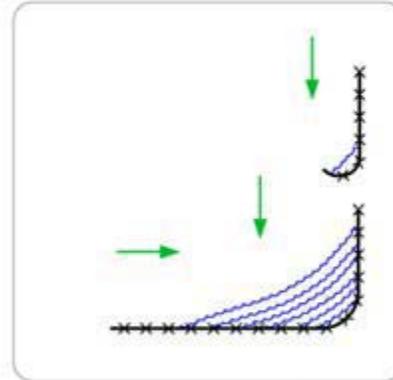
COMPOST BERMS AND SOCKS SC-6



STEP 1 - CONSTRUCT A DAM



STEP 2 - CONSTRUCT SIDE 2



STEP 3 - CONSTRUCT J-HOOKS AS NEEDED

INSTALLATION WITH J-HOOKS WILL INCREASE COMPOST BERM EFFICIENCY AND REDUCE EROSION-CAUSING FAILURES.

COMPOST BERM
TYPICAL PLACEMENT-TWO SLOPES

FIBER ROLLS OR WATTLES SC-7

Construction Specifications

Fiber rolls are manufactured from biodegradable fibers (such as weed-free rice straw) that are wrapped in photo degradable netting. They range from approximately 8 to 20 inches in diameter by 25-30 feet (8-9 m) long. Rolls are placed and staked along the contour of newly constructed or disturbed slopes, in shallow trenches. Fiber rolls reduce slope length, and are intended to capture and keep sediment on the slopes. Fiber rolls are useful to temporarily stabilize slopes by reducing soil creep, and sheet and rill erosion until permanent vegetation can be established. Fiber rolls can catch soil that is moved down the slope by the freeze/thaw processes. Organic matter and seeds are trapped behind the rolls, which provide a stable medium for germination. Rolls trap topsoil and retain moisture from rainfall, which aids in growth of seedlings planted upslope of the rolls.



Design Considerations:

- Sites appropriate for fiber rolls are:
 - Slopes susceptible to sheet and rill erosion.
 - Slopes producing dry ravel.
 - Slopes susceptible to freeze/thaw activity.
 - Slopes difficult to vegetate because of soil movement.
- Fiber rolls are not intended for use in concentrated flow situations.
- It is imperative, especially on steeper slopes, that a sufficiently deep trench is constructed in which to place the roll. Without the trench, the roll will not function properly, runoff will scour underneath it, and trees or shrubs planted behind the roll will not have a stable environment in which to become established.
- Fiber rolls last an average of two years, depending on the fiber and mesh used in manufacturing. This is an important factor to consider when planning how long the slope will need to be mechanically stabilized.
- Fiber rolls can be staked with live stakes if site conditions warrant. The moisture retained by the fiber roll will encourage cutting establishment.

Advantages

- Fiber rolls are a relatively low-cost solution to sheet and rill erosion problems.
- They can replace sediment fences or straw bales on steep slopes.
- Rolls are a short-term solution to help establish native vegetation.
- Rolls store moisture for vegetation planted immediately upslope.
- Plastic netting will eventually photo-degrade, eliminating the need for retrieval of materials after the fiber or straw has broken down.

FIBER ROLLS OR WATTLES SC-7

- The fibers become incorporated into the soil with time, adding organic material to the soil and retaining moisture for vegetation.

Disadvantages

- Rolls only function for one or two seasons.
- Pilot holes through the rolls must be pre-driven with a metal rod.
- If not installed properly with a sufficient trench, rolls may fail during the first rain event.
- Fiber rolls may require maintenance to ensure that the stakes are holding and the rolls are still in contact with the soil. This is especially true on steep slopes in sandy soil.

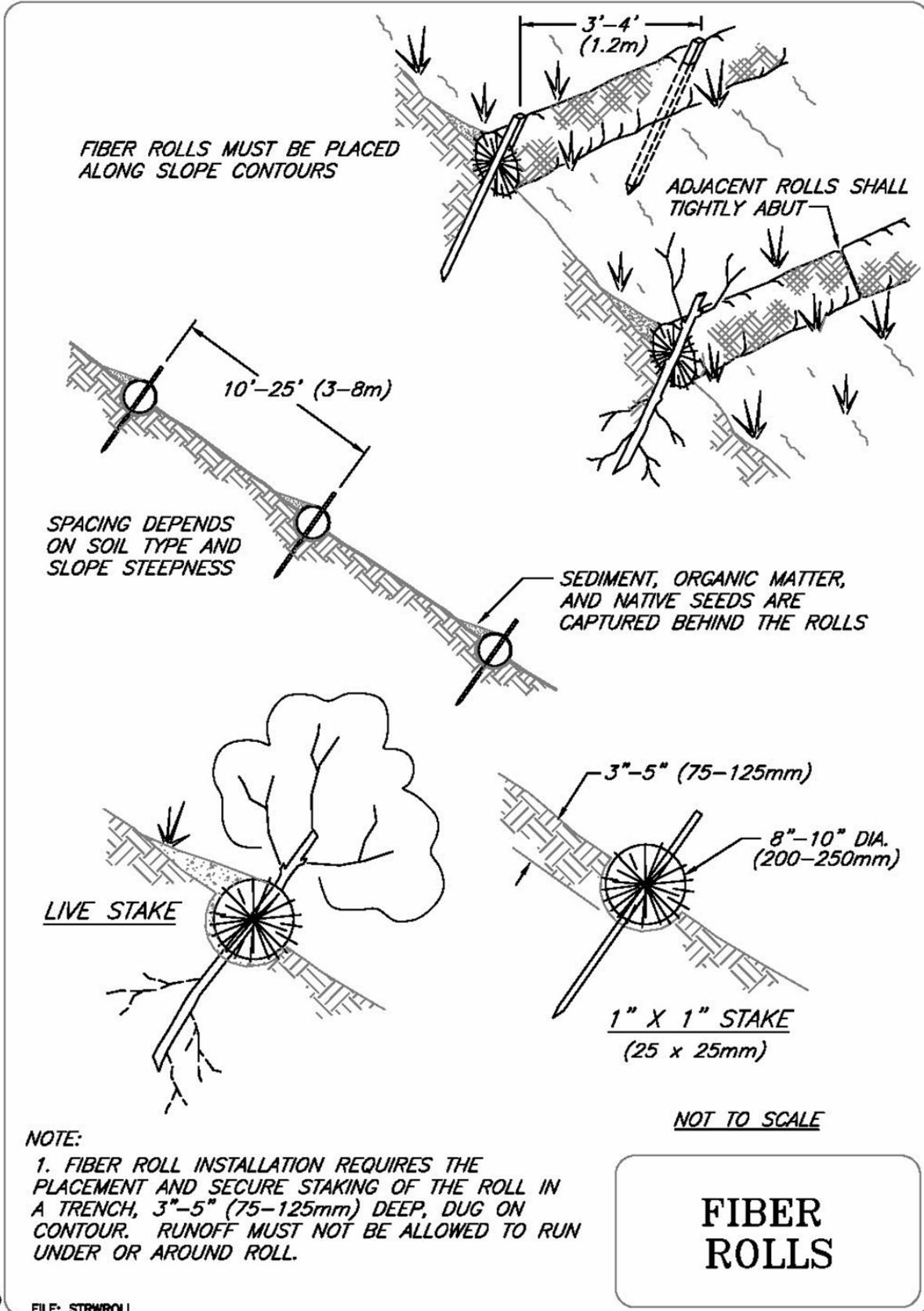
Installation

- Prepare the slope before the installation procedure is started.
- Shallow gullies should be smoothed as work progresses.
- Dig small trenches across the slope on contour, to place rolls in. The trench should be deep enough to accommodate half the thickness of the roll. When the soil is loose and uncompacted, the trench should be deep enough to bury the roll 1/3 of its thickness because the ground will settle.
- It is critical that rolls are installed perpendicular to water movement, and parallel to the slope contour.
- Start building trenches and installing rolls from the bottom of the slope and work up.
- Construct trenches at contour intervals 25-30 feet (8-10 m) apart depending on the steepness of the slope. The steeper the slope, the closer together the trenches should be.
- Lay the roll along the trenches fitting it snugly against the soil. Make sure no gaps exist between the soil and the straw wattle.
- Use a straight bar to drive holes through the roll and into the soil for the willow or wooden stakes.
- Drive the stake through the prepared hole, and into the soil. Leave only 1 or 2 inches (25 or 51 mm) of the stake exposed above roll.
- Install stakes at least every 4 feet (1.2 m) apart along the length of the wattle. Additional stakes may be driven on the downslope side of the trenches on highly erosive or very steep slopes.

Inspection and Maintenance

- Inspect the rolls and the slopes after rain events and at the frequencies required by local municipalities. Make sure the rolls are in contact with the soil.
- Repair any rills or gullies promptly.
- Reseed or replant vegetation if necessary until the slope is stabilized.

FIBER ROLLS OR WATTLES SC-7



1996 JOHN McCULLAH



FILE: STRWROLL

ENTRANCE / EXIT TRACKING CONTROLS – SC-10

Tracking controls reduce offsite tracking of sediment and other pollutants by providing a stabilized entrance at defined construction site entrances and exits and/or providing methods to clean-up sediment or other materials to prevent them from entering a storm drain by sweeping or vacuuming.

Construction Specifications:

- Stabilize entrances should be implemented on a project-by-project basis in addition to other BMPs.
- Sweeping or vacuuming should be implemented when sediment is tracked from the project site onto public or private paved roads, typically at points of site exit.
- Use stabilized entrances and/or sweeping at construction sites:
 - Where dirt or mud is tracked onto public roads;
 - Adjacent to water bodies;
 - Where poor soils are encountered, such as soils containing clay;
 - Where dust is a problem during dry weather conditions.

Stabilized Construction Entrances

- Limit the points of entrance/exit to the construction site by designating combination or single purpose entrances and exits. Require all employees, subcontractors and others to use them. Limit speed of vehicles to control dust. Clearly mark entrances and exits with appropriate signage.
- Locate construction entrances and exits to limit sediment leaving the site and to provide for maximum utility by all construction vehicles. Avoid entrances which have steep grades and entrances at curves in public roads.
- Grade each construction entrance/exit to prevent runoff from leaving the construction site.
- Design stabilized entrance/exit to support heaviest vehicles and equipment that will use it.
- Select construction access stabilization (aggregate, asphaltic concrete, concrete) based on longevity, required performance, and site conditions.
- Use of constructed or constructed/manufactured steel plates with ribs (e.g., shaker / rumble plates or corrugated steel plates) for entrance/exit access is allowable (See below).
- The aggregate size for construction of the pad shall be 3-6 inch (76-152 mm) stone. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
- The thickness of the pad shall not be less than 8 inches (203 mm). Use geotextile fabric, if necessary, to improve stability of the foundation in locations subject to seepage or high water table.
- The width of the pad shall not be less than the full width of all points of ingress or egress and in any case shall not be less than 12 feet (3.6 m) wide.
- The length of the pad is as required, but not less than 50 feet (15.2 m).
- All sediment spilled, dropped, washed or tracked onto public rights-of-way shall be removed as soon as possible by hand sweeping or mechanized sweeper. Washing of sediment from the public right-of-way shall be prohibited.
- Provide drainage to carry water to a sediment trap or other suitable outlet.
- When necessary, wheels shall be cleaned to remove sediment prior to entrance onto public rights-of-way (see SC-11, Entrance / Exit Tire Wash).
- All sediment shall be reduced or prevented from entering any storm drain, ditch or watercourse through use of sediment fence, gravel bags, sediment barriers, or other approved methods.

ENTRANCE / EXIT TRACKING CONTROLS – SC-10

Minimum BMP standards are provided on the following detail.

Entrance with Shaker Plates

- Incorporate with a stabilized construction entrance/exit.
- Construct on level ground when possible, on a pad of coarse aggregate, greater than 3 inches (76 mm) and smaller than 6 inches (150 mm). A geotextile fabric shall be placed below the aggregate.
- Install constructed or manufactured steel plates with ribs (e.g., rumble plates or corrugated steel plates) at the entrance/exit in addition to the aggregate.
- Steel shaker plates shall be designed and constructed/manufactured for anticipated traffic loads.

Street Sweeping and Vacuum Sweeping

- Inspect potential sediment tracking locations daily.
- Visible sediment tracking should be swept or vacuumed as needed. Manual sweeping is appropriate for small jobs.
- For larger projects, it is preferred to use mechanical broom or vacuum sweepers that collect and contain removed sediment and material.

If not mixed with debris or trash, incorporate the removed sediment back into the project or dispose of it at an approved disposal site.

Inspection and Maintenance:

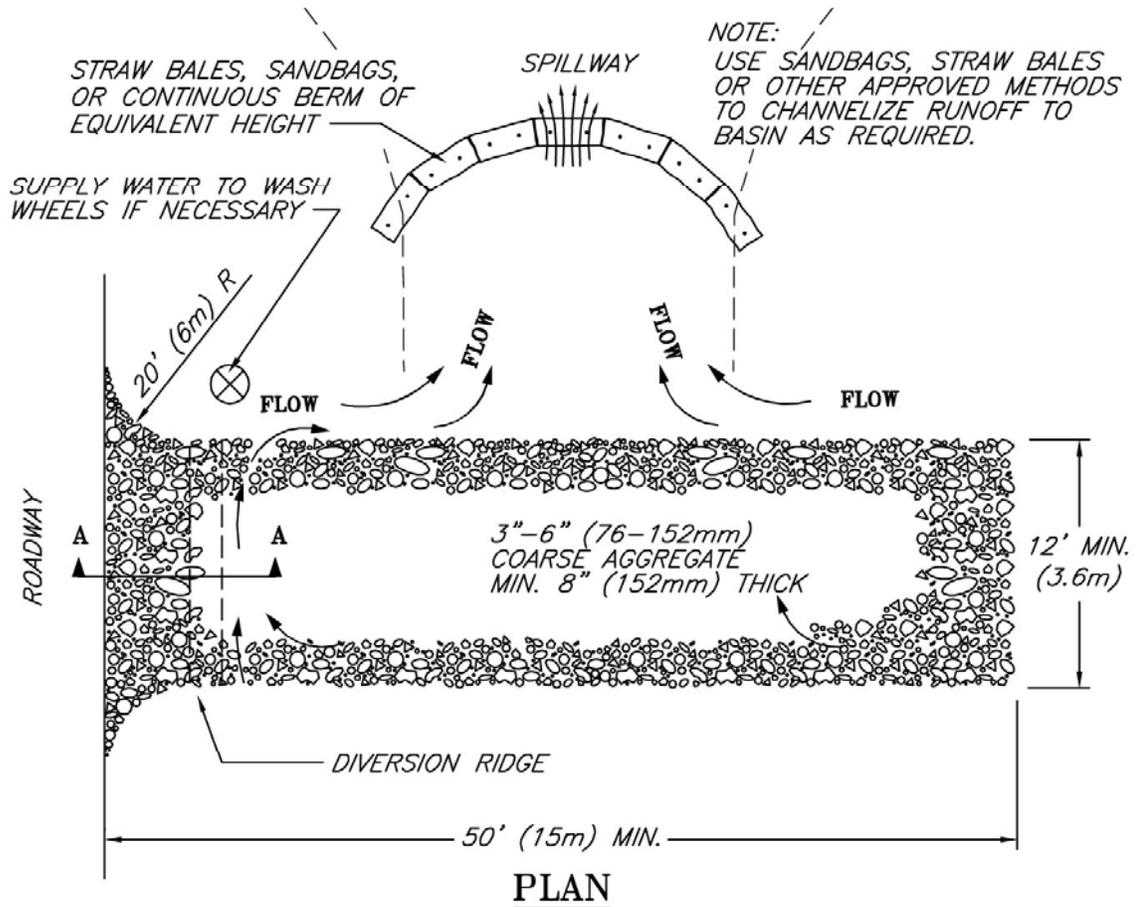
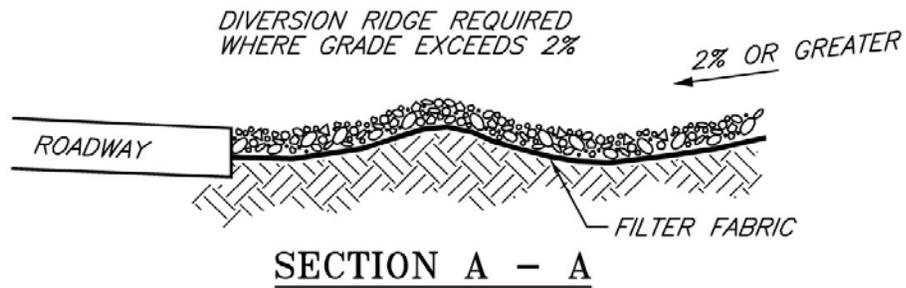
Stabilized Construction Entrance

- Inspect routinely for damage and assess effectiveness. Repair if access is clogged with sediment.
- Where tracking has occurred on roadways sweeping should be conducted the same day. Preferably water should not be used to wash sediment off the streets. If water is used, it should be captured preventing sediment-laden water from running off the site.
- Keep all temporary roadway ditches clear.
- The entrance shall be maintained in a condition that will reduce or prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand, and repair and/or maintenance of any measures used to trap sediment.
- Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. Replace gravel material when surface voids are visible.
- After each rainfall, inspect all gravel construction entrances and clean it out as necessary.
- As soon as possible remove all objectionable materials spilled, washed, or tracked onto public roadways. Remove all sediment deposited on paved roadways immediately.

Street Sweeping and Vacuuming

- Inspect entrance and exit points daily and sweep tracked sediment as needed.
- Be careful not to sweep up any unknown substance or any object that may be potentially hazardous.
- After sweeping is finished, properly dispose of sweeper wastes.

ENTRANCE / EXIT TRACKING CONTROLS – SC-10



NOTES:

1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEAN OUT OF ANY MEASURES USED TO TRAP SEDIMENT.
2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.

**TEMPORARY
GRAVEL
CONSTRUCTION
ENTRANCE/EXIT**

© 1994 JOHN McCULLAH

FILE: ENTRANCE

ENTRANCE / EXIT TIRE WASH – SC-11

Construction Specifications:

- Incorporate with a stabilized construction entrance/exit. See BMP SC-10, “Entrance / Exit Tracking Controls.”

Manual/Hose Tire Wash

- Construct on level ground when possible, on a pad of coarse aggregate, greater than 3 inches (75 mm) and smaller than 6 inches (150 mm). A geotextile fabric shall be placed below the aggregate.
- Tire wash shall be designed and constructed/manufactured for anticipated traffic loads.
- Provide a drainage conveyance that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch shall be of sufficient grade, width, and depth to carry the wash runoff.
- Require that all employees, subcontractors, and others that leave the site with mud-caked tires and/or under-carriages use the wash facility.

Temporary Drive-Through Tire Wash

- Minimum dimensions: 40 feet by 12 feet by 1.5 feet (length, width, and sump depth; 12.2 m by 3.7 m by 0.46 m). The minimum length includes ingress and egress from the sump.
- The aggregate size for construction of the pad shall be 4-6 inch (101-152 mm) stone. Place the gravel to the specific grade and dimensions shown on the plans, and smooth it.
- The thickness of the pad shall not be less than 8 inches (203 mm). Use geotextile fabric under the gravel to improve stability of the foundation.
- Alternatively, install a 3 in. asphalt lift over a stable roadway base with the same dimensions identified above.
- The run out pad should extend 50 feet (15.2 m) past the egress ramp and drain back into the sump or to a suitable collection and treatment facility.
- Install fencing, as necessary, to manage vehicle traffic.

Minimum BMP standards are provided on the following illustrations.

Inspection and Maintenance:

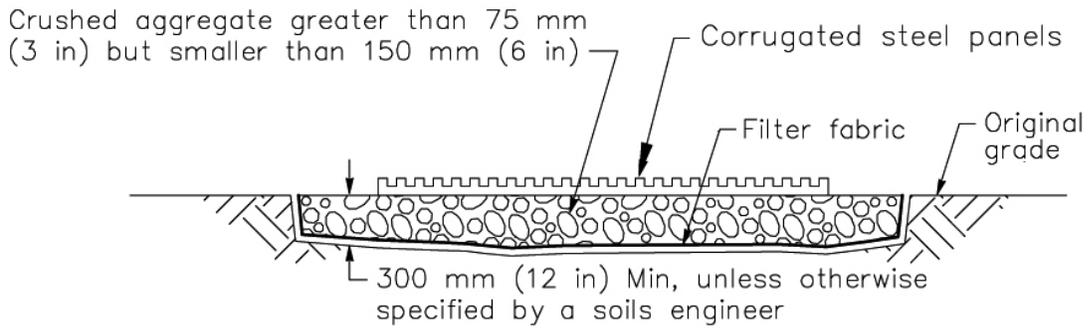
Manual/Hose Tire Wash

- Remove accumulated sediment in tire wash and/or sediment trap to maintain system performance.
- Inspect routinely for damage and repair as needed.

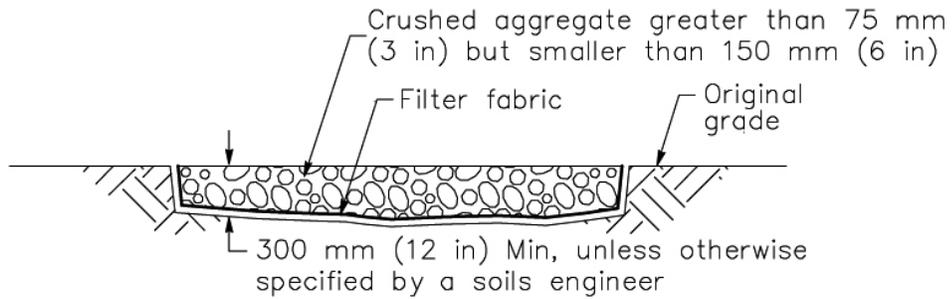
Temporary Drive-Through Tire Wash

- Inspect routinely to assess the water levels within the sump, the depth of accumulated sediment, and identify any areas that require maintenance.
- Remove accumulated sediment from the tire wash facility to maintain tire wash sump depth. Sediment may be pumped, piped or vacuumed to a suitable collection and treatment facility.
- Clean or replace rock when clogged with sediment and re-grade as needed.
- Maintain the run-out pad as necessary to prevent sediment accumulation.
- Immediately remove any rock that is carried from the pad to the roadway.
- Ensure that wash water drainage, collection and treatment system is functioning.

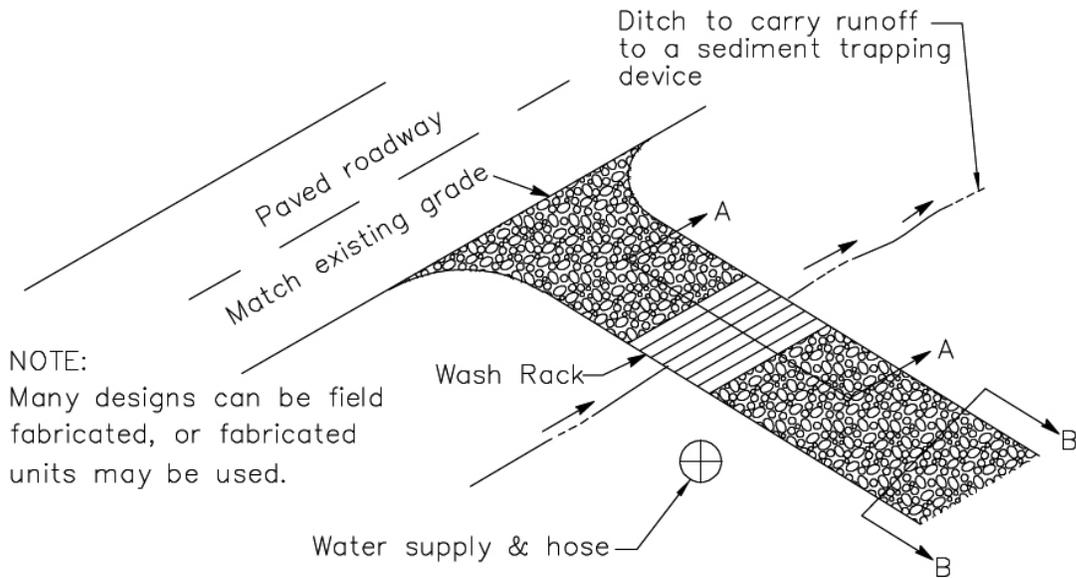
ENTRANCE / EXIT TIRE WASH – SC-11



SECTION A-A
NOT TO SCALE



SECTION B-B
NTS

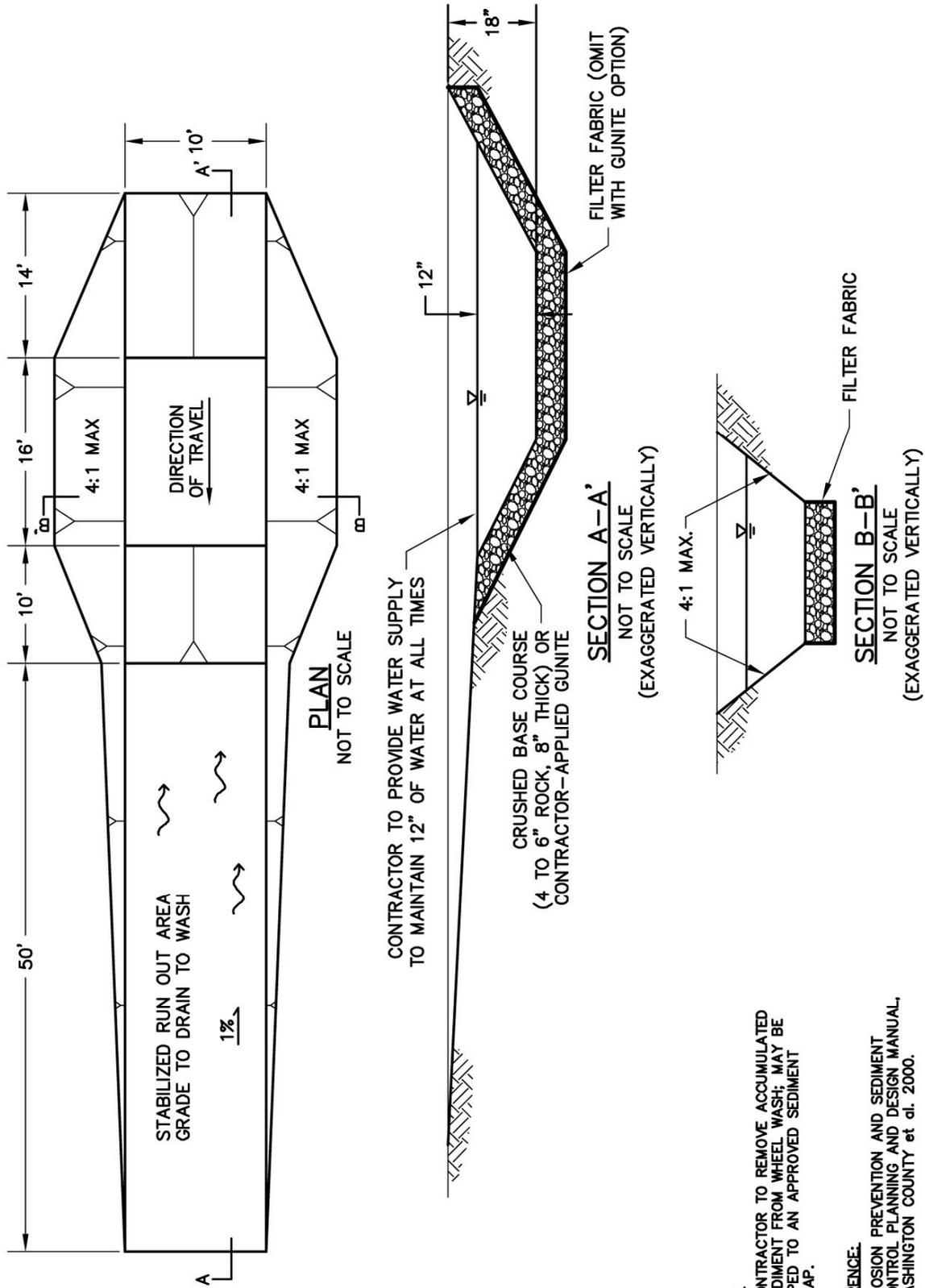


NOTE:
Many designs can be field fabricated, or fabricated units may be used.

TYPICAL TIRE WASH
NOT TO SCALE

MANUAL / HOSE TIRE WASH

ENTRANCE / EXIT TIRE WASH – SC-11



NOTE:
 1.) CONTRACTOR TO REMOVE ACCUMULATED SEDIMENT FROM WHEEL WASH; MAY BE PIPED TO AN APPROVED SEDIMENT TRAP.

REFERENCE:
 EROSION PREVENTION AND SEDIMENT CONTROL PLANNING AND DESIGN MANUAL, WASHINGTON COUNTY et al. 2000.

TEMPORARY DRIVE THROUGH TIRE WASH



Attachment 7.7

OREGON GUIDELINES FOR TIMING OF IN-WATER WORK TO PROTECT FISH AND WILDLIFE RESOURCES

June, 2008

Purpose of Guidelines - The Oregon Department of Fish and Wildlife, (ODFW), under its authority to manage Oregon's fish and wildlife resources has updated the following guidelines for timing of in-water work. The guidelines are to assist the public in minimizing potential impacts to important fish, wildlife and habitat resources.

"The guidelines are to assist the public in minimizing potential impacts..."

Developing the Guidelines - The guidelines are based on ODFW district fish biologists' recommendations. Primary considerations were given to important fish species including anadromous and other game fish and threatened, endangered, or sensitive species (coded list of species included in the guidelines). Time periods were established to avoid the vulnerable life stages of these fish including migration, spawning and rearing. The preferred work period applies to the listed streams, unlisted upstream tributaries, and associated reservoirs and lakes.

"The guidelines are based on ODFW district fish biologists' recommendations"

Using the Guidelines - These guidelines provide the public a way of planning in-water work during periods of time that would have the least impact on important fish, wildlife, and habitat resources. ODFW will use the guidelines as a basis for commenting on planning and regulatory processes. There are some circumstances where it may be appropriate to perform in-water work outside of the preferred work period indicated in the guidelines. ODFW, on a project by project basis, may consider variations in climate, location, and category of work that would allow more specific in-water work timing recommendations. These more specific timing recommendations will be made by the appropriate ODFW district office through the established planning and regulatory processes.

"These guidelines provide the public a way of planning in-water work during periods of time that would have the least impact on important fish, wildlife and habitat resources"

Modification of Guidelines - There may be limited situations where minor modification of the timing guidelines is warranted. ODFW may consider new information, the need for greater detail, or other factors that would generally improve the quality and usefulness of these guidelines. ODFW through the appropriate district office may modify or clarify timing guidelines within the district as needed. Statewide updates to guidelines will occur on a periodic basis.

"ODFW through the appropriate district office may modify or clarify timing guidelines within the district as needed"

Public Comments - A limited technical public review of these updated guidelines was conducted. A few responses provided specific biological information and recommendations for changing in-water work periods. Applicable ODFW districts reevaluated their timing recommendations based on this public response. Other comments concerned format and application of the timing guidelines. Some responses stated that different types of in-water activities should have different timing guidelines. ODFW recognizes there will be occasions that more specific timing guidelines may need to be established for specific activities. The established planning and regulatory processes can accommodate that need.

"A limited technical public review of these updated guidelines was conducted"

WATERWAYPREFERRED WORK PERIOD¹

Mill Creek	July 1 - August 15 (CHS,STS,RT,BUT,WF*)
Cottonwood Creek	July 1 - October 31 (STS,RT*)
Birch Creek	July 1 - October 31 (STS,RT*)
Couse Creek	July 1 - October 31 (STS,RT*)
South Fork Walla Walla River	July 1 - August 15 (CHS,STS,RT,BUT,WF*)
North Fork Walla Walla River	
NF Walla Walla River (below Little Meadows Cyn)	July 15 - September 30 (STS,RT,BUT,WF)
NF Walla Walla River (above Little Meadows Cyn)	July 1 - August 31 (STS,RT,BUT,WF)

Grande Ronde Watershed DistrictEnterprise Office - (541) 426-3279

Columbia

Snake River (state line to Hells Canyon Dam)	July 1 - October 15 (CHF,CHS,SS,STS*)
Grande Ronde Grande River (below Wallowa River)	July 1 - September 15 (CHF,STS*)
Wenaha River	July 1 - August 15 (CHS,STS,BUT*)
Joseph Creek	July 1 - March 31 (STS*)
Wallowa River	July 15 - August 15 (CHS,STS,RB,BT,BUT*)
Imnaha River (above Big Sheep Creek)	July 15 - August 15 (CHS,STS,BUT*)
Imnaha River (below Big Sheep Creek)	July 1 - October 15 (CHF,STS*)

La Grande Office - (541) 963-2138

Columbia

Snake

Grande Ronde

Grande Ronde River (Wallowa River to Highway 244 Bridge)	July 1 - October 15 (CHS,STS,RB,BUT*)
Minam River	July 1 - August 15 (CHS,STS,RB,BUT*)
Lookingglass Creek	July 1 - August 15 (CHS,STS,RB,BUT*)
Catherine Creek	
Catherine Creek (to, and including Little Creek)	July 1 - October 15 (CHS,STS,RB,BUT*)
Catherine Creek (above Little Creek)	July 1 - August 15 (CHS,STS,RB,BUT*)
Grande Ronde River (above highway 244 bridge)	July 1 - July 31 (CHS,STS,RB,BUT*)
Snake River Reservoir	July 1 - November 30 (WW*)
Snake River Reservoir Tributaries	July 1 - October 31 (RB*)
Burnt River	July 1 - October 31 (RB,BT*)
Pine Creek	July 1 - August 31 (RB,BUT*)
Powder River (mouth to Phillips Reservoir)	July 1 - October 31 (RB*)
Anthony Creek	July 1 - August 31 (RB,BUT*)
North Powder R. (above Dutch Flat Cr.)	July 1 - August 31 (RB,BUT*)
Wolf Creek (above Wolf Creek Res.)	July 1 - August 31 (RB,BUT*)
Big Muddy Creek (above Foothill Rd.)	July 1 - August 31 (RB,BUT*)
Pine Creek (above North Fork Pine Cr.)	July 1 - August 31 (RB,BUT*)
Salmon Creek (above Pocahontas Road)	July 1 - August 31 (RB,BUT*)
Powder River (above Phillips Reservoir)	July 1 - August 31 (RB,BUT*)
Deer Creek (above Phillips Reservoir)	July 1 - August 31 (RB,BUT*)

¹ Work period is established for named stream, all upstream tributaries, and associated lakes within the watershed unless otherwise indicated.

Attachment 7.8
Agency Consultation Record



Jason Yencopal

01/06/2011 05:03 PM

To: "Audie Huber" <Audiehuber@ctuir.com>, "Carolyn Templeton" <Carolyn.Templeton@ferc.gov>, "Carl Stiff" <cbstiff@wildblue.net>, "Colleen Fagan" <Colleen.E.Fagan@state.or.us>, "GRIFFIN Dennis"
cc: Heidi Martin/Baker County@Baker County, Jason Yencopal/Baker County@Baker County
Subject: Stakeholder Update Mason Dam Hydroelectric Project

Stakeholders,

Attached is an update with where we are at and where we are heading. If I may be of any help please let me know.

Sincerely,
Jason



Stakeholder Updates of January 6 2011b.pdf

January 6, 2011

Subject: Mason Dam Hydroelectric Project Update

Dear Stakeholders:

I appreciate your understanding as I have had to set up a temporary office. The County Courthouse had a flood in November in which most of the Courthouse Departments had to be relocated. I am now able to get back to some sort of normalcy.

Since our May 20th meeting, there has been some agency contact changes. Colleen Fagan with Oregon Department of Fish and Wildlife (ODF&W) has accepted a new position. Ken Homolk, ODF&W's hydropower program leader in Salem will be the new contact. The Forest Service has a new Whitman District Ranger, Jeff Tomac. I also wanted to remind everyone that Paul DeVito with the Oregon Department of Environmental Quality accepted a new position (midyear 2010) and Steve Kirk is now the main contact.

For the main update I will be summarizing the August 18, 2010 update that focused on the three following issues and add to it:

1. Transmission line route
2. Dissolved oxygen in the Powder River below Mason Dam
3. Fish entrainment and mortality through Mason Dam

Transmission Line Route

The preferred transmission line route is a 0.83 mile long, 12.47 kV over head line with 40 ft tall poles that would follow Black Mountain Road. This route would consist of the following segments:

Segment 1: 150 ft long, across open space at the base of the dam

Required Tree Clearance: None

Segment 2: 500 ft long, through sparse trees to Black Mountain Road

Required Tree Clearance: 40 ft wide by 500 ft long corridor through sparse trees

Segment 3: 1900 ft long, along Black Mountain Road, crossing the road as necessary to minimize tree clearance.

Required Tree Clearance: A few trees

Segment 4: 1300 ft long, on the west side of Black Mountain Road to the Idaho Power Corridor

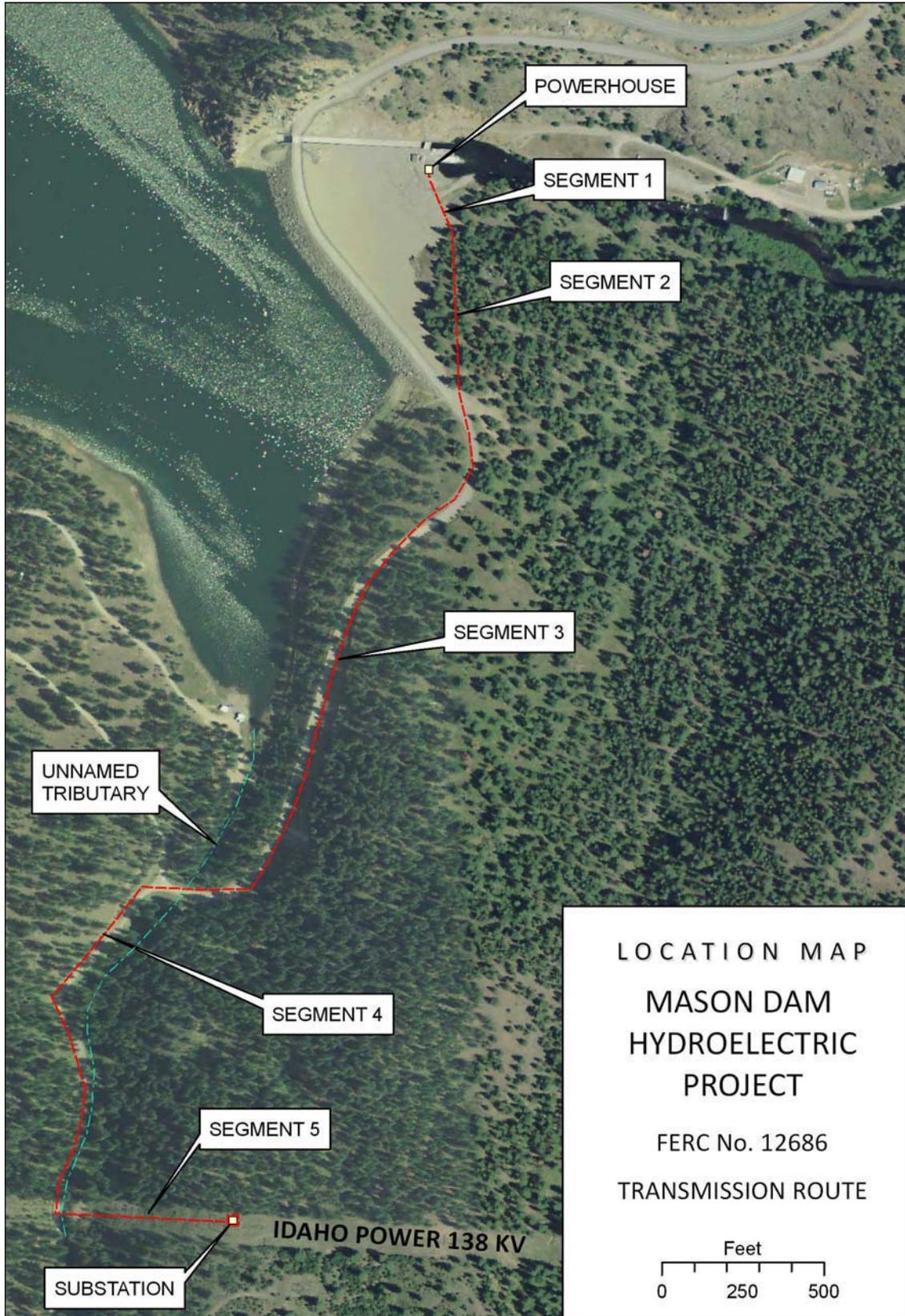
Required Tree Clearance: A few trees on the northern end of the segment and a 20 ft wide by 900 ft long corridor on the southern end of segment

See Figure 1 for a map.

Dissolved Oxygen

Baker County developed a DO Compliance Plan in October and submitted for stakeholders to comment on.

Figure 1.



Fish Entrainment and Turbine Mortality

Baker County originally proposed to screen the intake in lieu of conducting an entrainment study. Our understanding after the May 20th 2010 meeting was that the entrainment would not change from the addition of the hydroelectric project but the mortality would. Thus a turbine and valve mortality analysis would be done to satisfy the entrainment requirement that was waived by the agencies. We understand that the agencies have some existing projects that would benefit the resources of upper Powder River basin habitat and we would encourage these projects be submitted to the County to be discussed and incorporated in future plans.

Recent Progress

Baker County developed four plans for stakeholder review and comments. These plans include:

- Erosion and Sediment Control Plan
- Revegetation/Noxious Weed Management Plan
- Bypass Flow Plan
- DO Compliance Plan

We have received comments back on these plans from the Oregon Department of Environmental Quality and Oregon Department of Fish and Wildlife. We will continue to modify these plans based on the comments received.

Baker County is also working on the License Application to continue to develop this valuable energy resource.

A tentative timeline is to provide updates to the plans mentioned above in the next couple of weeks and at the latest have a license application by March.

We hope to dry out here at the Courthouse and continue to work together with all of you on the Mason Dam Hydroelectric Project.

Nicholas E Josten

From: jyencopal@bakercounty.org
Sent: Wednesday, October 20, 2010 3:03 PM
To: Audie Huber; Carolyn Templeton; Carl Stiff; Colleen Fagan; GRIFFIN Dennis; Emily Carter; Fred Warner; Gary Miller; Ken Anderson; Kenneth Hogan; GRAINEY Mary S; Mike Gerdes; Micheal Hall; Randy Joseph; KIRK Steve; Quentin Lawson; LUSK Rick M; Robert Ross; Shawn Steinmetz; Susan Rosebrough; Thomas Stahl; Timothy Welch; GRIFFIN Dennis; Joseph Hassell; Carl Merkle; lgecy@ecowest-inc.com; ted@tsorenson.net; gsense@cableone.net
Cc: hmartin@bakercounty.org; jyencopal@bakercounty.org
Subject: Mason Dam Plan Review
Attachments: Baker County Bypass Flow Plan Oct_20_2010_plusattachments_ap.pdf; Baker County DO Compliance Plan Oct_20_2010_plusattachments_ap.pdf; Baker County Erosion and Sedi...t_20_2010_plusattachments_ap.pdf

Dear Stakeholders,

Based on the PLP comments received and with FERC's recommendation, Baker County has developed plans that cover: Erosion and Sediment control, Bypass flow, DO compliance, and Noxious Weed management. Baker County would like to provide the agencies the following plans at this time. Attached are the Erosion and Sediment Control Plan, Bypass Flow Plan, and DO Compliance Plan. Comments on these plans will be due November 22nd, 2010. The Noxious Weed Management Plan is being reviewed by the Baker County Weed Department and will be distributed after their review, with comments from stakeholders due at a later date.

Thank you for your time and consideration. If I may be of any help please let me know.

Sincerely,
Jason

(See attached file: Baker County Bypass Flow Plan Oct_20_2010_plusattachments_ap.pdf)(See attached file: Baker County DO Compliance Plan Oct_20_2010_plusattachments_ap.pdf)(See attached file: Baker County Erosion and Sedi...t_20_2010_plusattachments_ap.pdf)



Oregon

Theodore R. Kulongoski, Governor

Department of Environmental Quality

Eastern Region Bend Office
475 NE Bellevue Drive, Suite 110
Bend, OR 97701-7415
(541) 388-6146
FAX (541) 388-8283

November 23, 2010

Jason Yencopal
Baker County
1995 Third Street
Baker City, OR 97814

RE: ODEQ Comments to the DO Compliance Plan (October 2010)
Mason Dam Hydroelectric Project (FERC No. P-12686)

Dear Mr. Yencopal:

The Oregon Department of Environmental Quality is submitting comments on the October 2010 Dissolved Oxygen (DO) Compliance Plan for the Mason Dam proposed hydroelectric project, FERC No. P-12686. These comments have been prepared to assist Baker County in refining the DO compliance plan prior to the License Application.

General Comments

The draft DO compliance plan lacks the detail necessary to insure that the applicant will comply with state water quality standards. In general, there is a lack of detail regarding system design and the procedures to implement the tiered approach. The following comments address specific issues.

Specific Comments:

I. Introduction: Add the following sentence: "The ODEQ may require modifications to the DO Compliance Plan as it deems appropriate to assess and confirm water quality compliance."

1.0 Purpose and Scope: Please provide reference to the Oregon Administrative Rules that specify the DO criteria applicable to the Powder River. Also include a description of the designated fish use for the stilling basin and downstream of the stilling basin with the applicable DO criteria. Oregon Department of Fish and Wildlife has designated the still basin as "redband trout rearing" and the Powder River immediately downstream of the stilling basin as "redband trout spawning" (personal communication with Colleen Fagan, ODFW)

Provide a summary description of the proposed seasonal operations relative to the seasonal DO criteria.

4.0 Responsibilities: Provide assurance that the approved Quality Assurance Project Plan (QAPP) for collection of the DO data will be followed and any changes in monitoring activities that do not conform to the QAPP will be reported to DEQ.

5.0 Procedures: Provide a more complete description of the tiered approach for DO compliance including; 1) decision process for changing compliance actions, 2) schedule of decision process for taking corrective actions to comply with DO, and 3) consideration of adaptive management to revise tiered approach based on DO compliance monitoring data.



5.1: Include a detailed description of the Draft Tube Aeration system with design specifications.

5.1.1 Draft Tube Aeration: the text states: "... that once it is open will allow air to enter the system through the venture effect..." Do you mean venturi effect?

5.1.2 Rock Weirs: Include an analysis of potential impacts to sediment erosion and sediment geomorphology that supports the designated fish use and associated water quality criteria.

5.1.3.1 Bypass Flow: Provide a description of the corrective action procedures and reporting schedules.

5.2 Monitoring: Provide additional information regarding the locations selected for monitoring DO. Since the proposed project is required to meet the DO criteria for trout rearing in the stilling basin, DEQ recommends monitoring DO at the downstream boundary of the stilling basin and at one location downstream of the stilling basin and within the area of proposed rock weirs to monitor DO relative to the DO criteria associated with redband trout spawning.

6.0 Summary of Mitigation Measures: Provide a more complete summary of mitigation measures and adaptive management used to implement the mitigation measures. For instance, the text states: "... adjustments will be made to operation criteria if DO levels fall below the state water DO standard." What is the schedule for reporting the DO levels? What is the decision process and schedule for taking corrective action?

7.0 Attachments: DEQ recommends deleting Section 7.0. Details regarding the weir locations, weir design specifications and Draft Tube Aeration System should be included in Section 5.1.1 Draft Tube Aeration and Section 5.1.2 Rock Weirs.

If you have any questions or need any additional information regarding these comments, please contact me at (541) 633-2023 or by email at kirk.steve@deq.state.or.us.

Sincerely,



Steve Kirk
Eastern Region Hydroelectric Specialist
Oregon Department of Environmental Quality



November 22, 2010

Jason Yencopal
Mason Dam Project Manager
1995 Third Street
Baker City, Oregon 97814

Subject: ODFW's Comments on Baker County's draft plans for the proposed Mason Dam Hydroelectric Project (FERC No. 12686).

Dear Mr. Yencopal:

Baker County has requested comments on draft plans associated with its efforts to install hydroelectric power at the existing Bureau of Reclamation's Mason Dam. Enclosed are ODFW's comments on Baker County's DO Compliance Plan, Bypass Flow Plan, Erosion and Sediment Control Plan, and Revegetation/Noxious Weed Management Plan.

DO Compliance Plan

3.0 - Baker County defines spawning as "the time that fish are spawning and fry are emerging and rearing". Baker County's definition includes spawning, incubation, emergence, and rearing. All four of these life history stages should be defined separately, particularly since the Oregon Department of Environmental Quality (DEQ) has separate dissolved oxygen (DO) standards for salmonid spawning use and salmonid rearing and migration use.

5.1.1.1 - Baker County indicates that a pipe will be attached to the draft tube with a valve that once it is open will allow air to enter the system through the venture effect and aerate the water. ODFW requests clarification on whether Baker County is referring to the Venturi effect.

5.1.2.2 - Baker County indicates that it will build rock weirs, as needed, across the Powder River in the 0.16 mile stretch downstream of the stilling basin, if agreed upon. Additional information is needed on the potential effects of these weirs on stream flows, fish passage, entrapment and stranding, and erosion. Upstream and downstream passage of all life stages of native migratory fish species, which include redband trout, needs to be provided throughout this stretch of the Powder River.

5.1.2.3 – According to Baker County, rock weirs would only be constructed if post-project monitoring reveals that DO concentrations drop below 95% saturation during spawning times at the DO monitoring station. Baker County, however, has not identified the proposed location of the DO monitoring station. Redband trout rearing occurs in the stilling basin with redband trout spawning likely occurring immediately downstream of the stilling basin. Therefore, ODFW believes DO monitoring for rearing should occur in the stilling basin at the first location where accurate readings can be taken, and monitoring for spawning should occur immediately downstream of the stilling basin.

5.1.2.4 – As proposed, weirs would be constructed one at a time until their number is sufficient to achieve the standard at the monitoring station. Additional information is needed on monitoring that will occur and how the project will be operated during weir construction to ensure water quality standards are met.

5.1.2.5 – ODFW believes that state water quality standard for DO will need to be met at the downstream end of the stilling basin. According to Attachment 7.1, however, three rock weirs would be placed within the 0.16 mile section of the Powder River downstream of the stilling basin. Therefore, the state standard for DO would not be met at the downstream end of the stilling basin. If DO standards cannot be met at the downstream end of the stilling basin with installation of rock weirs, ODFW recommends that other alternatives be investigated that would provide a reasonable assurance of compliance with state water quality standards. Further, how were locations and numbers of weirs determined?

5.1.2.8 – Baker County indicates upstream passage for small fish will be provided through large interstitial passages between boulders. Oregon's fish passage law (ORS 509.580 - 509.645) requires upstream and downstream passage at all artificial obstructions in those Oregon waters in which migratory native fish are currently or have historically been present. Additional information needs to be provided to demonstrate that upstream and downstream passage will be provided throughout the year for all life stages of native migratory fish. This should include a discussion of how interstitial spaces will be maintained. Rock weir designs should be provided to ODFW for review and approval. No construction should occur until ODFW approves rock weir designs.

5.1.2.9 – Construction is proposed for minimum flow periods. Construction will need to occur during ODFW's instream work window, unless a variance is requested and approved by ODFW.

5.2 – Insufficient information is provided to determine if monitoring will be sufficient to determine if the Project is in compliance with DEQ's water quality standards. A water quality monitoring plan should be developed in consultation with ODFW and ODEQ and included in this plan or the license application. The monitoring plan should include DO, TDG, and temperature monitoring.

7.3 – ODFW recommends that the Draft Tube Aeration System article be removed from the plan. Instead, Baker County should summarize it and other relevant literature on draft tube aeration within the DO Compliance Plan.

Bypass Flow Plan

This plan should include the minimum flows that this plan is intended to ensure will be maintained during construction and operation of the Project.

2.0 - More information on these references is needed including date and author so that they can be accessed by ODFW.

4.1 - Baker County indicates it will work with BOR and Baker Valley Irrigation District, but it fails to identify what they will be working on.

5.3.1 – Additional operations information is needed in this plan including emergency backup and notification components. ODFW should be notified of any emergencies as soon as possible.

5.4.1 – Additional information is needed on maintenance including procedures and timing.

6.2 – Additional information is needed to ensure identified minimum flows will be maintained below the project, including how and where they will be measured.

6.3 and 6.4 – These sections do not appear relevant to this plan. ODFW recommends they be removed.

Erosion and Sediment Control Plan

2.0 – Unclear what reference Baker County has identified. Additional information such as author, agency, and date should be provided.

3.3 – ODFW should also be consulted regarding revegetation of disturbed areas.

3.4 – Insufficient information is provided to determine adequacy of implementation schedule.

5.0 – Insufficient information is provided by Baker County for ODFW to determine what construction activities are planned for the Project, when these construction activities will occur, which BMPs will be implemented for each to control and manage erosion, dust, and soil movement, and how activities will be monitored. ODFW requests that Baker County elaborate on procedures.

5.2 – Who will be contracted to conduct weekly inspections and what information will they be collecting?

6.4 - When is tailrace construction proposed to occur?

6.5 – ODFW should be consulted on appropriate seed mixes to ensure no impacts to wildlife.

7.0 – These attachments should be removed from the plan. Instead, Baker County should summarize relevant sections and measures that will be implemented at this project.

Revegetation/Noxious Weed Management Plan

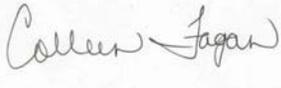
Baker County identifies the purpose of this plan is for the control and prevention of noxious weeds at the Mason Dam Hydroelectric Project. ODFW requests that the boundary for the plan be more clearly identified.

5.0 – Insufficient information is presented for ODFW to determine if implementation of this plan will result in control and prevention of noxious weeds. Proposed methods and monitoring for control and prevention of noxious weeds need to be included in the plan.

7.0 – ODFW recommends that the attachments be deleted from the plan. Instead, Baker County should clearly describe the efforts it will undertake to prevent the introduction and spread of noxious weeds as well as treatments that will be applied to decrease or eliminate noxious weed infestations. The majority of information included in these attachments is not relevant to this project.

Thank you for the opportunity to review these draft plans. If you have any questions on these comments or need additional information, please contact me at (541) 962-1835 or colleen.e.fagan@state.or.us.

Sincerely,



Colleen Fagan
NE Region Hydropower Coordinator