

APPENDIX 11

**TEMPORARY EROSION AND SEDIMENT CONTROL REPORT
AND PROJECT STORMWATER POLLUTION PREVENTION
PLAN (SWPPP)
DAVID EVANS AND ASSOCIATES, INC
June 2009**

FINAL

*Temporary Erosion and Sediment Control Report &
Project Stormwater Pollution Prevention Plan (SWPPP)*

Cross Park

Tacoma, Washington

PRCC00000043

June, 2009



DAVID EVANS AND ASSOCIATES INC.

Prepared for

Pierce County Parks & Recreation

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Preface

This report was prepared for Pierce County Parks and Recreation for the Proposed Cross Park. In preparing this report, David Evans and Associates, Inc., (DEA) used information collected in the course of the investigation and versions of the Pierce County Site Development Regulations.

I hereby state the this Erosion and Sedimentation Control Report for Pierce County Parks and Recreation has been prepared by me or under my supervision and meets the standard of care and expertise which is usual and customary in this community for professional engineers. I understand that Pierce County does not and will not assume liability for the sufficiency, suitability, or performance of T.E.S.C. facilities prepared by me.

[Engineer]
Project Civil Engineer

Section 1: Project Description

This report has been prepared for Pierce County Parks Department for the proposed Cross Park at 4418 Military Road East. The project site is located in Section 25, Township 19 North, Range 3 East, W.M. in Pierce County, Washington State. The site area includes about 12.16 acres and is located on parcel number is 0319252018. The zoning of the proposed parcel is Residential Resource (RR).

The proposed project includes a trail head with restroom facilities and picnic shelters, as well as a small parking lot. All of the improvements will be limited to approximately three acres at the north end of the parcel. The project site is defined as the 12.16 acres to the north of Clover Creek. The 2009 assessed land value for the full parcel is \$640,200.

All stormwater discharge will be managed using Low Impact Development techniques. The primary Best Management Practice (BMP) will be rain gardens. Rain gardens infiltrative beds with plantings that accept sheet flow from runoff surfaces.

Section 2: Twelve Elements

Element #1: Mark Clearing Limits

Prior to beginning land disturbing activities, including clearing and grading, clearly mark all clearing limits, sensitive areas and their buffers, and trees that are to be preserved within the construction area. These shall be clearly marked, both in the field and on the plans, to prevent damage and offsite impacts.

The clearing limits shown on the Erosion Control Plan Sheets shall be marked with High Visibility Plastic Fence as shown in pierce county standard detail BMP C103 prior to beginning land disturbing activities.

The duff layer, native top soil, and natural vegetation shall be retained in an undisturbed state to the maximum extent practicable. If it is not practicable to retain the duff layer in place, it should be stockpiled on site, covered to prevent erosion, and replaced immediately upon completion of the ground disturbing activities.

Element #2: Establish Construction Access

The site access shall be constructed as shown on the Erosion Control Plan sheets using quarry spalls.

Wheel wash or tire baths should be located on site, if the stabilized constructions entrance is not effective in preventing sediment from being tracked onto roads/accesses.

If sediment is tracked off site, roads/accesses shall be cleaned thoroughly at the end of each day, or more frequently during wet weather, if necessary to prevent sediment from entering waters of the state. Sediment shall be removed from roads by shoveling or

pickup sweeping and shall be transported to a controlled sediment disposal area. Street washing will be allowed only after sediment is removed in this manner.

Street wash wastewater shall be controlled by pumping back on site to an approved infiltration facility, or otherwise must be prevented from discharging into systems tributary to state surface waters. Options include discharge to the sanitary sewer, or discharge to an approved offsite treatment system. For discharges to the sanitary sewer, permits must be obtained from the County Industrial Pretreatment Program at (253) 798-3013.

Element #3: Control Flow Rates

A sediment trap shall be constructed to provide flow rate protection for the construction runoff. Sizing calculations are attached in Appendix A.

Element #4: Install Sediment Controls

The sediment trap, silt fence, swales and dikes shall be installed prior to mass grading.

Element #5: Stabilize Soils

All exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact, flowing water, and wind.

Full stabilization means all soil disturbing activities at the site have been completed and areas where the soil or natural vegetative cover has been disturbed have been properly covered and accepted to meet permanent erosion control. Permanent erosion control can include concrete or asphalt paving; quarry spalls used as ditch lining; application of thick layers of gravel or mulch; or vegetative cover in a manner that will fully prevent soil erosion. Where the term "fully established" is used to describe vegetative cover or plantings, it shall be understood to mean that healthy vegetation covers 90 percent of exposed bare soil. The application of hydroseeding, even in conjunction with a bonded fiber matrix (BFM) or rolled erosion product, will not be accepted as fully established permanent erosion control before the necessary development and ground cover requirements of the plantings are met. The strong root structures of well established vegetation are an essential mechanism in controlling soil erosion. The county will inspect and must approve all areas as fully stabilized before the release of financial guarantees.

Temporary erosion control measures shall remain in place until permanent measures are established. From October 1 through April 30, no soils shall remain exposed and unworked for more than 2 days. From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days. This condition applies to all soils on site, whether at final grade or not. Soils shall be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast. Applicable practices include, but are not limited to, temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, soil application of polyacrylamide (PAM), the early application of gravel base on areas to be paved, and dust control.

Soil stabilization measures should be appropriate for the time of year, site conditions, estimated duration of use, and potential water quality impacts that stabilization agents may have on downstream waters or groundwater. Soil stockpiles must be stabilized from erosion, protected with sediment trapping measures, and when possible, be located away from storm drain inlets, waterways and drainage channels.

Contractors shall install the bedding materials, roadbeds, structures, pipelines, or utilities and restabilize the disturbed soils so that:

- From October 1 through April 30 no soils shall remain exposed and unworked for more than 2 days, and
- From May 1 to September 30, no soils shall remain exposed and unworked for more than 7 days.

Element #6: Protect Slopes

Construct cut and fill slopes in a manner that will minimize erosion. Slope protection in the form of check dams and grass-lined channels will be installed as necessary to minimize erosion of slopes during construction.

Excavated material shall be placed on the uphill side of trenches, consistent with safety and space considerations.

Element #7: Protect Drain Inlets

All storm drain inlets made operable during construction shall be protected so that stormwater runoff does not enter the conveyance system without first being filtered or treated to remove sediment.

All approach roads shall be kept clean. Sediment and street wash wastewater shall be controlled as specified above in Element #2.

Inlets should be inspected weekly at a minimum and daily during storm events. Inlet protection devices should be cleaned or removed and replaced when sediment has filled one-third of the available storage (unless a different standard is specified by the product manufacturer).

Element #8: Stabilize Channels and Outlets

The temporary on-site channels have been designed to convey the 10 year, 1-hour time step flow rate indicated by WWHM, increased by a factor of 1.6, as required by the Pierce County Stormwater Manual.

Outlet protection will be provided to protect against possible overflow of the sediment trap.

Element #9: Stabilize Channels and Outlets

All pollutants, including waste materials and demolition debris, that occur onsite shall be handled and disposed of in a manner that does not cause contamination of stormwater. Woody debris may be chopped and spread on site.

Cover, containment, and protection from vandalism shall be provided for all chemicals, liquid products, petroleum products, and other materials that have the potential to pose a threat to human health or the environment. Onsite fueling tanks shall include secondary containment.

Maintenance and repair of heavy equipment and vehicles involving oil changes, hydraulic system drain down, solvent and de-greasing cleaning operations, fuel tank drain down and removal, and other activities which may result in discharge or spillage of pollutants to the ground or into stormwater runoff must be conducted using spill prevention measures, such as drip pans. Contaminated surfaces shall be cleaned immediately following any discharge or spill incident. Emergency repairs may be performed on site using temporary plastic placed beneath and, if raining, over the vehicle.

Wheel wash or tire bath wastewater shall be discharged to a separate onsite treatment system or to the sanitary sewer.

Application of agricultural chemicals, including fertilizers and pesticides, shall be conducted in a manner and at application rates that will not result in loss of chemical to stormwater runoff. Manufacturers' recommendations for application rates and procedures shall be followed.

BMPs shall be used to prevent or treat contamination of stormwater runoff by pH modifying sources. These sources include, but are not limited to, bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and sawing, exposed aggregate processes, and concrete pumping and mixer washout waters. Stormwater discharges shall not cause or contribute to a violation of the water quality standard for pH in the receiving water.

Construction sites shall adjust the pH of stormwater if necessary to prevent violations of water quality standards. Projects must obtain written approval from the Department of Ecology prior to using chemical treatment other than CO₂ or dry ice to adjust pH.

Element #10: Control Dewatering

Foundation, vault, and trench dewatering water, which have similar characteristics to stormwater runoff at the site, shall be discharged into a controlled conveyance system prior to discharge to a sediment trap or sediment pond. Channels must be stabilized, as specified in Element #8.

Clean, non-turbid dewatering water, such as well-point groundwater, can be discharged to systems tributary to state surface waters, as specified in Element #8, provided the dewatering flow does not cause erosion or flooding of receiving waters. These clean waters should not be routed through stormwater sediment ponds.

Highly turbid or contaminated dewatering water from construction equipment operation, clamshell digging, concrete tremie pour, or work inside a cofferdam, shall be handled separately from stormwater.

Other disposal options, depending on site constraints, may include:

- Infiltration
- Transport offsite in a vehicle, such as a vacuum flush truck, for legal disposal in a manner that does not pollute state waters
- Ecology-approved onsite chemical treatment or other suitable treatment technologies
- Sanitary sewer discharge with local sewer district approval, if there is no other option
- Use of a sedimentation bag with outfall to a ditch or swale for small volumes of localized dewatering.

Element #11: Maintain BMPs

All temporary and permanent ESC BMPs shall be maintained and repaired as needed to assure continued performance of their intended function. Maintenance and repair shall be conducted in accordance with BMP specifications.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site. Disturbed soil resulting from removal of BMPs or vegetation shall be permanently stabilized.

Element #12: Manage the Project

Phasing of Construction:

Development projects shall be phased where feasible in order to prevent soil erosion and, to the maximum extent practicable, the transport of sediment from the site during construction. Revegetation of exposed areas and maintenance of that vegetation shall be an integral part of the clearing activities for any phase.

Seasonal Work Limitations:

From October 1 through April 30, clearing, grading, and other soil disturbing activities shall only be permitted if shown to the satisfaction of the county that silt-laden runoff will be prevented from leaving the site through a combination of the following:

- Site conditions including existing vegetative coverage, slope, soil type, and proximity to receiving waters
- Limitations on activities and the extent of disturbed areas
- Proposed ESC measures.

Based on the information provided and/or local weather conditions, the county may expand or restrict the seasonal limitation on site disturbance. The county shall take enforcement action – such as a notice of violation, administrative order, penalty, or stop-work order under the following circumstances:

- If, during the course of any construction activity or soil disturbance during the seasonal limitation period, sediment leaves the construction site causing a violation of the surface water quality standard

Maintaining an updated Construction SWPPP:

- The Construction SWPPP shall be retained on site or within reasonable access to the site.
- The SWPPP shall be modified whenever there is a change in the design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the state.
- The SWPPP shall be modified if, during inspections or investigations conducted by the owner/operator, or the applicable local or state regulatory authority, it is determined that the SWPPP is ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site.
- The SWPPP shall be modified as necessary to include additional or modified BMPs designed to correct problems identified. Revisions to the SWPPP shall be completed within 7 days following the inspection.

Section 3: Construction Sequence and Procedure

The construction sequence shall be as follows:

1. Attend pre-construction meeting with Pierce County prior to starting any work.
2. Beginning October 1, 2008, turbidity sampling will be required by a certified erosion and sediment control lead (CESCL). The CESCL shall be identified in the swppp and shall be present on-site or on call at all times. Certification shall be obtained through an approved erosion and sediment control training program that meets the minimum training standards established by ecology (see d.o.e. bmp c160). If turbidity monitoring thresholds are exceeded, install d.o.e.-approved self-contained flocculation/filtration system(s) as required to reduce the turbidity of the effluent discharge to acceptable levels.
3. Flag all clearing limits.
4. Install construction fence as shown on the plans.
5. Locate and flag sediment trap area.
6. Install filter fabric fences in all locations shown on the Erosion Control Plans.
7. Install construction entrance.
8. Clear and grub all areas within the clearing limits.
9. Mass grade sediment trap as shown on the Erosion Control Plan Sheets. Install a staff gauge with a mark 1' above the bottom in each sediment trap. Provide rip-rap for discharge points and in overflow weirs.
10. Provide temporary/permanent covering of surfaces as required by the specifications and time of year.
11. Construct interceptor ditches and rock check dams.
12. Commence grading the site to final grade elevations.
13. Install temporary culverts as shown on the plans.
14. Commence grading the site to final grade elevations.
15. Install catch basins and pipes and other drainage system facilities. Install temporary catch basin protection until the site is completely stabilized.
16. Install water and other utilities per the construction plans.
17. Fine grade road and parking areas and install base course and crushed surfacing top course for paved areas.

18. Install hot mix asphalt concrete pavement as shown on plans.
19. Install pervious trail.
20. Landscape areas, hydroseed and install amenities to stabilize exposed soil.
21. Erosion control measures shall be updated as necessary during all phases of construction to prevent sediment from being transported off site. All erosion control facilities shall remain until the site soils have been stabilized.
22. Contractor to remove temporary culverts, catch basin protection and other T.E.S.C. facilities only when directed by the engineer.
23. Remove all sediment from drainage structures, pipes, and detention pond.
24. Continue daily inspection reports until the final day inspection is signed off by the construction manager that the site is fully stabilized and the permit may be terminated.

Section 4: Soil Stabilization and Sediment Trapping

Filter fabric fencing and sediment ponds will be used to control sedimentation. All areas that are to be left open for more than 5 days will be stabilized per the standard Pierce County Erosion Control Notes. A standard construction entrance shall be constructed to minimize soil tracking from grading activity. A sediment trap shall be placed adjacent to the construction entrance to detain sediment from truck wheels. If any sediment is tracked offsite the contractor shall sweep the sediment off of the roadway and dispose of it onsite. Sediment ponds shall be installed according to the T.E.S.C. plans. They have been sized to contain the 10-year, 24-hour storm event. If erosion/sedimentation occurs, the contractor shall utilize mulching, netting, jute matting, temporary ditches, and other appropriate means as necessary to stabilize the site. All erosion facilities shall be inspected by the contractor after any major rainfall events. Any sediment exceeding levels described in the erosion control measures found on sheet EC-1 of the construction plans shall be removed. Permanent slope stabilization for all disturbed areas will be provided in the form of landscaping, hydroseeding, or paving. The contractor shall stabilize the areas adjacent to environmentally sensitive areas such as wetlands and surface waters with hydroseed as soon as possible to prevent sediment and pollution from damaging these areas. All environmentally sensitive areas shall be protected with filter fabric fencing.

Section 5: Permanent Erosion Control and Site Restoration

Upon completion of the project, the entire site will be covered with landscaping, seeded areas, or natural vegetation, and pavement. All of these are resistant to erosion. Sediment will be contained in the permanent wet pond facility where it can be removed by maintenance staff. Runoff outfalls from the project area will be reinforced by quarry spalls.

Section 6: Geotechnical Analysis and Report

See attached Geotechnical Report by Terracon that is included in the Feasibility Report in Appendix 2.

Section 7: Inspection Sequence

This project will utilize catch basin protection, temporary construction entrances, sediment ponds, and filter fabric fencing. These methods are the minimum level of protection. If these methods do not prevent erosion/sedimentation from occurring, then the contractor shall use other methods as necessary to prevent erosion and sedimentation on the project site and adjacent properties.

The contractor must coordinate with the Pierce County Inspector to arrange the following inspections:

1. Initially, when the catch basin protection, filter fabric fences, sediment ponds and temporary construction entrance are installed, prior to clearing
2. Completion of clearing
3. Upon completion of excavation, filling, and earthwork
4. After major rainfall events
5. Completion of project
6. As needed to determine compliance with approved plans and/or specifications.
(Does not require advanced notice)

Contact Roger Jernegan at (253) 798-4062 to coordinate preconstruction meeting and county inspections.

Section 8: Control of Pollutants Other Than Sediments

Pollutants other than sediments that are likely to occur on the project primarily consist of gasoline, hydraulic fluid, oil, diesel, and other equipment-related fluids. Minimizing the risk of fluid spills can control these pollutants. The contractor will accomplish this by:

- Creating a “maintenance area” where all vehicles are serviced and providing spill cleaning materials (absorbent towels, covered disposal drums, gloves, shovels, etc.) at this location. In the event of a spill, immediately wipe up the spill with towels and use a shovel to dig up the contaminated soil. Place the contaminated soil and towels in the drum, and dispose of the drum and its contents in a legal manner at the end of the job.
- Utilizing properly trained personnel for vehicle maintenance to assure a proper level of familiarity with fueling/lubricating equipment and proper clean-up techniques
- Making sure that all hydraulic fittings are properly tightened and the hydraulic leaks/oil leaks are repaired immediately

Section 9: Utilities

Installation of dry utilities and water utilities shall be completed prior to project completion. Therefore, erosion/sedimentation from the trenching of these utilities will be controlled via the T.E.S.C. measures already installed during the project.

Appendix A: Calculations

Sediment Pond A Pipe Capacity

Given Input Data:

Shape Circular
Solving for Depth of Flow
Diameter 1.0000 ft
Flowrate 1.9600 cfs
Slope 0.0648 ft/ft
Manning's n 0.0200

Computed Results:

Depth 0.3971 ft
Area 0.7854 ft²
Wetted Area 0.2905 ft²
Wetted Perimeter 1.3634 ft
Perimeter 3.1416 ft
Velocity 6.7470 fps
Hydraulic Radius 0.2131 ft
Percent Full 39.7067 %
Full flow Flowrate 5.8951 cfs
Full flow velocity 7.5059 fps

Sediment Pond B Pipe Capacity

Given Input Data:

Shape Circular
Solving for Depth of Flow
Diameter 1.0000 ft
Flowrate 4.5600 cfs
Slope 0.0536 ft/ft
Manning's n 0.0200

Computed Results:

Depth 0.7085 ft
Area 0.7854 ft²
Wetted Area 0.5950 ft²
Wetted Perimeter 2.0010 ft
Perimeter 3.1416 ft
Velocity 7.6635 fps
Hydraulic Radius 0.2974 ft
Percent Full 70.8545 %
Full flow Flowrate 5.3615 cfs
Full flow velocity 6.8265 fps





