

CHAPTER 1

EROSION PREVENTION AND SEDIMENT CONTROL

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1.1 Introduction

Air and water pollution can result from the release of chemicals, waste materials, and soils into air or water. Soil that erodes from construction sites and is discharged into water is pollution. The term pollution control refers to methods and procedures used to prevent pollution of air and surface waters. The purpose of this manual is to present the Oregon Department of Transportation (ODOT) program to prevent pollution of water caused by erosion from construction sites.

Water pollution in the United States is regulated under the Federal Water Pollution Control Act of 1972, now known as the Clean Water Act (CWA). The CWA originally emphasized control of point source pollution. Point source pollution is discharged through discrete conveyance, typically through a pipe from an industrial or municipal facility. In 1987 Congress amended the CWA to include nonpoint sources of pollution. Nonpoint pollution occurs when runoff from land carries pollutants to receiving waters. Section 402 of the CWA provides the legal basis for the National Pollutant Discharge Elimination System (NPDES) permit program, which regulates point and nonpoint discharges.

The U.S. Environmental Protection Agency (EPA) has delegated the implementation of the NPDES program to the state of Oregon. The Oregon Department of Environmental Quality administers the NPDES program through Oregon Revised Statute (ORS) 468B and associated Oregon Administrative Rules (OAR). ORS 468B.025 explicitly prohibits the discharge or placement of wastes into waters of the state, prohibits the discharge of waste that causes violations of water quality standards, and prohibits violations permit conditions.

ODOT holds several NPDES permits, including the 1200-CA general construction permit, which requires a site specific erosion control plan for construction activities which disturb a total of 5 acres or more. Recent revisions to the NPDES permit program were enacted in the Final Storm Water Phase II Rule (Phase II), which was signed by the Environmental Protection Agency in October, 1999. Under Phase II, construction sites which disturb a total of 1 acre or more are required to comply. The general construction permit also requires control of construction site pollutants other than sediment, such as oil, gasoline and solvents. In addition to Federal requirements, many local jurisdictions have developed storm water management programs that include erosion and sediment control requirements.

Using this manual in conjunction with ODOT Specifications Sections 00280 (Appendix A) and 00290 and ODOT's erosion control details and drawings, the designer can develop a project-specific erosion and sediment control plan that meets or exceeds Federal, State, and local requirements.

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In order to prevent pollution associated with erosion from its construction projects and meet local, State and Federal requirements, ODOT requires an Erosion and Sediment Control Plan (ESCP) for each project. ODOT usually prepares the ESCP, which is implemented by the contractor during construction. For projects having minimal soil disturbance, ODOT may specify that the contractor develops the ESCP.

The ESCP consists of plans, details and specifications that are included in the contract documents. The ESCP is intended to provide adequate measures to minimize erosion, and to control sediment resulting from construction activities within the project boundaries.

1.2 Background and Policies

ODOT is required to comply with the NPDES 1200-CA General Construction Permits (1200-CA Permit) issued by the Oregon Department of Environmental Quality (DEQ). These permits addressed erosion and sediment in storm water runoff from construction projects that disturb 5 acres or more, and after November 1999 were revised under Phase II to apply to sites of 1 acre or more. ODOT has 5 regional permits and has elected to apply the permit requirements to all projects, regardless of size.

It is state law and ODOT policy to comply with all conditions of the 1200-CA Permits and other Federal, State, County, and City regulatory requirements.

As a representative of the Federal Highway Administration (FHWA), ODOT assures its actions do not jeopardize threatened or endangered species, and implements conservation measures, or reasonable and prudent measures identified by the US Fish and Wildlife Service and the National Marine Fisheries Service, to avoid and minimize potential adverse effects to such species.

Contractors are required to adhere to the project plans and specifications (Section 00150 of the ODOT Standard Specifications). In order to implement erosion control measures, in accordance with the contractor's staging and methods of operation, the contractor is required to review and revise the site specific ESCP and present this plan at the Pre-construction Conference.

The contractor shall be aware of, and adhere to, any limitations in the work area imposed by environmental permits such as the Division of State Lands (DSL) and U.S. Army Corps of Engineers (USACE) Removal/Fill Permit. The contractor must also comply with special conditions imposed by such permits issued, including conservation measures as documented in the Biological Assessment (BA) for the project.

Prior to beginning construction, the contractor is required to submit a general work schedule and plan that indicates planned implementation of temporary and permanent erosion control measures, including shutdown procedures for winter and other work interruptions.

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General design and construction considerations are as follows:

- ODOT will plan, site, and develop roads and highways in a manner that minimizes impacts and protects areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss.
- ODOT will, during the design process and construction, take into consideration minimizing land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss.
- Where applicable and appropriate, ODOT will locate construction nonpoint pollutant sources (including sediment) away from drainage swales, wetlands, or water bodies. When it is necessary to locate these activities adjacent to drainage swales or water bodies, protective measures such as “no work” or “do not enter” areas as identified on the plans and berms, fencing or other appropriate measures will be implemented on a project-by-project basis.
- Cut and fill slopes will be as flat as practicable and consistent with soil stability. Slopes of 1:2 or steeper may require special design.
- Removed sediment from erosion control facilities shall be placed in non-critical embankment areas such as slope areas and interchange quadrants. In no instances should the removed sediment be placed in a position where subsequent rainfall could return it to the sediment control devices or drainageways.

1.2.1 NPDES Permit Requirements

As the administrator of the NPDES permit, DEQ has the authority to grant permits for construction activities including clearing, grading, excavation, and stockpiling.

ODOT holds several NPDES permits, including the 1200-CA Permit. Potential pollutant sources covered by this permit include those released through construction activities performed under the authority or jurisdiction of the public agency (ODOT). Until the permit expires or is modified or revoked, the permittee or the permittee’s contractor is authorized to construct, install, modify, or operate erosion and sediment control measures and storm water treatment and control facilities, and to discharge storm water to public waters in conformance with all the requirements, limitations, and conditions set forth within the NPDES permit. Measures used to conform to the 1200-CA Permit Requirements are called Best Management Practices (BMP’s). Unless authorized by another NPDES permit, all other direct and indirect discharges to public waters are prohibited. The primary NPDES mandated controls, limitations and plan requirements are as follows (Appendix B):

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1. The permittee shall ensure that an adequate ESCP is prepared and implemented for each construction activity regulated by this permit and under the authority or jurisdiction of the permittee.
2. A copy of the ESCP for each construction activity will be retained on-site and made available to the DEQ upon request. During inactive periods of greater than 7 consecutive calendar days, the ESCP shall be retained by the permittee.
3. The ESCP shall be developed and implemented to prevent the discharge of significant amounts of sediment to surface waters. Under the NPDES 1200-CA Permit (Schedule A) the following observations are considered significant:
 - a. Earth slides or mud flows that leave the construction site and are likely to discharge to surface waters.
 - b. Evidence of concentration flows of water causing erosion when such flows are not filtered or settled to remove sediment prior to leaving the construction site and are likely to discharge to surface waters. Evidence includes the presence of rills, rivulets or channels. Flow to storm water inlets or catch basins located on the site will be considered “leaving the site” if there is no sediment control structures downstream of the inlets or catch basins that are under the permittee’s control.
 - c. Turbid flows of water that are not filtered or settled to remove sediment prior to leaving the construction site and are likely to discharge to surface waters. Flow to storm water inlets or catch basins located on the site will be considered “leaving the site” if there are no sediment control structures downstream of the inlets or catch basins that are under the permittee’s control.
 - d. Deposits of sediment at the construction site in areas that drain to unprotected storm water inlets or catch basins that discharge to surface waters. Inlets and catch basins with failing sediment controls due to lack of maintenance or inadequate design will be considered unprotected.
 - e. Deposits of sediment from the construction site on public or private streets outside of the permitted construction activity that are likely to discharge to surface waters.
 - f. Deposits of sediment from the construction site on any adjacent property outside of the permitted construction activity that are likely to discharge to surface waters.
4. DEQ may require modifications to the ESCP at any time if the ESCP is ineffective at preventing the discharge of significant amounts of sediment to surface waters.
5. Significant amounts of sediment that leave the site shall be cleaned up within 24 hours and placed back on the site or disposed of properly. Any in-stream clean-up shall be coordinated with the DSL.

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6. Under no conditions shall sediment from the construction site be washed into storm drain sewers or drainageways.
7. Each ESCP shall include any procedures necessary to meet local erosion and sediment control requirements or storm water management requirements.
8. Each ESCP shall also, at a minimum, include a site description, site map, required controls and practices, additional controls and practices, inspection requirements, inspection requirements for inactive or inaccessible sites, and written records.

The penalties for water pollution and permit condition violations are as follows:

- Oregon Law (ORS 468.140) allows the Director (DEQ) to impose civil penalties up to \$10,000 per day for violation of a term, condition, or requirement of a permit.
- Under ORS 468.943, unlawful water pollution, if committed by a person with criminal negligence, is punishable by a fine of up to \$25,000 or by imprisonment for not more than one year, or by both. Each day on which a violation occurs or continues is a separately punishable offense.
- Under ORS 468.946, a person who knowingly discharges, places or causes to be placed any waste into the waters of the State or in a location where the waste is likely to escape into the waters of the State, is subject to a class B felony punishable by a fine not to exceed \$200,000 and up to 10 years in prison.

Phase I regulations require NPDES permits for construction activities that disturb 5 acres or more. Phase II regulations enacted November 1999 reduce the threshold down to 1 acre. The Phase II regulations also require NPDES permits for smaller municipalities than required under Phase I, and these municipalities will now need to include an erosion prevention and sediment control program as an element of their storm water management programs. A summary of Phase II regulations is provided in Appendix B, and additional information can be obtained on the EPA web site <http://www.epa.gov/owm/sw/phase2/>

1.2.2 Other Agencies and Acts

The ODOT planning process requires contact and coordination with other private groups and public agencies or jurisdictions that may either have an interest in, or control of, the impacts of proposed development. This process provides a means for other interested parties to supply input regarding erosion and sediment controls, environmentally sensitive areas, and other regulated activities.

The development of an ESCP spans the entire planning, design and construction stages of a project. To be successful, it is imperative that communication among the interested parties be

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established and maintained throughout each stage of development and in accordance with Federal, State, and local agencies and acts. Some of the principal agencies and acts are described in the following sections.

1.2.2.1 Coastal Zone Management Act

The Coastal Zone Management Act of 1972 (CZMA) established a program for States and Territories to voluntarily develop comprehensive programs to protect and manage coastal resources. To receive Federal approval and implementation funding, States and Territories had to demonstrate that they had programs, including enforceable policies, sufficiently comprehensive and specific to regulate land uses, water uses, and coastal development as well as to resolve conflicts between competing uses.

There are 29 federally approved State and Territorial programs. Despite institutional differences, each program must protect and manage important coastal resources, including wetlands, estuaries, beaches, dunes, barrier islands, coral reefs, fish and wildlife and their habitats. Resource management and protection are accomplished through State laws, regulations, permits, and local plans and zoning ordinances.

While water quality protection is important to the management of many of these coastal resources, it was not specifically cited as a purpose or policy of the original statute. The Coastal Zone Act Reauthorization Amendments of 1990 specifically changed the state coastal programs, as well as State nonpoint source programs, by addressing nonpoint source pollution affecting coastal water quality.

1.2.2.2 Coastal Zone Act Reauthorization Amendments

In the Coastal Zone Act Reauthorization Amendments of 1990 (CZARA), Congress recognized that nonpoint pollution is a key factor in the degradation of many coastal waters and established a new program to address this pollution source. Congress further recognized that the solution to nonpoint source pollution lies in State and local action. In Section 6202 (a) of the amendments, Congress called upon States to develop and implement state Coastal Nonpoint Pollution Control Programs (CNPCP) that involve identifying nonpoint source categories, describing Best Management Practices (BMP's), and adopting enforceable policies. States are also required to provide technical assistance to local governments.

The legislative history indicates that the central purpose of Section 6217 of the amendments is to strengthen the links between Federal and State coastal zone management and water quality programs to enhance State and local efforts to manage land use activities that degrade coastal waters and coastal habitats. DEQ committed to the implementation of a CNPCP as part of The Oregon Plan for Salmon and Watersheds.

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1.2.2.3.1 AASHTO Highway Drainage Manual, Vol. 3, Guidelines for Erosion and Sediment Control in Highway Construction Projects, 1992

The AASHTO Highway Drainage Manual, Vol. 3, Guidelines for Erosion and Sediment Control in Highway Construction Projects, 1992 provides planning recommendations and construction guidelines for erosion and sediment control on highway construction projects. The Manual also covers basic erosion and sediment control measures and development guidelines for erosion control plans (Appendix B).

1.2.2.4 FHWA Memorandum – Final Rule

On July 26, 1994 the FHWA published its Final Rule adopting the AASHTO Guidelines to be followed on all projects funded under title 23, United States Code. As a part of this rule, state highway agencies were directed to apply these guidelines, or their own more stringent guidelines.

With its Final Rule, the FHWA committed to ensuring that all highway construction projects are located, designed, constructed, and maintained according to standards that will minimize erosion and control associated sedimentation. FHWA's adoption of the AASHTO Guidelines and the additional requirements that erosion and sediment control plans be developed, implemented, and monitored for all applicable projects is the regulatory basis for ODOT's own, more stringent, program (Appendix B).

1.2.2.5 DSL/USACE Permits

Section 401 of the CWA requires that any applicant for a federal permit to conduct any activity that may result in a discharge to waters of the State must provide the licensing or permitting agency a certification from DEQ that the activity complies with water quality requirements and standards. A broad range of land uses commonly require DEQ 401 certification, including agriculture, mining, ports, transportation projects and industrial siting/construction and operations. Projects in which the applicant will dredge, fill, or otherwise alter a waterway require a permit from the DSL and from the USACE.

The two agencies have developed a joint permit application. Although the regulatory authorities of DSL and USACE are different, their roles, when considered together, include protecting navigable waters (and the ocean), ensuring wise and beneficial water use, maintaining and enhancing water quality, protecting fish and wildlife habitat and recreational resources, and in general, protecting the public interest.

After the DSL and USACE have received a joint permit application, they forward it to DEQ. When ODOT is preparing the permit applications, the applications are circulated to all appropriate agencies, including DEQ. The permit is reviewed by DEQ to ensure that it does not endanger Oregon's streams and wetlands and to confirm that the plans meet water quality laws

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and standards. Frequently, applicants are required to incorporate protective measures into their construction and operational plans, such as bank stabilization, treatment of storm water runoff, spill protection, and fish and wildlife protection.

1.2.2.6 Specifications

ODOT specifications for erosion and sediment control are provided in the standard and supplemental provisions. The Specifications, Section 00280 – Erosion and Sediment Control included in Appendix A, covers materials, installation, monitoring, maintaining, repairing and removing erosion control measures. Special provisions modify Section 00280 and include seed mixes and other project-specific erosion prevention and sediment control special provisions not included in Section 00280.

Section 00290 (a) – Water Pollution Prevention Measures, describes the contractor's responsibilities related to preventing water pollution. The 00290 (a) Section also covers the contractor's responsibility regarding control of construction site pollutants, including sediment, from contractor operations not included in the ESCP. Section 00180.41, Project Work Schedule, requires the contractor to submit plan implementation and maintenance schedules to the Engineer for approval. Section 01030, describes the contractor's responsibilities related to seeding.

1.2.3 Designer, Inspector, and Contractor Responsibilities

The three principle parties involved in designing, implementing and monitoring an ESCP are the designer, inspector and contractor. Each party has specific roles and responsibilities, summarized below.

Designer Responsibilities

- Research construction project site conditions.
- Ensure topography and drainage are clearly delineated on ESCP.
- Understand the scope of the construction project including detour facilities, duration of construction, and time of year construction will commence.
- Develop Special Provisions that will address the necessary practices to control erosion and contain sediment on site.
- Provide an ESCP with sufficient bid items to address erosion and sediment throughout project construction.
- Regularly update designers' knowledge of the latest technology in erosion control materials and methods.
- Ensure that the specified erosion control products are available on the ODOT Conditional and Qualified Products List.

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Inspector Responsibilities

- Have knowledge and understanding of the project ESCP and Pollution Control Plan (PCP).
- Ensure the contractor submits revisions to the ESCP and presents it at the Pre-construction meeting.
- Ensure the contractor updates the ESCP as construction progresses.
- Ensure contractor maintains the erosion control facilities as needed.
- Ensure contractor completes monitoring reports weekly or after more than 0.5 in of rain in 24 hour period during active projects and once every 2 weeks during inactive projects of more than 7 days. (ODOT Form 734-2361 Erosion Monitoring Form).
- Authorize contractor to make changes to ESCP and PCP and ensure payment if beyond original bid estimate when necessary to control erosion.
- Know Section 00280 (Erosion and Sediment Control) and 01030 (Seeding) and the 00280 and 01030 Special Provisions for the project.
- Know how to properly install BMP's to control erosion and contain sediment.
- Ensure that contractor and project comply with NPDES 1200-CA Permit.
- Be familiar with Standard Erosion Details.

Contractor Responsibilities

- Become educated on the latest technology to control erosion and contain sediment.
- Bid on the job with knowledge of site conditions, keeping contingencies in mind.
- Be knowledgeable about the ESCP and the 00280 (Erosion and Sediment Control) and 01030 (Seeding) Sections of the specifications.
- Revise the ESCP to meet conditions of construction, i.e. phasing, timing, weather.
- Develop a PCP that includes a site plan and narrative, describing methods of erosion and sediment control to be used to prevent erosion and sediment from contractor's operations related to disposal sites, borrow pit operations, haul roads, equipment storage sites, fueling operations and staging areas.
- Construct BMP's as described on the details and specifications.
- Minimize clearing of vegetation and look for opportunities to minimize erosion, offering ideas to ODOT inspectors for approval.

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- Monitor erosion control devices and record on ODOT Form 734-2361.
- Maintain erosion control facilities and modify when needed to be effective.
- Update ESCP as work progresses and modify plan as conditions change.
- Ensure that permanent seeding is done within the time frames found in Section 01030.