



REGIONAL ROAD MAINTENANCE ENDANGERED SPECIES ACT

PROGRAM GUIDELINES



developed by:
Regional Road Maintenance
Technical Working Group



INTRODUCTION

BACKGROUND

In May 1999, the federal government listed the Puget Sound chinook salmon as “threatened” under the Endangered Species Act (ESA). In December 1999, the bull trout was also listed as “threatened” in the coterminous United States, including the Puget Sound region. In response to these listings, local governments in the Puget Sound area formed a coalition, known as the “Tri-County ESA Response Effort,” to implement programs to conserve listed species. The Tri-County ESA Response Effort identified several government agency program areas with the potential to contribute to conservation of the listed species. Road maintenance is one of these programs.

Under the Tri-County Response Effort, the Tri-County Road Maintenance ESA Technical Working Group—a team of local road maintenance managers and technical staff—was formed. The mission of the Tri-County Road Maintenance ESA Technical Working Group was to develop a road maintenance program that would contribute to the conservation of salmonids and other fish species and would meet federal agencies’ requirements under Section 4(d) of the ESA (see below). At the same time the Tri-County effort was getting underway, WSDOT was beginning to develop its own road maintenance program, with the same goals as the Tri-County Road Maintenance ESA Technical Working Group.

The Tri-County Road Maintenance ESA Technical Working Group quickly expanded to include counties and cities outside the Tri-County area. WSDOT also became an active and vital member of the group. The group was renamed the Regional Road Maintenance Technical Working Group to reflect the growing interest and participation in the program. In the fall of 2001, after two years of collaborative effort developing the Regional Program and the WSDOT road maintenance program, WSDOT decided to formally consider their program part of the Regional Program. This decision expanded the Regional Program to include the entire State of Washington.

Section 4(d)

The National Oceanic and Atmospheric Administration’s National Marine Fisheries Service (NMFS) administers the ESA as to salmon and other species that spend the majority of their life history in marine waters. The United States Fish and Wildlife Service (USFWS) administers the ESA as to terrestrial species, birds, and species that spend the majority of their life history in freshwater, such as bull trout. These federal Services follow separate procedures to apply Section 4(d) of the ESA.



Section 4(d) of the ESA grants the Secretaries of Interior and Commerce (and by delegation the USFWS and NMFS) broad administrative discretion to promulgate regulations that are necessary and advisable to provide for the conservation of *threatened* species. Section 4(d) also confers upon the Secretaries, and thus upon the NMFS and USFWS (the Services), discretion to apply to a *threatened* species any or all of the prohibitions against “take”¹ that automatically apply to *endangered* species via ESA Section 9.

USFWS has implemented a standing prohibition on the take of *threatened* species (codified at 50 CFR 17.31(a)) under Section 4(d) of the ESA. In other words, take prohibitions automatically apply when the USFWS lists a species as *threatened*, such as the bull trout. NMFS does not have a standing prohibition on take. Instead, NMFS uses its authority under Section 4(d) to adopt protective regulations on a species-by-species basis. NMFS’ protective rules usually incorporate ESA Section 9’s prohibition on take.

However, both of the Services sometimes promulgate more detailed 4(d) rules for *threatened* species.

- When NMFS issues a 4(d) rule, the rule may apply the Section 9(a) prohibition of “take,” but “limit” the application of that prohibition to certain activities. The decision to “limit” the take prohibition is based on a determination that such activities are already adequately regulated, or are unlikely to cause prohibited “take” if executed in a manner approved by NMFS. For example, NMFS adopted a detailed 4(d) Rule in July 2000, codified at 50 CFR 223.203. That rule prohibits take of 14 groups of salmon and steelhead (including the Puget Sound chinook) listed as *threatened* under the ESA, but “limits” the prohibition on take for 13 categories of activities that NMFS deemed to be sufficiently regulated or otherwise adequately protective of the species.
- When USFWS promulgates a detailed 4(d) rule for *threatened* species, it is called a “special 4(d) rule” to distinguish it from the standing USFWS regulation prohibiting the take of *threatened* species. If deemed appropriate by USFWS, a special 4(d) rule may be adopted to eliminate or reduce the standing regulation’s applicability to activities that may affect a particular *threatened* species for which USFWS is responsible.

¹Section 3 of the ESA defines “take” to include actions that “harass” or “harm” listed species. USFWS regulations further define “harass” to mean “an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering.” USFWS regulations further define “harm” to mean “an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.” (50C.F.R. §17.3). NMFS has adopted a similar definition, codified in 50 C.F.R. §222.102.



NMFS' 4(d) Rule for salmon and steelhead includes a "take limit" for approved road maintenance programs. In that rule, Limit 10(ii) provides that routine road maintenance activities conducted by the employees or agents of a state, county, city, or port in a manner that has been found to contribute to properly functioning condition are eligible for the limitation on the definition of "take" of *threatened* species.

The USFWS published a "special 4(d) rule" for bull trout on November 1, 1999. It appeared in the Federal Register at Volume 64, Number 210, pages 58909-58933. That rule applies the ESA Section 9 take prohibition to bull trout, but exempts certain fishing programs, educational programs, and scientific activities from the prohibition. On the same date, USFWS published a "Notice of Intent to Prepare a Proposed Special Rule Pursuant to Section 4(d) of the Endangered Species Act for the Bull Trout." It appeared in the Federal Register at Volume 64, Number 210, pages 58934-58936. The notice stated that USFWS is considering whether to amend the existing special rule to exempt two additional categories of other activities that may affect bull trout: habitat restoration, and other land and water management activities governed by enforceable regulations that provide substantial protection for bull trout. However, a local agency desiring a take limit under the NMFS Salmon and Steelhead 4(d) Rule, or "Special 4(d) Rule, and/or Section 7 take exemption (provided through the incidental take statement of a biological opinion) through the USFWS, prepares a Part 3 Application for its routine road maintenance activities.

The Regional Road Maintenance ESA Guidelines

Among other things, Section 2(b) of the ESA states that the purpose of the ESA is to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved, and to provide a program for the conservation of such listed species. Under ESA Section 3, "conservation" is defined as the use of all methods and procedures which are necessary to bring any endangered or threatened species to the point at which the measures provided pursuant to the Act are no longer necessary.

The Services have identified habitat degradation in both freshwater and estuarine/near-shore marine environments as a major factor of decline for bull trout and listed salmonids and steelhead. When properly modified and implemented, road maintenance practices can contribute to the conservation of listed species and the ecosystems upon which they depend by protecting or restoring habitat. The Tri-County ESA Response Effort had two primary goals



for road maintenance. The first goal was to develop a road maintenance program that would contribute to the conservation of chinook and bull trout and other listed species. The second goal was to negotiate a program the Services would deem an appropriate basis to “limit”, reduce or eliminate the prohibition on take of certain threatened species (chinook, bull trout, and other threatened species) for which they are responsible. As described above, the Services utilize different options to limit, reduce, or eliminate the prohibition on take of threatened species:

- For NMFS administered species, NMFS could grant approval for a take limit for the specified road maintenance program under Limit 10 of the 4(d) Rule issued in July 2000.
- For USFWS administered species, USFWS could promulgate a special 4(d) rule (or amend an existing special 4(d) rule) and/or Section 7 take exemption to reduce or eliminate certain take prohibitions that apply to the specified road maintenance program.

To assist local governments in implementing the program, and to provide the Services with a thorough document against which Regional Program compliance could be evaluated, the Regional Road Maintenance Technical Working Group developed the *Regional Road Maintenance ESA Program Guidelines (Guidelines)*. The Services and other regulatory authorities, as well as Puget Sound area tribes, environmental interest groups, and business groups, also provided input and assistance in the development of the *Guidelines*. The collaborative effort to develop the Regional Program was extensive. A full year of development and review of the program had been completed by July 2000. That collaborative effort continued through 2000 and 2001. Biological reviews conducted in the course of that process demonstrate that if local agencies follow the *Guidelines* when doing road maintenance work, they can contribute to the conservation of chinook salmon, bull trout, and other aquatic species listed under the ESA.

PURPOSE

The purpose of the *Regional Road Maintenance ESA Program Guidelines* is to provide a consistent, Regional Program that can be used by any agency wishing to limit, reduce or eliminate the prohibition on take of threatened species under the 4(d) Rule (NMFS), special 4(d) rule and/or Section 7 take exemption (USFW).

The Regional Program consists of the following three parts:



- **Part 1: Regional Program Elements** is the basic framework for the Regional Road Maintenance ESA Program. It includes ten program elements that make up the Regional Program. Implementation of all ten of the program elements is required for a local agency to obtain a 4(d) take limit (NMFS), special 4(d) rule, and/or a Section 7 take exemption from USFWS.
- **Part 2: Best Management Practices** is a set of site-specific best management practices (BMPs) for road maintenance. Under the Regional Program, road maintenance, environmental, and engineering design staff can use these BMPs, in addition to routine BMPs presented in Part 1 to achieve conservation outcomes identified in the *Guidelines*. It is recognized that state regulations and local ordinances or site-specific permit conditions may all dictate use of specific BMPs. For that reason, Part 2 offers a menu of possible BMPs from which the most suitable method of maintenance activity can be selected.
- **Part 3: Application** is an individual agency application for a 4(d) take limit (NMFS) special 4(d) rule and/or Section 7 take exemption, to receive an elimination or reduction of the standing prohibition of take for threatened species (USFWS) under the Regional Program. The Part 3 Application, known as the “plug-and-play” part of the Regional Program, allows local agencies to “plug” into Parts 1 and 2 of the program. The Part 3 Application is a specific commitment that an agency will comply with the ten program elements in Part 1.

The five appendices to the *Guidelines* include the following:

- **Appendix A.** Appendix A is a list of contacts for information on the Regional Program.
- **Appendix B.** Appendix B is a description of the role of the Washington State Department of Transportation (WSDOT) Highway and Local Program (H&LP) or the Regional Forum in screening Part 3 Applications to the Regional Program
- **Appendix C.** Appendix C is a BMP Outcome Category matrix. It is a tool for planning, selecting and implementing BMPs that achieve the conservation outcomes of the Regional Program.
- **Appendix D.** Appendix D contains three sample checklists agencies can refer to or use to implement the Regional Program. The checklists contain useful steps for planning and selecting BMPs, conducting pre-construction or pre-maintenance meetings, and implementing BMPs.



- **Appendix E.** Appendix E is a Fish Exclusion Protocol.

The *Guidelines* also include a glossary, list of acronyms and index.

Local agencies are encouraged to participate in the Regional Program to help achieve regional conservation objectives. Detailed information about how the Regional Program works is contained in Part 1.

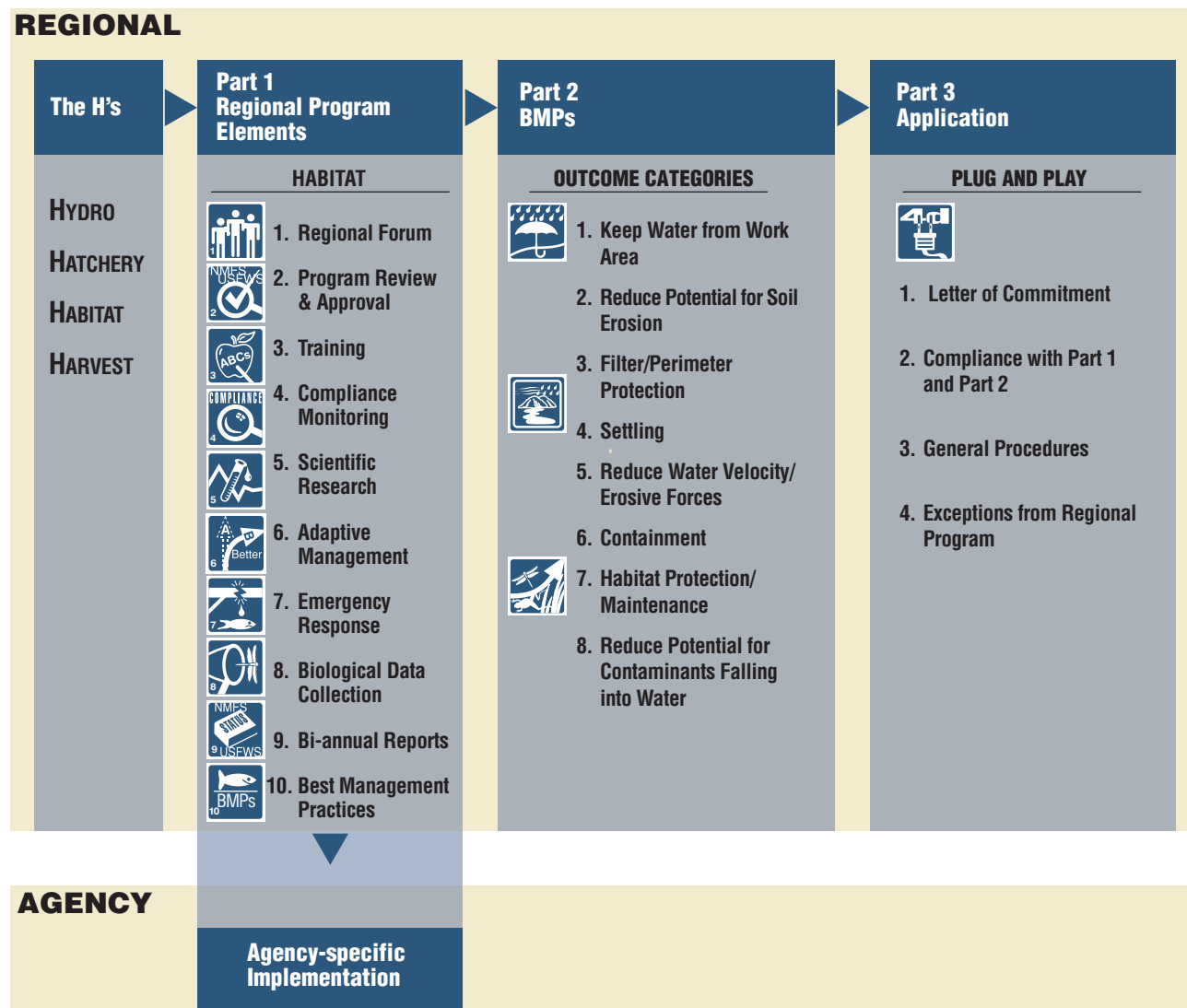
Agencies seeking guidance in developing Part 3 Applications for their participation in the Regional Program are welcome to attend Regional Forum meetings (see Part 1, Element 1, Regional Forum, for more information). Contact information on the Regional Forum members is listed in Appendix A.

The Regional Road Maintenance ESA Program framework is shown on Figure 1.



Regional Road Maintenance ESA Program Framework

Figure 1





PERMIT REGULATION

Compliance with this program in no way exempts participating agencies from local, state, and federal permits required by law. In fact, permit compliance is specifically spelled out as a BMP requirement in these *Guidelines*. Merely following permit requirements does not, however, constitute compliance with the Regional Program. To receive coverage under the program, agencies must comply with the *Guidelines*.

Compliance with Washington state fish passage regulations is particularly important for conservation when performing culvert replacement work in stream crossings. Washington State law and regulations require that new or retrofit culverts be designed for fish passage. (RCW 77.55.060; WAC 220-110-070). Culvert installation and replacement under these sections requires the issuance of a Hydraulic Project Approval (HPA) by the Washington Department of Fish and Wildlife (WDFW). All work done under this section will comply with the HPA. To clarify the fish passage criteria defined by WAC 220-110-070, WDFW prepared a design manual entitled “Fish Passage Design at Road Culverts” (the Manual) (WDFW 1999). The Manual was reviewed by the NMFS, which concluded that, when designing retrofits or replacements of existing culverts, the WDFW Guidelines should result in improved habitat conditions with the potential to bring impaired habitat on a trend to Properly Functioning Conditions (PFC). Using the WDFW Manual, while designing a new culvert, should not impair PFC as long as the hydraulic and other fish passage considerations are properly applied (NMFS memorandum, Assistant Regional Administrator for Hydro to Assistant Regional Administrator for Habitat Conservation, November 28, 2001). Therefore, the Regional Program incorporates the relevant considerations for the design of new and retrofit culverts stated in the Manual, as well as other relevant fish passage and habitat considerations addressed in the last chapter of the Manual. (As of the date of this publication, the Manual can be viewed on the Internet at <http://www.wa.gov/wdfw/hab/engineer/cm/fpdrc.pdf>.)

OTHER 4(D) PROGRAM ELEMENTS

Activities covered by the definition of “maintenance” will be executed according to the ten program elements set forth in these *Regional Road Maintenance ESA Program Guidelines*, as negotiated with the National Marine Fisheries Service and United States Fish and Wildlife Service (the Services). In the event that a jurisdiction or other entity adopts this Regional Road Maintenance ESA Program, and also adopts a development and



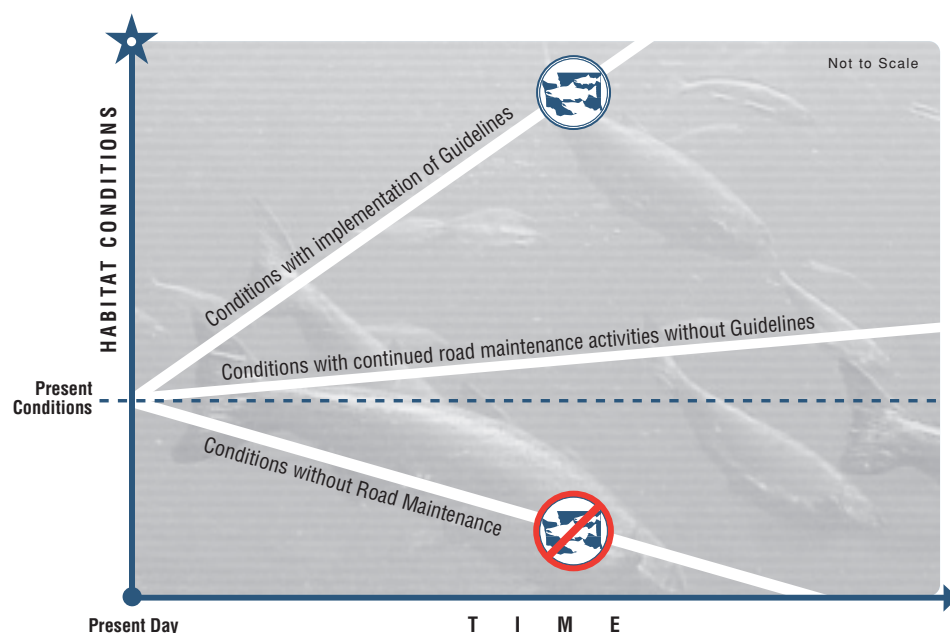
redevelopment program (if any), the maintenance activities included in these *Regional Road Maintenance ESA Program Guidelines* will not be considered “development” or “redevelopment.” Maintenance activities conducted in compliance with this Regional Road Maintenance ESA Program shall be recognized as mitigation (WAC 197-11-768) which is exempt from development or redevelopment regulations adopted pursuant to the land use or stormwater operational programs or any other future development or redevelopment related programs.

Unlike development or redevelopment, road maintenance mitigates the impacts of the original construction of the road structures, ongoing roadway use, and preservation of the structure. Road maintenance can also lead to habitat improvement. Figure 2 shows the impact of road maintenance on habitat conditions under three scenarios:

1. If road maintenance were to cease altogether, habitat conditions would decline.
2. With current road maintenance practices, habitat conditions would improve slowly.
3. With implementation of the *Guidelines*, habitat conditions would improve at a greater rate.

Impact of Road Maintenance on Habitat Conditions

Figure 2





APPLYING THE *GUIDELINES* TO ROAD MAINTENANCE

This Regional Program applies to roadway maintenance operations, utility maintenance, maintenance of stormwater facilities, and other right-of-way (ROW) structure maintenance within the ROW.

Participants in the Regional Program need a clear understanding of what road maintenance is, how it minimizes impacts to habitat, and where it occurs.

DEFINITION OF ROAD MAINTENANCE

Activities that fall under the following definition of “maintenance” are covered under the Regional Program:

Maintenance: Repair and maintenance include activities that:

- (a) are conducted on currently serviceable structures, facilities and equipment; and
- (b) involve no expansion of or change in use of such structures, facilities, and equipment; beyond those that existed previously; and
- (c) do not result in significant negative hydrological impact.

Repair and maintenance include those usual activities taken to prevent a decline, lapse, or cessation in the use of structures and systems or to replace dysfunctional facilities. Repair and maintenance also include replacing existing structures with different types of structures, PROVIDED THAT replacement is required to meet current engineering standards or by one or more environmental permits and the functioning characteristics of the original structure are not changed. An example would be replacing a collapsed, fish-blocking round or wooden culvert with a new box culvert under the same span or width of roadway.

As negotiated with the Services, the Regional Program specifies activities that have been determined to be adequately regulated and therefore can limit, reduce or eliminate the prohibition on take of threatened species.

The Regional Program does not apply to construction of new facilities or major expansion of existing facilities.



ROAD MAINTENANCE IS MITIGATION

Road maintenance limits, reduces, or eliminates impacts from vehicle use and road wear. Given the critical nature of the transportation system, road maintenance is not optional. It is required for several reasons (WAC 197-11-768 mitigation):

- Safety of the traveling public
- Preservation of infrastructure
- Mitigation for environmental impacts associated with initial construction, preservation, and maintenance during the life of the structure.

The *Guidelines* provide a road maintenance program that achieves the dual goals of operating a transportation system while conserving aquatic habitat conditions. An example of how road maintenance conserves habitat can be found in the road maintenance category “Cleaning Enclosed Drainage Systems.” Maintenance activities within the category contribute to the following conservation outcomes:

1. Street sweeping reduces sediments from entering storm drains and waterways.
2. Maintaining and cleaning enclosed drainage systems removes sediments.
3. Maintaining and cleaning oil/water separators reduces pollutants and sediments.
4. Maintaining and cleaning retention/detention facilities and connector ditches removes pollutants and sediments.
5. Repair and restoration of an enclosed drainage system facility ensures storage capacity.
6. Mowing bio-swales and cleaning water quality vaults removes pollutants and sediments.
7. Culvert repair and rehabilitation reduces erosion.
8. Outfall maintenance reduces erosion.
9. Check dams, or similar BMP’s should not be used when maintenance activities are conducted in locations that could reduce actual or potential high flow salmonid refuge functions.

Each maintenance category within the *Guidelines* has activities that contribute to the conservation outcomes listed for that category.



RIGHT-OF-WAY STRUCTURE

Road maintenance activities occur within the right-of-way (ROW). ROW is the area of land dedicated for public use or secured by the public for purposes of ingress and egress to abutting property and other public purposes. ROW includes area maintained by public agencies through prescriptive rights. ROW structures include planned, designed, engineered and constructed features that together encompass many built systems. Typical ROW structures include, but are not limited to, the following:

- Open drainage system/sediment transport system.
- Closed drainage system/sediment transport system.
- Retention/detention/wetland systems/sediment transport system.
- Road surface/drainage and sediment transport system.
- Bridge systems.
- Utilities.
- Stream system.
- The ROW itself, width, air space above and underground.

An understanding of the ROW, its structures, and its relationship to water quality and habitat is critical to the successful implementation of the Regional Program.

Examples of systems and structures within the ROW include the following: roadway, bridges, drainage, sediment containment, retention/detention, water, sewer, gas, electrical, street lighting, traffic loops, and traffic signals.

The aboveground surface area of the ROW structure consists of, but is not limited to, the roadway shoulder, cuts, fills, ditches, channels, dikes, bridges, retention/detention structures, swales and constructed wetlands (intentional and incidental). The road surface directs water from the road, across the gravel or grass shoulder, across the inslope of the ditch, through the ditch to a swale or retention/detention area and then to an outlet.

The ROW structure also includes a sediment transport (stormwater) system. The function of this system is to remove sediment before it outfalls to a watercourse or stream. The roadway drainage system has built-in stormwater retention capacity. The road surface traps large amounts of fine material, where it can be removed by sweeping operations, thereby preventing sedimentation in watercourses or streams. Gravel or grass shoulders filter and trap sediments. Ditches hold and trap sediments frequently acting as long,



narrow retention/detention ponds. Stormwater retention/detention facilities and constructed wetlands hold and trap large amounts of sediment, reducing downstream sedimentation. The open drainage system is designed to trap sediments. Road maintenance often removes these sediments before they pass through the system to a stream or watercourse.

Like an open drainage system, an enclosed drainage system transports sediment to built-in trapping and holding areas where the sediment can be removed before it reaches a stream or watercourse. An enclosed drainage system starts with the road surface or structure and directs water and sediment to inlets, catch basins, manholes, vaults, pipes, and retention/detention facilities. Inlets to the enclosed drainage system both limit the size of sediments and hold sediments. Catch basins, manholes, vaults, pipes, and retention/detention structures, constructed wetlands, and treatment facilities trap large quantities of sediments so they can be removed before they enter the outflow.

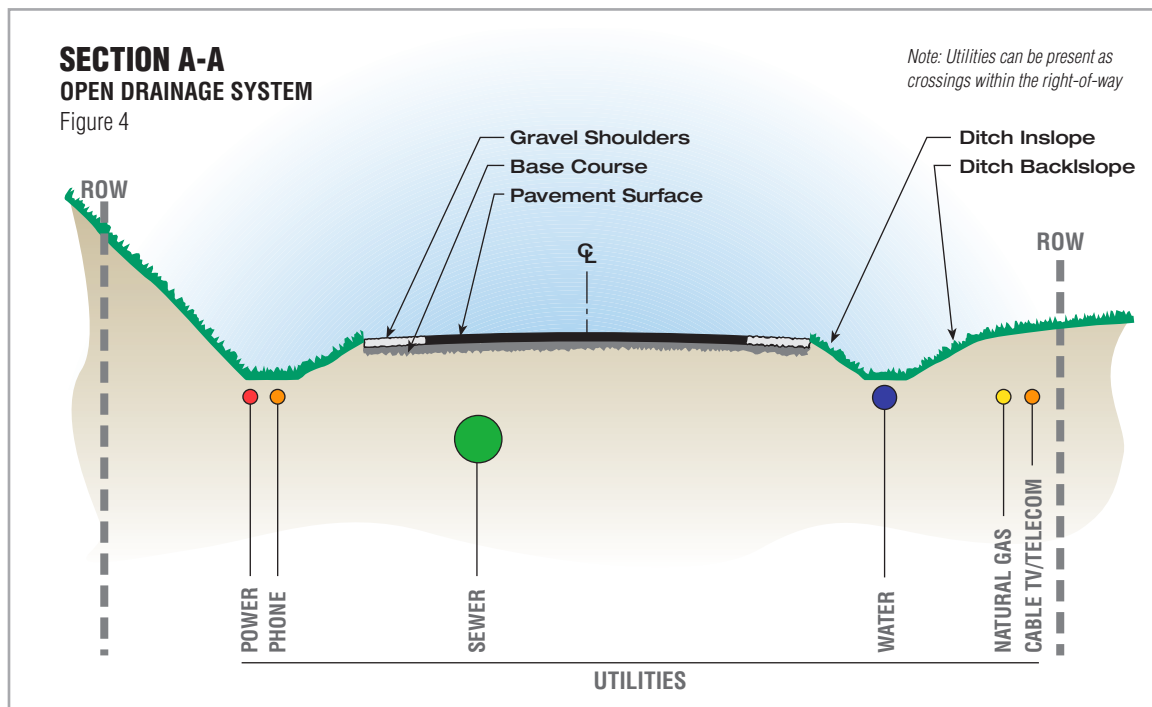
Road and utility maintenance activities occur within the road ROW structure. Figures 3-7 provide typical illustrations of the ROW structure, including the following:

- Figure 3: Typical ROW Structure
- Figure 4: Section A-A: Open Drainage System
- Figure 5: Section B-B: Enclosed Drainage System
- Figure 6: Section C-C: Retention/Detention Facility
- Figure 7: Section D-D: Stream Crossing Road.



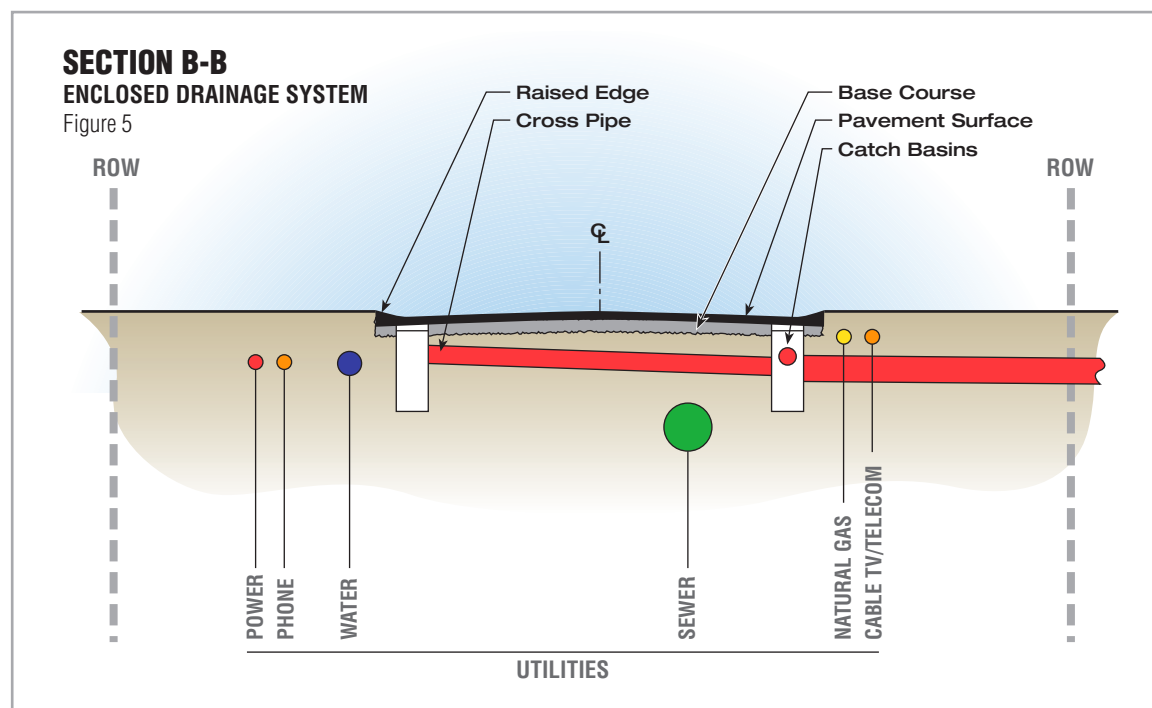
SECTION A-A OPEN DRAINAGE SYSTEM

Figure 4



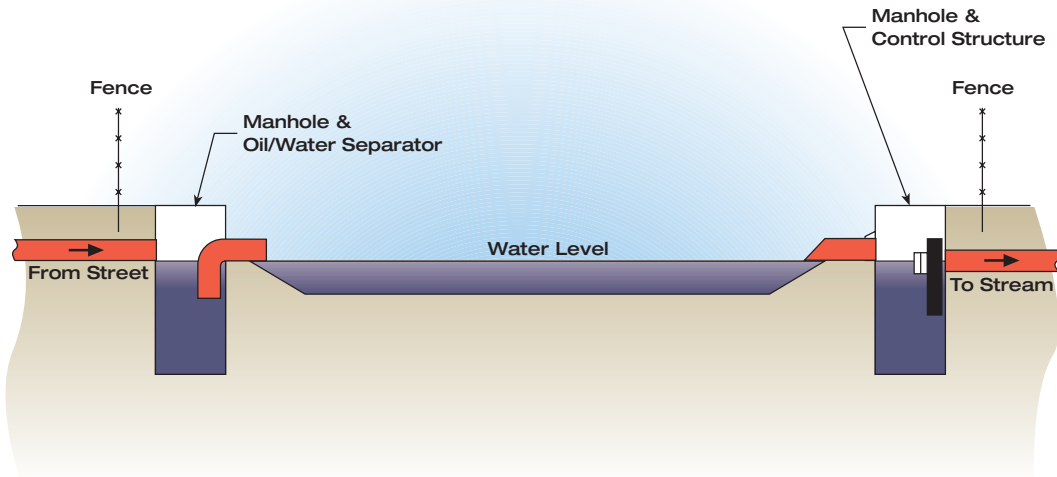
SECTION B-B ENCLOSED DRAINAGE SYSTEM

Figure 5

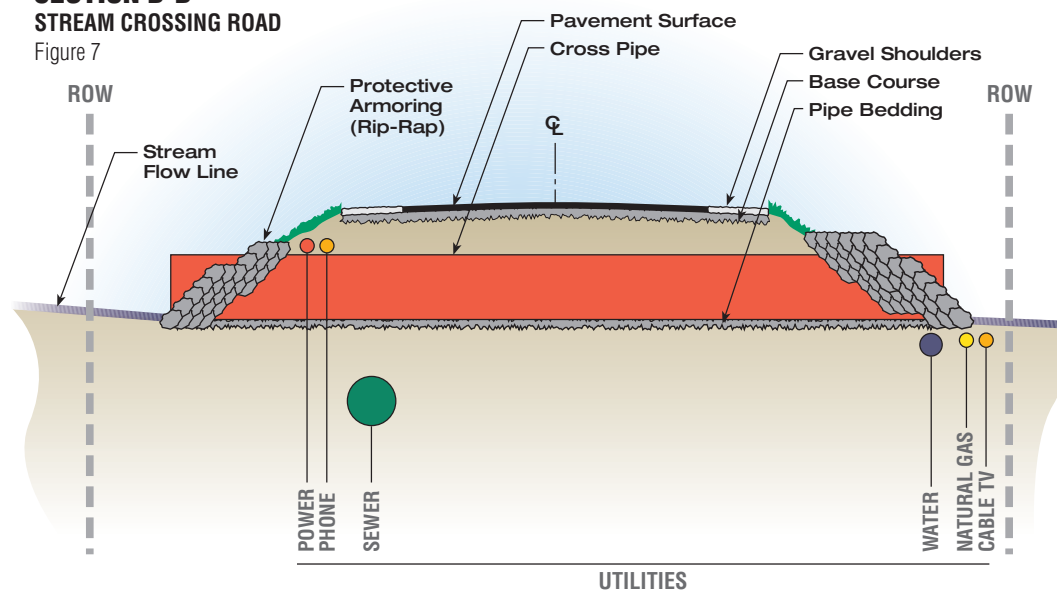




SECTION C-C
RETENTION/DETENTION FACILITY
Figure 6



SECTION D-D
STREAM CROSSING ROAD
Figure 7



PART 1

Regional Program Elements



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Part 1

Regional Program Elements

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Introduction to Program Elements

There are ten program elements in the Regional Road Maintenance ESA Program. Those agencies seeking coverage under the 4(d) Rule must comply with each of these program elements:



Element 1. **Regional Forum:** A Regional Forum has been created from participating agencies. The Regional Forum provides a regional meeting for program discussion, coordination, and adaptive management.



Element 2. **Program Review and Approval:** The program review and approval process will require that each agency participating in the Regional Program comply with the ten program elements. The Washington State Department of Transportation (WSDOT) Highways and Local Programs (H&LP), Olympia Service Center, or Regional Forum will review each agency's Part 3 Application to determine whether or not it includes all program elements. **The Services will issue approval for each agency to receive a 4(d) take limit (NMFS), special 4(d) rule, and/or a take exemption (USFWS) to receive a reduction or elimination of the prohibition on take of threatened species (USFWS).**



Element 3. **Training:** Courses will include the topics of basic ESA, design, biological review, permit activities, maintenance BMPs, and monitoring work activities. The WSDOT Technology Transfer (T2) Center, UW Transpeed, or WSDOT Operations & Maintenance Program in conjunction with the Regional Forum, will develop a curriculum for training maintenance employees in the implementation of the Regional Program. The curriculum may be taught by T2 instructors, WSDOT trainers or other trainers.



Element 4. **Compliance Monitoring:** Compliance monitoring will take place at several levels: local agency supervisory staff, local agency permitting authorities and state, and federal permitting authorities evaluating BMPs for use and implementation. Each local agency will establish a formal compliance monitoring program for monitoring BMP implementation and any monitoring that is part of various research projects.



INTRODUCTION TO PROGRAM ELEMENTS (continued)



Element 5. **Scientific Research:** Case studies in the field, as well as literature research done by others, are included in this program element. The scientific research element will serve to verify effectiveness of BMPs and update BMPs based on the latest technologies.



Element 6. **Adaptive Management:** The adaptive management philosophy will apply to all ten elements of the Regional Program. The training, research, biological data collection, and program monitoring elements are the basis for adaptive management.



Element 7. **Emergency Response:** This element provides a framework under which agencies can operate during emergencies.



Element 8. **Biological Data Collection:** This element includes habitat location information within the ROW and development of a process to train and alert staff where the *Guidelines* need to be utilized.



Element 9. **Biennial Reports:** The Regional Forum will provide biennial (every two years) reports to the Services. Biennial Reports will include a review of the ten program elements, updates on research, recommended BMP changes, and recommended updates on each program element.



Element 10. **Best Management Practices (BMPs) and Conservation Outcomes:** Under the Regional Program, BMPs and desired conservation outcomes have been developed for road maintenance activities. The Regional Forum will annually review and update the BMPs. Local agencies and the Services will review the changes the Regional Forum recommends for adoption.

Program Element 1: REGIONAL FORUM



The Regional Forum will provide a regional meeting in which information and experiences can be shared to improve the Regional Road Maintenance ESA Program. Each agency seeking a limit, reduction, or elimination of the take prohibition by means of this Regional Program, will participate in the Regional Forum.

The role of the Regional Forum is the sharing of information. Participating agencies will report to the Regional Forum experiences in program implementation, including, but not limited to, the following:

- Hands-on crew experiences with various BMPs under various conditions.
- Discovery of new products or BMP inventions and applications.
- Results of scientific research and case studies.
- Feedback on training.

REGIONAL FORUM MEMBERS

Regional Forum members shall have road maintenance knowledge and technical expertise to address Regional Road Maintenance ESA Program issues, as well as the authority to implement program changes. It is understood that program expansions or new program initiatives will have to go through each agency's budget approval process as well as review and approval by the Services. Using the adaptive management process, the Regional Forum will recommend program changes. Program modifications that could affect an individual agency's policies, budget, or level of road maintenance service will be taken back to the agency's policy makers for review and approval. To ensure that policy and budget issues are adequately addressed in individual agencies, Regional Forum members must occupy positions in their own road maintenance organizations with the authority to formally request budget or policy initiatives within their respective agency.

For overall changes to the Regional Program, the Regional Forum's function is advisory. The final approval authority for individual agency budget changes resides with the executive and legislative branches of participating local governments. The Services will have final approval authority for changes to the Regional Program. If the Services raise no objections to program changes, the limit, reduction, or elimination of the take prohibition would then apply to the revised program.



Formal revisions to the Regional Program will be suggested on an as-needed basis, based upon review of adaptive management information. At a minimum, the overall program will be reviewed every two years. (See Program Element 9, Biennial Reports.)

Once the Regional Program has been fully implemented in a particular agency, changes to the program will not necessarily (or even likely) result in changes to that agency's policies or costs. The program is outcome based, allowing individual agencies to select from a menu of options to achieve the desired outcome. (See Program Element 10, BMPs and Conservation Outcomes.)

ROLES AND RESPONSIBILITIES

The primary role of the Regional Forum is to share information, review, evaluate, and modify the Regional Program. The Regional Forum will engage in adaptive management to provide for ongoing review and to evaluate recommended program changes. The Regional Forum will meet on a quarterly basis, with additional meetings scheduled to address specific issues as needed. In the quarterly meetings, Adaptive Management reports from each agency will be reviewed and discussed. The Regional Forum will make recommendations on program revisions and changes to the BMPs.

To assist Regional Forum members in the adaptive management process, agency environmental and engineering staff, as well as consultants, will be called upon as needed. Agency environmental staff, as well as consultants, will be used to evaluate data relating to this program (in particular BMPs and case studies). Technical staff will make recommendations that will be folded into the adaptive management process.

The Regional Forum will produce a quarterly newsletter to be distributed to local agencies that participate in the Regional Forum, as well as the Services. The newsletter will also be made available to others and will serve the following functions:

- Share information gathered from scientific research and case studies.
- Troubleshoot BMPs based on a variety of field conditions.
- Notify agencies of BMP training programs.
- Notify agencies of future meetings.
- Notify agencies of changes to the Regional Program.



COMMITTEES

Technical committees will be (or have been) formed as needed to develop and implement detailed work programs for specific Regional Program elements.

The committees will be formed from the members of the Regional Forum, or their appointees, and will be under the direction of the Regional Forum. The following committees have been formed:

1. Program Review and Approval.
2. Regional Program Training. (This committee has an aggressive work program for developing and implementing a statewide training program.)
3. Compliance Monitoring.
4. Scientific Research and Case Studies.
5. Interdisciplinary 4(d) Coordination.
6. Part 3 Framework.
7. Stormwater.
8. Biological Review.
9. Interagency.

The committees will identify key decision points in each program. They will schedule Regional Forum briefings and committee meetings as needed. The Services will be notified and given a comment and approval period prior to any program changes.



Program Element 2: PROGRAM REVIEW AND APPROVAL

Agencies seeking a take limit from NMFS, a special 4(d) rule and/or a Section 7 exemption to receive a reduction or elimination of the prohibition on take of threatened species from USFWS must comply with the ten Regional Program elements. The ten program elements provide the basic umbrella for a Regional Road Maintenance ESA Program. Each agency will implement its own Part 3 Application within the framework of the Regional Program, according to its own organizational structure, resources, and labor contracts.

PROCEDURES FOR PART 3 APPLICATION BY LOCAL AGENCIES

Each agency desiring a limit, reduction, or elimination of the take prohibition on threatened species for its routine road maintenance activities prepares a Part 3 Application. The Part 3 Application is the plug-and-play component of the Regional Program and allows an agency to “plug” into the Services-approved Parts 1 and 2 of the Regional Program. The Part 3 Application is therefore a commitment that an agency will implement Parts 1 and 2 of the program. The Part 3 Application is presented in Part 3 of the *Guidelines*. The application contains the following four sections:

- **Section 1: Letter of Commitment.** This section is a letter of commitment requesting the Services to approve plug-and-play for an agency to use Parts 1 and 2 of the Regional Program to receive a take limit under the NMFS Salmon and Steelhead 4(d) rule, special 4(d) rule, and/or section 7 take exemption (provided through the incidental take statement of a biological opinion) through the USFWS.
- **Section 2: Compliance with Part 1 and Part 2.** This section contains the ten program elements in the Regional Program. Agencies must commit to complying with all Regional Program elements at both the regional and local levels to obtain a take limit under the NMFS Salmon and Steelhead 4(d) rule, special 4(d) rule, and/or section 7 take exemption (provided through the incidental take statement of a biological opinion) through the USFWS.
- **Section 3: General Procedures.** This section contains the general procedures of an agency. It outlines organizational structure and agency processes for maintenance selection, BMP selection and implementation, checklists, and adaptive management.
- **Section 4: Exceptions from Regional Program.** This section contains any exceptions from the Regional Program including the following:

program review and approval

- Any agency programs **not** included in the Regional Program.
- Any deviations.
- Any additional maintenance categories not listed in Part 1 of the *Guidelines*.
- Checklist process(es) if they differ from those in the *Guidelines*.
- Any additions or changes outside of the *Guidelines*.

The Regional Forum has developed a Program Review and Approval Committee to help agencies through the Part 3 Application process. The Services determine final approval of the Part 3 Application. Regional Forum and WSDOT HL&P review are advisory only. The final approval authority for an individual agency resides with the executive and legislative branches of participating local governments. Figure 8 shows the steps that an agency will need to follow to submit their Part 3 Application under the Regional Program. As an agency prepares its Part 3 Application, the agency may seek advice and assistance from the Regional Forum. The agency may also submit its Part 3 Application to the Review and Approval Committee for preliminary review. The agency's Part 3 Application will be referred to H&LP or the Regional Forum to review it for consistency with the Regional Program. If the Part 3 Application complies with the Regional Program, H&LP or the Regional Forum submits the Part 3 Application to the Services for final approval of the program. The flowchart on the following page (Figure 8) shows the requirement that exceptions contained in Section 4 of the Part 3 Application will be evaluated by the Services to determine if a separate, agency-specific biological review is required.

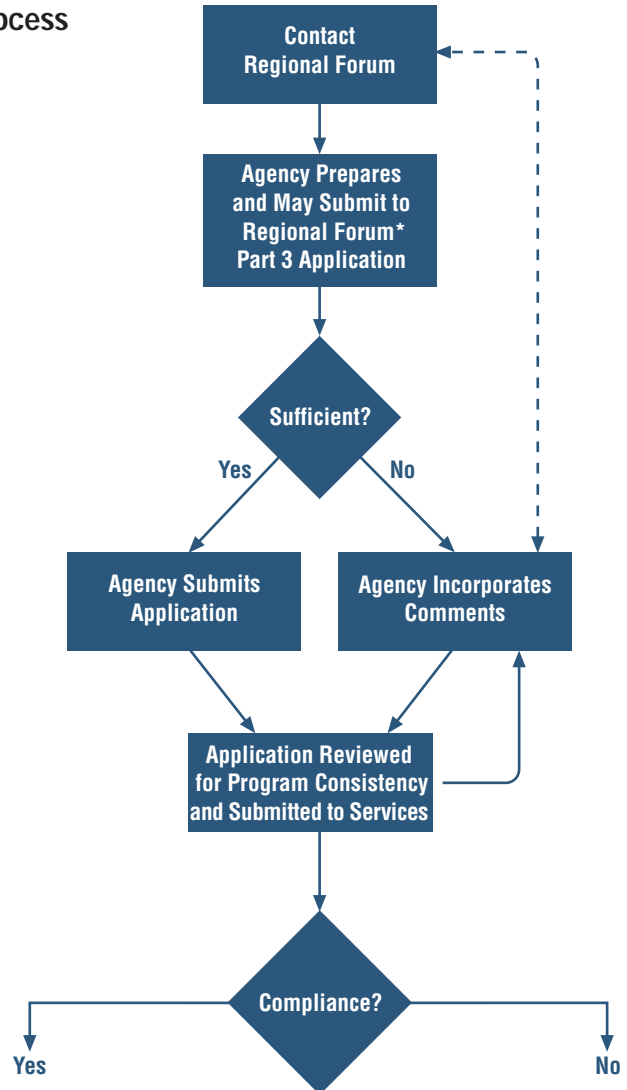
The Regional Program provides a framework for development, review, and submittal processes for Part 3 Application. Agencies should contact the Regional Forum for assistance reviewing the Regional Program and understanding it before starting their Part 3 Application process. (A training course, "ESA 100 Briefing for Decision Makers," includes this program review.)



program review and approval

Part 3 Application Process

Figure 8

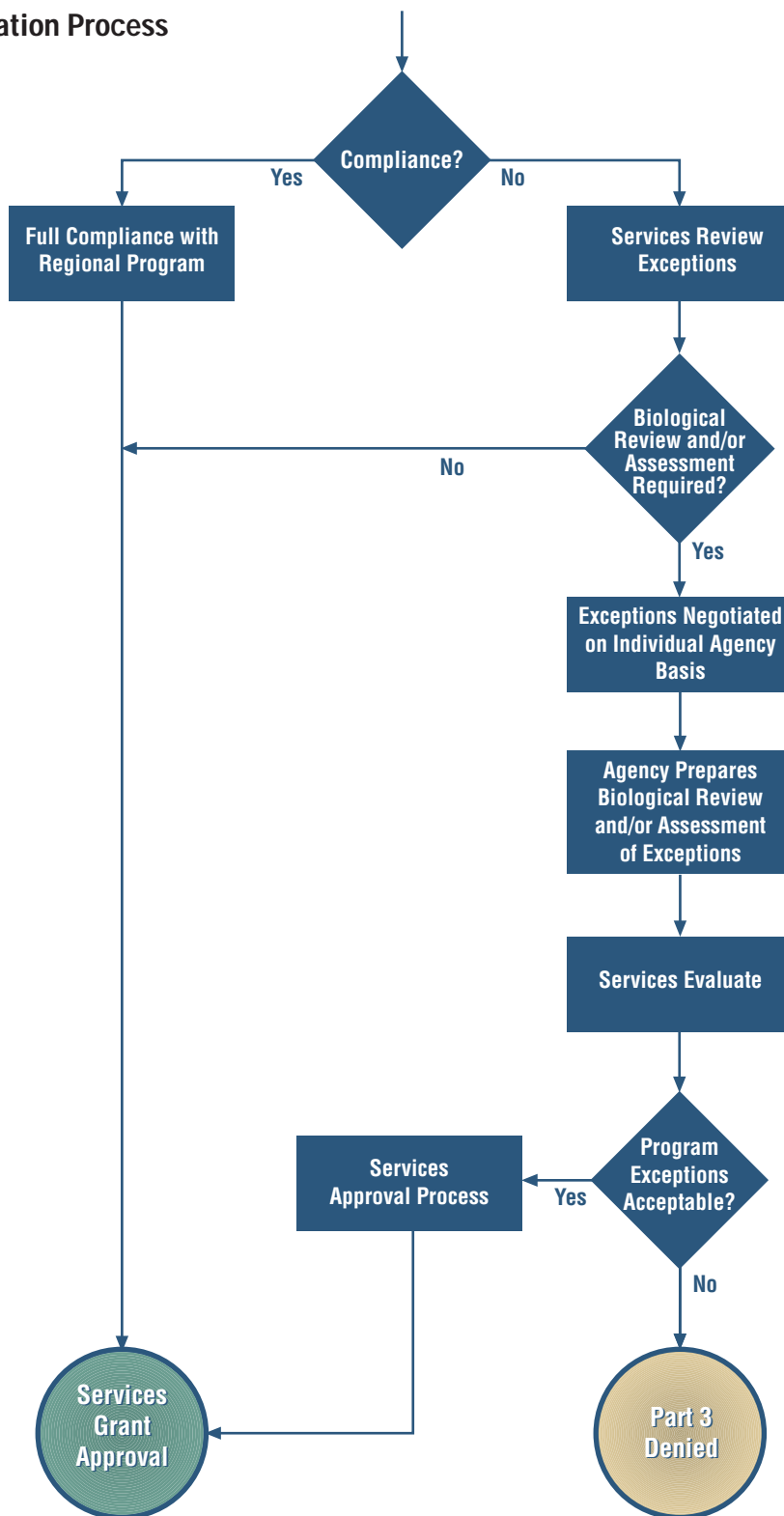


Continued on Next Page

program review and approval

Part 3 Application Process

Figure 8 continued





program review and approval

The Review and Approval Committee can assist agencies in developing their Part 3 Application. The Committee will review a Part 3 Application and answer agency questions about the Part 3 framework. The Part 3 Application, when completed by the agency, may be reviewed by the Regional Forum or the WSDOT Highways and Local Program (H&LP) review process.

WSDOT will review the Part 3 Application to ensure it is complete and includes all four sections. If the application is in compliance, WSDOT will pass it on to the Services with a letter of compliance. For more detail on WSDOT H&LP's role in screening Part 3 Applications see Appendix B.

DISPUTE RESOLUTION

Dispute resolution is available for applications that are incomplete or inconsistent with the framework for Part 3. WSDOT H&LP will return the application to the agency with a letter of deficiencies for correction. While an agency may elect to pass the application onto the Services, the letter of deficiencies must be included for the Services' review and approval. The Services determine final approval of the application. The Regional Forum and H&LP review are advisory only. The final approval authority for an individual agency resides with the executive and legislative branches of participating local governments.

If upon review of an individual agency's Part 3 Application, H&LP determines an application is not in compliance with the *Guidelines*, H&LP will provide a detailed description of Part 3 Application deficiencies to the applicant agency. If the applicant agency is unable to resolve the deficiencies to the satisfaction of H&LP, the agency has two options:

1. The applicant agency may elect **not** to submit a Part 3 Application to the Services. In such case, H&LP will not forward the Part 3 Application to the Services and will return all documentation to the applicant.
2. The applicant agency can request that H&LP submit the Part 3 Application to the Services. Any such submittal shall contain a detailed description of deficiencies as identified by H&LP, as well as a cover letter from the applicant agency stating their case. The final decision to approve an individual agency's Part 3 Application rests with the Services.

Program Element 3: TRAINING



Training is one of the most critical elements of the Regional Program. Training will initially focus on the BMPs to ensure crews, supervisors, engineers, and environmental staff are appropriately trained to effectively implement BMPs. New employees who have a role in implementing the Regional Program will be trained in areas for which they are responsible.

The two primary goals of training are to ensure staff 1) understand the Regional Road Maintenance ESA Program, and 2) are aware of their roles and responsibilities for field work, technical support, permits, and implementation. Training will be conducted with an adaptive management philosophy. That means future needs are addressed as questions and issues arise during program implementation.

WSDOT H&LP administers a statewide transportation management, engineering, operations, and road maintenance training program. Regional Program training will be folded into the existing WSDOT Technology Transfer (T2) Center, UW Transpeed, or WSDOT Training Program in conjunction with the Regional Forum Training Program. A Regional Program Training Committee has been formed and reached agreement with T2 staff on roles and responsibilities.

Training will be accomplished with both classroom and “train-the-trainer” sessions. The sessions will be developed and presented by either T2 Center instructors, WSDOT Trainers or agency staff (who have received the appropriate train-the-trainer training). Training will often be customized for the target audience and take advantage of course materials developed for this program.

PURPOSE

The following is the purpose the Regional Program training:

- Provide training to key road maintenance personnel involved with making decisions, designing, constructing, or maintaining facilities impacted by ESA.
- Develop and provide a consistent, comprehensive training curriculum.



GOALS

The following are the goals of the Regional Program training:

- Meet various regional members training needs.
- Provide “train-the-trainer” training.
- Provide training that will adapt to changing technologies, training methods, and feedback from trainees.
- Include oversight techniques to evaluate the effectiveness of the training program.
- Make training available to private contractors through T2.

TRAINING WORK PLAN

The Regional Program Training Committee is working with T2 to develop training consistent with the *Guidelines*. The committee has been tasked with the following:

- Develop detailed work program (purpose, goals, schedule, key points for Regional Forum review).
- Develop training curriculum (to be approved by Regional Forum).
- Develop agreement outlining T2 and Regional Program Training Committee roles and responsibilities (to be approved by the Regional Forum).
- Project estimated number of participants (by work classification) expected to attend the various training sessions.
- Identify topics by course, staff classification and frequency.
- Brief Regional Forum and obtain approval at key decision points. These briefings should also highlight program challenges and successes.
- Assign leadership for specific subject areas to specific agencies (subject to Regional Forum approval).

TRAINING CURRICULUM

Four tracks are provided in the Regional Program curriculum. Each agency’s training program will require key staff to attend the appropriate courses as outlined in Figure 9 on the following page:



FOUR ESA TRAINING TRACKS

The ESA Training Plan has been grouped into four separate tracks: (1) Briefing for decision makers; (2) a training course addressing maintenance design and technical staff procedures involved in roadway maintenance activities; (3) a training course addressing field crew practices involved in roadway maintenance activities; and (4) a course to train agency level trainers in training skills applicable to the ESA training program. These trainers are selected by their agencies for this training after completion of track 2 and 3. WSDOT's training program is a separate program that has combined the ESA training elements into its existing training..

Track 1: Briefing for Decision Makers

An overview of the ESA program for regional level management and administration. This is a stand-alone training class and not part of the required training program and is offered by members of the Regional Road Maintenance Forum.

Track 2: Introduction, Design and BMPs, and Environmental Roles for Technical and Scientific Staff

2 days. This course is a combination of the various procedures for technical, professional and environmental staff, supervisors and leads involved in maintenance activities. The track is an overview addressing: introduction to the Guidelines, design, habitat, ten program elements and maintenance BMPs to meet RRMP requirements.

Track 3: Introduction and Outcome-based Road Maintenance

1 day. This course is a combination of the various procedures for field crews and leads involved in maintenance activities. The track is an overview addressing: introduction to the Guidelines, design, habitat, environmental roles, ten program elements and implementation of maintenance BMPs to meet RRMP requirements.

Track 4: Train-the-Trainer for The Regional Road Maintenance Program

2 days. For agency-selected ESA trainers. This is the training track to train skills and techniques, evaluate, prepare, and certify candidates to teach the RRMP classroom (Tracks 2 and 3) and field demonstrations for BMP installations.



Program Element 4: COMPLIANCE MONITORING

Under the Regional Program, the basic components of the umbrella compliance monitoring program include planning, performance assessments, outcome assessments, and daily inspections. Crews, supervisors, environmental staff, and regulatory agencies may perform inspections. A combination of maintenance and environmental staff will do compliance monitoring in each agency. Each local agency will establish a compliance program for monitoring BMP outcomes and monitoring that takes place as part of various research projects (see Program Element 5, Scientific Research).

PLANNING

Roadway maintenance personnel (managers, supervisors and crew leads) will meet regularly with their respective environmental personnel to identify upcoming maintenance activities. Permits, BMPs, in-water work windows, and environmental issues will be discussed at this meeting. Activities will also be identified for which the environmental personnel will work with maintenance personnel at a job site to assess the extent and effectiveness with which BMPs are implemented. These meetings will serve as a baseline upon which maintenance and environmental personnel communicate more routinely on environmental issues throughout the year.

PERFORMANCE ASSESSMENTS

To help assess the adequacy of BMPs, environmental staff will accompany maintenance personnel in the field during selected maintenance activities. Activities for which environmental performance will be assessed will be selected during the planning meetings referenced above. Selected activities will be those that have the highest level of risk for adversely impacting fish or aquatic habitat. Examples of such activities include in-water work, stream bank stabilization, and bridge pier scour repair. A BMP/Outcome Categories matrix has been developed for specific maintenance activities and circumstances in which BMPs should be implemented. (See Figure 13 or Appendix C for the BMP Outcome Category matrix.)

Sample checklists have been provided in Part 1 and Appendix D of the *Guidelines* to assist in selecting and implementing BMPs. Agencies may elect to tailor checklists to meet their specific protocols. Any modifications to the checklists will be included in the agency's Part 3 Application submitted to WSDOT under Program Element 2, Program Review and Approval. (See



Figures 14 through 16 or Appendix D for the checklists.)

In the event a problem occurs in BMP use, corrective actions appropriate to the circumstances will be implemented. Corrective actions may include additional training, providing improved information to maintenance personnel, and modification of BMPs. BMPs will be modified according to the agency's adaptive management process as described in Program Element 6, Adaptive Management.

Periodically, the Services may evaluate an approved program for its effectiveness in maintaining and achieving program implementation that provides for the conservation of the listed salmonids. Whenever warranted, the Services will identify to an agency ways in which the program needs to be altered or strengthened. If any agency does not change to respond adequately to the new information in the shortest amount of time feasible, but not longer than one year, the Services will publish notification in the Federal Register, announcing their intention to withdraw the take limit (NMFS), special 4(d) rule and/or Section 7 take exemption, to remove the reduction or elimination of the take prohibition (USFWS). In this case the take prohibitions would then apply. Such announcement will provide for a comment period of no less than 30 days after which the Services will make a final determination whether to subject the activities to the ESA Section 9 prohibitions.

OUTCOME ASSESSMENTS

The outcomes or results from BMP practices, as they relate to the BMPs in Parts 1 or 2 of the Regional Program, will continue to be measured as part of road maintenance assessment efforts. Water quality will be monitored as needed for maintenance activities, where such outcome measurements are needed, to assure that aquatic habitat is not being adversely impacted.

COORDINATION WITH RESOURCE AGENCIES

Communication with the appropriate government resource agencies (i.e. NMFS, USFWS, WDFW) is an integral part of the Regional Program. Some permits (such as Hydraulic Project Approval [HPA] permits) require various types of communication between roadway maintenance and the appropriate resource agency regarding compliance with permit conditions. Examples include project-specific notifications, project-specific consultation prior to the commencement of permitted work, as well as day-to-day interagency



compliance monitoring

coordination and communication. This type of communication has been, and will continue to be, an integral component of roadway maintenance efforts to meet our responsibilities in a proactive manner.

Program Element 5: SCIENTIFIC RESEARCH



The Regional Forum has committed to two types of scientific research program elements.

The research will serve to verify the effectiveness of the BMPs, and update the BMPs based on the latest technologies.

- **Literature Research:** The search for completed studies and existing literature will be ongoing. Information will be shared with the Regional Forum and, where applicable, recommended program changes will be tested.
- **Case Studies:** Scientific analysis of specific BMPs will be conducted at test sites throughout the region.

Rather than each agency individually conducting research and case studies, members of the Regional Forum will recommend a regional scientific research committee. The Scientific Research and Case Studies Committee will lead this program element. Each agency seeking a take limit from NMFS special 4(d) rule and/or Section 7 take exemption to receive a reduction or elimination of the take prohibition from USFWS under this Regional Program must participate in this regional effort.

The research will serve to verify the effectiveness of the BMPs, and update BMPs based on the latest technologies. Some agencies began case study work in 1999:

- King County is conducting case studies on ditch maintenance BMPs.
- Pierce County is evaluating various, non-herbicidal methods of roadside vegetation control. This is an ongoing evaluation to monitor impacts over time.
- The City of Seattle recently completed a study evaluating the effects of chip sealing on a nearby water body (Bitter Lake).



Program Element 6: ADAPTIVE MANAGEMENT

The science of salmonid recovery is evolving. Actions required under the Regional Program may need to be modified as knowledge gaps are filled over time. Adaptive management will serve as a formalized process to ensure that new information is incorporated into decisions and actions affecting salmonid recovery.

In nearly all cases, conducting maintenance activities in compliance with the Regional Program contributes to conservation of the species. The Regional Program recognizes the potential for problems to occur during the course of maintenance activities, and has an adaptive management process that will address these concerns. The adaptive management process allows for local agencies as well as the Regional Forum to learn from experience in the field and scientific research to improve the program over time. Thus, conservation outcomes are achieved and the slight risk of adverse impacts avoided or minimized.

It will be necessary to monitor and assess how well implementation of the *Guidelines* achieves the goals of the program. Adaptive management will provide a systematic process for gathering and analyzing information to develop and implement alternatives that correct unproductive BMPs. Implementing effective adaptive management will assure progress is made toward achieving regional road maintenance outcome-based goals.

The concepts, elements, and principles described in the Regional Program are designed to assist in developing effective adaptive management and monitoring programs that result in the following outcomes:

- An adaptive management philosophy is one that is clearly defined, predictable, and can be understood.
- Relevant information is gathered, using appropriate quality controls, and is coordinated to evaluate road maintenance BMP decisions and actions as it pertains to the implementation of Regional Program BMPs.
- Program review occurs on predetermined timelines to ensure continual progress toward program goals and objectives.

COMPONENTS OF ADAPTIVE MANAGEMENT

The following are the three basic components of the Adaptive Management Program Element:

- Compliance Monitoring.
- Effectiveness Monitoring.
- Changes to the Regional Program.

Compliance Monitoring

Compliance monitoring is done to ensure agencies are implementing the Regional Program. Monitoring BMPs is a key component. Implementation of BMPs and all ten program elements will also be monitored.

Effectiveness Monitoring

The focus of effectiveness monitoring is BMP implementation to determine if BMPs are accomplishing Regional Program objectives. This monitoring will be accomplished through scientific research and case studies. The effectiveness of all other Regional Program elements will be monitored as well. Effectiveness monitoring of BMPs will be conducted to measure whether specific BMPs are achieving specified objectives. The type of work most often undertaken in aquatic habitat areas will guide BMP selection.

Changes to the Regional Program

The Regional Forum will engage in adaptive management to provide for ongoing Regional Program review and will evaluate and recommend program changes to the Services.

Program expansions or new program initiatives will have to go through each agency's budget approval process as well as review and approval by the Services. Using the adaptive management philosophy, the members of the Regional Forum will recommend program changes. Program modifications that could affect an individual agency's policies, budget, or level of road maintenance service will be taken back to agency policy makers for review and approval. To ensure that policy and budget issues are adequately addressed in individual agencies, Regional Forum members must occupy positions in their own road maintenance organizations with the authority to formally request budget or policy initiatives.



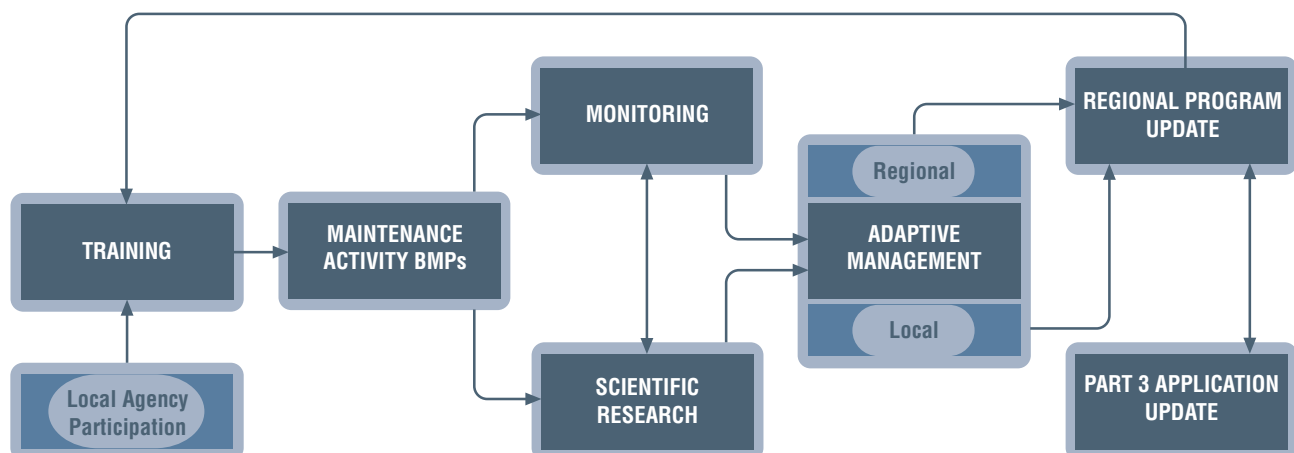
For overall changes to the Regional Program, the function of the Regional Forum is advisory. The final approval authority for individual agency budget changes resides with the executive and legislative branches of participating local governments. The Services will have final approval authority for changes to the Regional Program. It is assumed that, if the Services raise no objections to program changes, the take limitation (NMFS), special 4(d) rule and/or Section 7 take exemption to receive a reduction or elimination of the take prohibition (USFWS), would then apply to the revised program.

AVOIDING OR MINIMIZING ADVERSE IMPACTS

The overall impact of the Regional Program is to contribute to the conservation of listed aquatic species, while performing road maintenance activities. Although the risk of take from road maintenance is slight and likely to occur on a one-time or infrequent basis, the Regional Program recognizes that risk and has built in a method to correct for errors or failures of BMPs. This corrective action is accomplished by combining various other program elements with Program Element 10, BMPs and Conservation Outcomes. These other elements—Compliance Monitoring, Scientific Research, and Adaptive Management—all help to minimize the risk of take. As shown on Figure 10, *Avoiding or Minimizing Adverse Impacts*, these program elements form an integrated process of training, monitoring, and adaptive management that tracks the effectiveness of maintenance activity BMPs and alters that practice as needed (Figure 10):

Avoiding or Minimizing Adverse Impacts

Figure 10



Training: The first step in minimizing the risk of take is through a training program. As training becomes available, crew members and supervisors will receive appropriate training from instructors who have been through the Train-the-Trainer course (see Program Element 3, Training). With appropriate training, field personnel will recognize problems with BMPs and potential habitat risks. Training provides the means of quickly responding to problems in the field to avoid or minimize habitat impact. Training will also be given to engineering and environmental support staff to ensure that potential technical problems are dealt with in the planning stages of projects that require design or environmental support.

BMPs: In accordance with Program Element 10 (BMPs and Conservation Outcomes), and Part 2 of the *Guidelines*, BMPs will be used to achieve prescribed outcomes. The BMPs are designed to avoid or minimize adverse impacts, while achieving conservation outcomes.

Monitoring: BMPs will be monitored for effectiveness during the course of maintenance activities. In cases where BMPs are needed after maintenance work is completed, monitoring will continue for those BMPs. If problems occur, actions such as correcting or adding BMPs will be taken to ensure that outcomes are met.

Scientific Research: Scientific case studies and literature research will be conducted to ensure that BMPs achieve the desired outcomes. Based on these findings, recommendations to modify Part 1 or Part 2 of the Regional Program will be presented to the Regional Forum.

Adaptive Management: Adaptive management will occur at the local, agency-specific, and regional levels. Local ESA teams and the Regional Forum will evaluate information gathered during the course of maintenance activities, BMP implementation, monitoring, and scientific research. Based on this evaluation, Part 3 Applications will be updated at the local level, and the *Guidelines* will be updated at the regional level. Program updates will be factored into the training program.



AGENCY ADAPTIVE MANAGEMENT

During the course of road maintenance activities, countless combinations of conditions occur that affect BMP effectiveness. It is for this reason that the BMPs in the Regional Program are outcome-based. The outcome-based approach allows all staff—road crew supervisors, environmental staff, engineers, and others—to respond to changing conditions at the worksite to achieve specified BMP outcomes.

In spite of the outcome-based approach, it is anticipated that there will be rare occasions when problems occur at the work site, reducing BMP effectiveness. When this occurs, agency adaptive management will be employed to avoid or minimize potential adverse impacts to habitat. There are three phases to the agency adaptive management process:

- Pre-activity evaluation.
- Maintenance activity.
- Adaptive management.

Pre-Activity Evaluation. Prior to starting work, the site is evaluated to determine appropriate maintenance activities and BMPs. Maintenance activities are selected to achieve the following dual goals:

1. Maintaining and repairing the ROW structure
2. Providing mitigation for the original construction of the ROW structure.

BMPs are selected to achieve the outcomes prescribed in the Regional Program, thus avoiding or minimizing adverse impacts and contributing to habitat conservation.

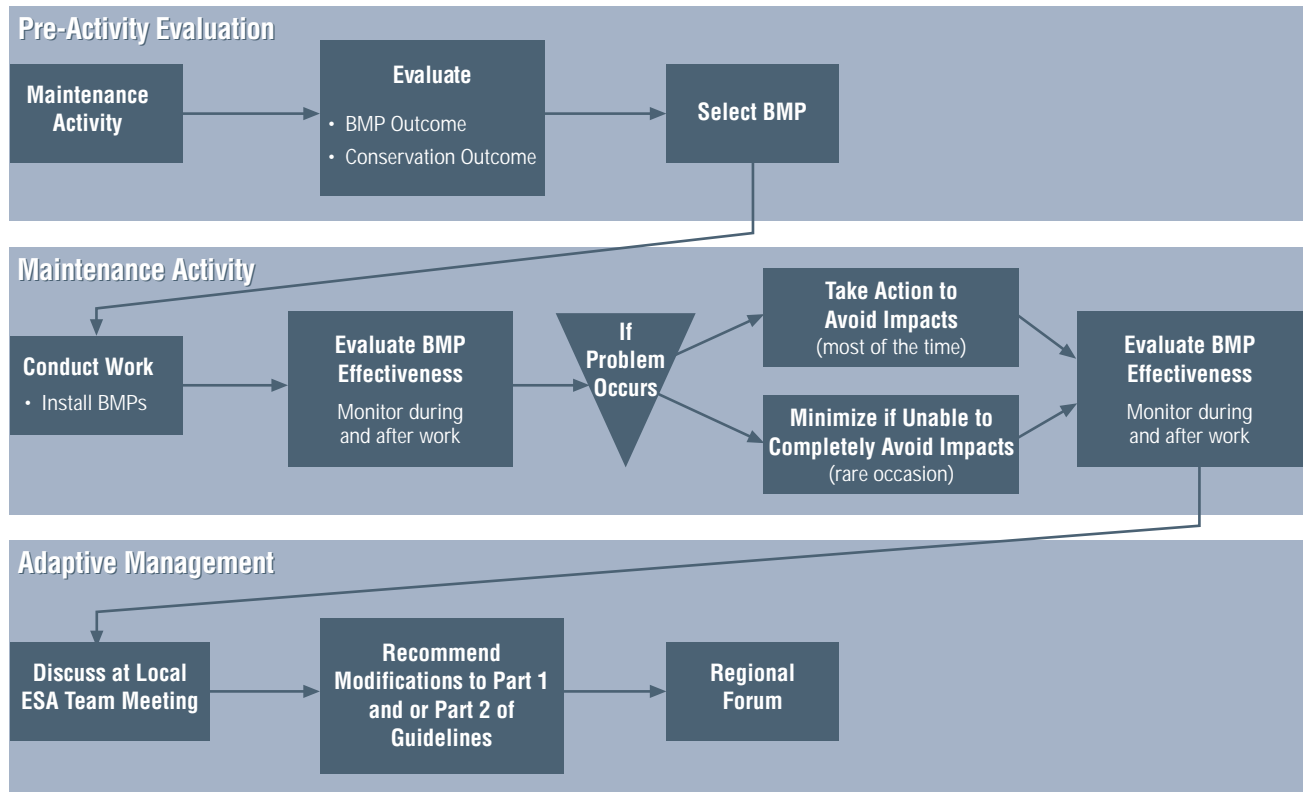
Maintenance Activity. Local ESA teams will be formed in each agency as defined in their Part 3 Application. Whenever corrective actions are taken, the local ESA team will evaluate the actions and their effectiveness.

During the course of maintenance activities, BMPs are installed and monitored. BMP monitoring occurs both during and after the maintenance activity itself to evaluate the effectiveness. If a problem occurs, corrective action will be taken to avoid impacts and to achieve the BMP outcome. Usually, actions involve installing additional BMPs, which, in combination with the initial BMPs, will achieve the BMP outcome.

In nearly all situations, it will be possible to correct problems as they arise. On rare occasions, however, adverse impacts could occur. In nearly all cases, these will be temporary impacts, lasting only until a combination of BMPs is installed to correct the problem.

Adaptive Management. Based on the local ESA team's evaluations, recommendations for modifications to Parts 1 or 2 of the Regional Program will be forwarded to the Regional Forum. The agency adaptive management process is shown on Figure 11.

 **Agency Adaptive Management**
Figure 11





REGIONAL ADAPTIVE MANAGEMENT

Adaptive management is key to the success of the Regional Program. Adaptive management provides a means of improving conservation outcomes in three ways:

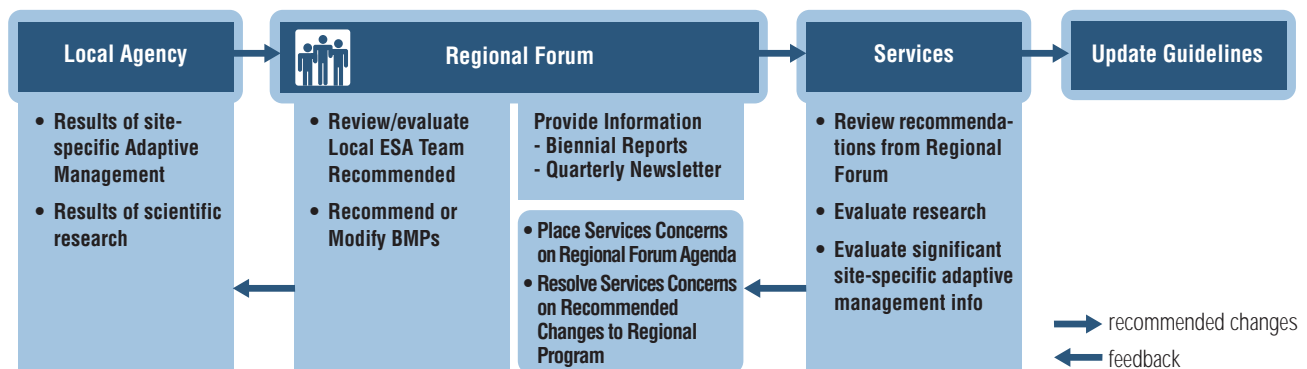
1. Improving site-specific outcomes at the local level
2. Improving the Regional Program at the regional level
3. Avoiding and minimizing potential adverse impacts by sharing information at the regional level.

Recommendations from local ESA teams are evaluated in Regional Forum meetings. Additionally, Regional Forum members evaluate the result of local agency scientific research. Based on this evaluation, the Regional Forum produces recommended program changes, which are submitted to the Services for final review and approval. If the Services have questions or concerns, these are referred back to the Regional Forum for resolution. Final program changes, as approved by the Services, are used to update the *Guidelines* (Figure 12).



Regional Adaptive Management

Figure 12



Program Element 7: EMERGENCY RESPONSE



Road maintenance organizations must respond immediately to any natural or human caused emergencies. Emergency response actions must be undertaken to minimize or avoid:

- Imminent threat to public health or safety.
- Imminent threat to danger to public or private property.
- Imminent threat of serious environmental degradation.

EMERGENCY RESPONSE ACTIONS

Emergency response actions include, but are not limited to, fixing damage to roadways, roadsides, or ROW structures whenever an emergency occurs. Examples of emergency actions include fire response, spills, landslides, slumps, water, drainage, or sewer line repair and cleanup, utility line breaks, overflows of water reservoir facilities, stormwater facilities, sewer facilities, collection boxes, and other related facilities during operation or caused by high flow events, high precipitation events, flood events, snow and ice controls or other emergency conditions. These actions may or may not be technically defined as an emergency under Presidential declaration. However, failure to perform these activities may result in an imminent threat of serious environmental degradation, threat to public health or safety or damage to public or private property.

UNSCHEDULED MAINTENANCE ACTIVITIES

Unanticipated repairs require action to be started within a few days or before the next wet weather season within the in-water window to protect fish. Therefore, there is not enough time to go through the normal permitting process and require expedited permits. However, if the danger becomes more immediate and regulations cannot be met, the applications should be treated as emergency actions.

HAZARDOUS MATERIAL INCIDENT RESPONSE

Traffic accidents on roadways occasionally result in the release of hazardous materials to the environment. If the party(s) responsible for the hazardous materials release cannot be identified or made to contain and clean up the release, the Department of Ecology (Ecology) assumes these responsibilities. The role of road maintenance personnel is to manage traffic at incidents on roadways. This is conducted in support of the overall incident management



emergency response

effort. Road maintenance personnel can also provide technical information (i.e. information on drainage system characteristics) in support of the incident response. However, trained maintenance personnel may take control actions when necessary and feasible to contain a release of petroleum products into surface waters.

MINIMIZATION AND AVOIDANCE

- Emergency response and inspection followed by notification of the appropriate resources in a timely manner.
- Develop a phone tree for resource contacts to be called during an emergency response.
- Where possible, emergency maintenance will use the same BMPs as routine maintenance activities to avoid additional impacts to wetlands, watercourses or streams.
- Emergency maintenance will provide, where possible, adequate erosion control or bank stabilization around watercourses.

Where appropriate, permit processing will begin as soon as the emergency situation has been stabilized.

Program Element 8: Biological Data Collection



Existing ROW structures are linear and tend to have small-scale and minor site-specific points of impact. For that reason, the following biological data will be gathered in the ROW:

- Identification of aquatic habitat resources within ROW.
- ROW aquatic habitat location to make BMP decisions.
- Train and alert staff where to apply the guidelines.

Knowing the location of aquatic habitat within the ROW and using BMPs during maintenance activities in these areas will have a positive impact on aquatic habitat.

Element 8, Biological Data Collection, is the key to providing road maintenance staff with ROW aquatic habitat location information so that they can make appropriate BMP decisions. Under the biological data collection program element, agencies will develop processes to train and alert staff where the *Guidelines* need to be applied. Training and location of where to apply guidelines may be accomplished by the use of maps, geographic information systems (GIS), site visits, or marking locations in the field.

Some agencies currently have information on aquatic habitat resource locations. Once an initial aquatic habitat identification has been completed, ongoing updates will be made to address changing conditions. An agency will be considered in compliance with the Regional Program as long as there is a biological data collection process in place.

This data will be collected in the road ROW structure and used to evaluate the use of BMPs. The data collected and the results of this adaptive management process will be made available for project prioritization, biological assessments, and future planning.



Program Element 9: BIENNIAL REPORTS

The Regional Forum will submit biennial reports to the Services on the status of all ten elements of the Regional Program. At a minimum, the reports will include the following:

- Status reports and updates on each program element.
- Training program, review and updates.
- Review of scientific research.
- Implementation review.
- Adaptive Management reports, including recommended changes to the *Guidelines*.

In addition to the formal reports, the Services will be provided copies of a quarterly newsletter. The biennial report will be provided to others upon request.

Program Element 10: BMPS AND CONSERVATION OUTCOMES



REGIONAL PROGRAM BMPS

The Regional Program BMPS were developed with the idea that they must be outcome based. Rather than providing a “cookbook recipe” approach to BMPS, the Regional Program BMPS focus on the following outcomes:

- Minimize erosion/sedimentation.
- Contain pollutants.
- Maximize habitat improvements.

The *Guidelines* provide many options for achieving the outcomes identified in this program element, as well as the outcomes identified in Part 2, Best Management Practices. BMPS will be selected based on worksite conditions. The Regional Forum clearly recognizes the difficulties encountered when implementing BMPS. Conditions vary dramatically from site to site based on many factors:

- Soils/geological conditions.
- Stream/surface water hydrology.
- Groundwater conditions.
- Presence of utility lines or structures.
- Vegetation.
- Resource availability.
- Regulatory requirements (i.e. permit requirements).
- Legal requirements (such as safety standards, regulations).
- Terrain.
- Space available in ROW.

The menu of options provided in the Regional Program allows crews, supervisors, design engineers, and environmental staff the flexibility to select the most efficient BMPS for each site.

IMPLEMENTATION STRATEGY

Flexibility in selecting BMPS depending on site conditions is an absolute necessity for successful implementation of the Regional Program. The Regional Forum will develop a training program for supervisory personnel and crews. The training will provide individuals with background information to



bmps and conservation outcomes

recognize when environmental staff needs to be consulted regarding BMPs and when BMPs should be used. Each agency will develop and implement a maintenance activity decision process flowchart, indicating the key points at which environmental staff will be consulted.

The training will be coupled with outcome monitoring to implement BMPs that are appropriately and effectively installed.

HOW TO USE THE BMP PORTIONS OF THE *GUIDELINES*

The success of the BMP portions of the *Guidelines* depends on understanding that the purpose of the Regional Program BMPs is to:

- Minimize erosion and sedimentation as a result of road maintenance activities or tasks.
- Contain pollutants generated from maintenance activities.
- Identify and maximize opportunities for implementing habitat protection and maintenance features.

Installing a BMP may not always meet all of the above purposes. The work site and BMPs must be monitored and maintained properly. If BMPs do not produce the desired outcomes, those BMPs may require modification or the use of additional BMPs.

READ THE *GUIDELINES*

It is important to read the entire *Guidelines* to gain a basic understanding of how BMPs can be useful in daily operations. Part 1, Program Element 10, BMPs and Conservation Outcomes and Part 2, Best Management Practices, are to be used **in tandem** to perform maintenance activities and implement BMPs. Road maintenance activities have been divided into 15 *Maintenance Categories* presented as separate sections in Part 1, Program Element 10, BMPs and Conservation Outcomes:

1. Roadway Surface.
2. Enclosed Drainage Systems.
3. Cleaning Enclosed Drainage Systems.
4. Open Drainage Systems.
5. Watercourses and Streams.

bmps and conservation outcomes

6. Stream Crossings.
7. Gravel Shoulders.
8. Street Surface Cleaning.
9. Bridge Maintenance.
10. Snow and Ice Control.
11. Emergency Slide/Washout Repair.
12. Concrete.
13. Sewer Systems.
14. Water Systems
15. Vegetation.

Each category includes activities, purpose, BMP outcomes, BMPs, and potential conservation outcomes. Some of the Part 1 BMPs are routine, while others require more detailed information. Those BMPs requiring more information are included in Part 2 in alphabetical order.

IDENTIFY CONSERVATION OUTCOMES

While developing these *Guidelines*, the Regional Forum identified “conservation outcomes” that could be achieved while performing road maintenance activities. Potential conservation outcomes are identified for each maintenance category. These conservation outcomes are the result of using BMPs to conserve aquatic species.

SELECT BMP OUTCOME CATEGORIES

When reviewing a proposed maintenance or construction activity, it is important to have some basic understanding of erosion and sediment control. It is easier and more effective to reduce soil particles and contaminants from becoming waterborne or airborne (entering or mixing with the water) than to separate them after they have mixed. To help select the appropriate BMP for your specific application, the BMPs in Part 2 have been grouped into eight site-specific BMP *Outcome Categories*:

1. Keep Water from Work Area.
2. Reduce Potential for Soil Erosion.
3. Filter/Perimeter Protection.



bmps and conservation outcomes

4. Settling.
5. Reduce Water Velocity/Erosive Forces.
6. Containment.
7. Habitat Protection/Maintenance.
8. Reduce Potential for Contaminants Falling into Water.

Part 2 presents more detailed information on the Outcome Categories, including the following:

- Definition.
- Desired Outcome.
- Applications.
- Limitations.
- Permit Conditions.
- BMP Options.


Part 2 also presents each site-specific BMP alphabetically. The Part 2 BMPs include a description, including a statement on its purpose, applications, limitations, construction guidelines, maintenance and removal. Many photos and illustrations are also provided.























































The BMP Outcome Categories matrix shown on Figure 13 is a tool for selecting and using BMPs that meet the conservation outcomes of the Regional Program. Additional copies of the matrix are provided in Appendix C.

bmps and conservation outcomes















































BMP Outcome Category Matrix

 = Recommended BMP Application but not limited to

		BMP OUTCOME CATEGORY							
		Keep Water From Work Area	Reduce Potential for Soil Erosion	Filter / Perimeter Protection	Settling	Reduce Water Velocity / Erosive Forces	Containment	Habitat Protection / Maintenance	Reduce Potential for Contaminants Falling Into Water
BMP	PAGE								
AQUA BARRIER	2.20								
BACK OF SLOPE PLANTING	2.23								
COFFERDAM	2.25								
COIR FABRIC	2.28								
COIR LOG	2.30								
CONCRETE CONTAINMENT (1)	2.33								
CONCRETE CONTAINMENT (2)	2.36								
CONSTRUCTION ACCESS ROAD	2.38								
CONTINUOUS BERM	2.41								
CURB INLET SEDIMENT TRAP	2.44								
DEWATERING	2.49								
DIAPER NETTING	2.51								
DITCH LINING	2.53								
DIVERSION BERM	2.55								
DIVERSION CHANNEL	2.57								
DUST CONTROL	2.60								
EXCELSIOR FILLED LOG	2.62								
FILTER FABRIC	2.64								
GRASS LINED CHANNEL	2.66								
GRAVEL FILLED SUMP	2.70								
HALF ROUND FILTER	2.71								
HAND SEEDING	2.73								
HYDROSEEDING	2.75								
INLET PROTECTION	2.77								
KIMBLE FILTER PIPE	2.84								
LARGE WOODY MATERIAL	2.86								
LIVE STAKING	2.91								
MULCHING	2.95								
PLASTIC COVERING	2.97								
PLYWOOD WORK PLATFORM	2.99								

BMP Outcome Category Matrix

 = Recommended BMP Application but not limited to

		BMP OUTCOME CATEGORY							
BMP	PAGE	Keep Water From Work Area	Reduce Potential for Soil Erosion	Filter / Perimeter Protection	Settling	Reduce Water Velocity / Erosive Forces	Containment	Habitat Protection / Maintenance	Reduce Potential for Contaminants Falling Into Water
RIP RAP	2.101								
ROCK CHECK DAM	2.103								
SANDBAG	2.107								
SEDIMENTATION SUMP	2.111								
SILT FENCE	2.112								
SILT MAT	2.115								
SILTATION POND/SETTLING TANK	2.117								
SOIL STABILIZATION (Blankets/Matting)	2.120								
STRAW BALE BARRIER (1)	2.125								
STRAW BALE BARRIER (2)	2.128								
STRAW BALE BARRIER (3)	2.133								
STRAW LOG	2.136								
STREAM BANK STABILIZATION	2.139								
STREAM BYPASS	2.140								
STREAMBED GRAVEL	2.144								
SURFACE ROUGHENING	2.146								
SWEEPING	2.150								
TEMPORARY SEDIMENT TRAP	2.153								
TRIANGULAR SILT DIKE	2.156								
TURBIDITY CURTAIN	2.160								
VACTORING	2.164								
VEGETATIVE BUFFER	2.166								
WASHED ROCK	2.168								

VISIT THE SITE

Before starting an activity, conduct a site visit to gather information. Useful information includes the scope of activity, work area, potential staging and temporary storage areas, proximity to sensitive areas or drainage features, soil conditions, existing vegetation, and amount of onsite water. Other important information is the presence of slopes, traffic, and an initial assessment of BMP options. This information will be used for five basic purposes:

1. Plan the activity.
2. Identify maintenance/construction methods, sequence, and schedule.
3. Determine equipment and materials.
4. Select BMP or combination of BMPs.
5. Determine permit needs.

SELECT AND IMPLEMENT A BMP OR COMBINATION OF BMPs

There is no ideal or perfect BMP for each specific activity. Generally, a combination of BMPs is used to meet the desired outcome. The *Guidelines* aid in the BMP selection process. The following steps will help make a successful BMP selection and work activity:

1. Use the following sample checklists or develop and use your own checklist (Figures 14 through 16).
2. Become familiar with the *Guidelines*.
3. Identify the Maintenance Category(s) to be performed and BMP categories.
4. Define the activity, scope, and limits.
5. Conduct a site visit.
6. Review BMP options.
7. List those BMPs (from both Part 1 and Part 2) applicable to the Maintenance Category(s) and site conditions.
8. Select the BMP(s) that will meet the desired outcome.
9. Secure permits.
10. Prepare a construction or maintenance sequence and schedule.
11. Conduct a pre-maintenance/pre-construction meeting to review the activity, roles and responsibilities, and BMPs (installation, monitoring, maintenance, and removal).



12. Gather the necessary equipment and materials.
13. Implement the BMP(s) by following the *Guidelines*, permit conditions, or plans.
14. Ask for help (if required).

USE THE CHECKLISTS

The sample checklists on the following pages have been developed to guide your maintenance activities, including site visits and selecting and implementing BMPs (see Figures 14 through 16). These checklists are also provided in Appendix D.

ASK FOR HELP

Generally, follow your own agency's Part 3 Application or protocols for assistance. Other agencies with membership in the Regional Forum may be able to offer additional assistance. See Appendix A for a list of Regional Forum contacts.

Activity and bmp

Planning and Selection

Sample Checklist #1

Figure 14

ACTIVITY INFORMATION		
Location:	Maintenance Activity:	
Lead:	Date:	
Description of Activity:		
CHECKLIST		
Steps	Completed	Comments
1. Make site visit before starting work.		
2. Define activity, scope and limits.		
3. Identify sensitive areas and drainage features.		
4. Is environmental staff required to review plans or provide crew support?		
5. Are fish present (or likely to be present) in work area or activity impact area. (If yes, contact environmental support staff or WSDFW.)		
6. Will fish exclusion be required? (If yes, coordinate with designated staff or agency.)		
7. Review Maintenance Category BMP options related to site-specific conditions.		
8. Select applicable BMPs from Part 1 and 2 of the <i>Guidelines</i> .		
9. Secure permits.		
10. Read and understand all permit conditions. Resolve permit conditions before moving forward.		
11. Prepare construction/maintenance schedule, and/or sequence (Including installing, monitoring, maintaining, and removing BMP(s).)		
12. Schedule a pre-maintenance or pre-construction meeting as necessary.		
13. Review activity as possible model for training and/or adaptive management discussions.		



Activity and bmp

Pre-construction and Pre-maintenance Meeting

Sample Checklist #2

Figure 15

ACTIVITY INFORMATION		
Location:	Maintenance Activity:	
Lead:	Date:	
Description of Activity:		
CHECKLIST		
Steps	Completed	Comments
1. Invite appropriate personnel and/or agencies.		
2. Prepare agenda and attendance/sign-in form.		
3. Outline construction/maintenance, schedule, and/or sequence (Including installation, monitoring, maintaining, & removing BMP(s)).		
4. Identify sensitive areas and drainage features.		
5. If fish exclusion required, follow Fish Exclusion Protocol in Appendix E.		
6. Clarify roles & responsibilities of all personnel & agencies related to all aspects of the activity.		
7. Discuss permits, approvals and their conditions.		
8. If environmental staff is required to be onsite during work activities: introduce personnel and their role(s).		

Activity and bmp Installation, Monitoring, Maintaining and Removal Sample Checklist #3

Figure 16

ACTIVITY INFORMATION		
Location:	Maintenance Activity:	
Lead:	Date:	
Description of Activity:		
CHECKLIST		
Steps	Completed	Comments
1. Identify/mark work area and location of BMP(s).		
2. Arrange for delivery of BMP(s) products.		
3. Environmental staff support as appropriate.		
4. Make sure BMP(s) are installed in accordance with the <i>Guidelines</i> , permit conditions and/or specifications.		
5. Monitor/check BMP(s) routinely to make sure BMP outcomes are achieved, and make repairs, adjustments, and/or additions as necessary.		
6. Remove BMP(s) and re-vegetate in accordance with the <i>Guidelines</i> .		



Activity and bmp

Routine Part 1

Sample Checklist #4

Figure 17

Task	Yes	No
1. Make site visit before starting work		
2. Define activity, scope, and limits		
3. Review Part 1 BMPs		
• Permit needed		
• Scheduling considerations		
• Equipment maintenance		
• Disturbed soil		
• Waste material removed		
• Spill kit		
• Part 2 BMPs needed		
• Evaluate using detailed checklist 1, 2, and/or 3		
4. Is environmental staff required? NO – continue maintenance YES – contact environmental staff for review		
5. In water work		
• Stop work		
• Contact environmental staff for review		
• Evaluate using detailed checklist 1, 2, and/or 3		

Maintenance Category #1: ROADWAY SURFACE



ACTIVITIES¹

Repair, replace, install, or maintain roadway surfaces. Activities include the following: pothole and square cut patching; removing paved surface or roadway base; repairing roadway base; repaving; adding gravel or grading roads, access roads, or ROW surfaces; dust control; extending pavement edge; paving graveled shoulder; crack sealing; overlay; chip seal; resurfacing; pavement marking and traffic channelization; traffic control features.

PURPOSE

The roadway surface is part of the ROW structure. The slope of the road surface routes water and sediments off the roadway, to the shoulder, to an open drainage area or ditch or to an enclosed drainage system. Thus, the slope of the roadway surface is part of the water flow and sediment collection systems.

These activities are performed to provide a safe roadway surface for the traveling public and to reduce further roadway deterioration or failure. Most patching and resurfacing activities occur from May to October. Potholes are repaired as they occur within established guidelines to reduce accidents, vehicle damage, and adverse environmental impacts.

BMP OUTCOMES

- Restore structure.
- Minimize work site pollutants from maintenance/repair activities.
- Restore or maintain surface water drainage.
- Restore or maintain road surface/safety.
- Reduce turbidity.
- Reduce sediments from entering watercourses or streams.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



roadway surface

BMPs

Maintenance Category #1: Roadway Surface

BMPs	Description
Roadway Surface	Perform repairs, replacement, and maintenance of roadway surface.
Shoulder Work	Maximize opportunities for shoulder work, which will increase infiltration or biofiltration. (See also Maintenance Category #7, Gravel Shoulders).
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or worksite pollutants from entering watercourses or streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection,” • “Reduce Potential for Soil Erosion” • “Reduce Water Velocity/Erosive Forces.” <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of BMPs that protect soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	Prior to BMP removal, clean up accumulated sediments and seed or replant disturbed area.
Equipment/Tools	<p>Tool and equipment cleanup procedures:</p> <ul style="list-style-type: none"> • Routinely inspect equipment, tools and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves.
	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field.

Continued on next page

**BMPs****Maintenance Category #1: Roadway Surface (Continued)**

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	<ul style="list-style-type: none"> • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	<p>After repairs are completed, remove construction/maintenance waste materials from site for disposal or recycling.</p> <p>If area is swept with a pick-up sweeper, the material will be hauled out of the area to appropriate disposal site.</p>
Painting/Marking	<ul style="list-style-type: none"> • Follow state and federal guidelines for handling paint and other traffic marking materials. • Stripe roadways in dry weather.
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Restore structure
- Protect watercourse, stream and/or water body.
- Maximize opportunities for increased infiltration.
- Reduce runoff of dirt, debris, sediment, and petroleum products from maintenance activity to maintain water quality.

Conservation objectives and how they are achieved are shown on the following table:

Roadway Surface Maintenance	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or restore sediment transport system to reduce loading to watercourses or streams.</p> <p>Remove or reduce sediment to protect watercourses or streams.</p> <p>Maintain or restore nutrient process by re-vegetating (at optimum time for successful revegetation) after disturbance.</p> <p>Repair/maintenance of road surface reduces water splashing off of roadway, which in turn reduces:</p> <ul style="list-style-type: none"> • Turbidity. • Sediment loading. • Erosion. • Off-road damages from vehicles leaving road surface. • Spills. • Structural damage to shoulders and ditches. 	<p>Performing maintenance activities.</p> <p>Reducing vehicle accidents:</p> <ul style="list-style-type: none"> • Reduces risk of pollutants and debris entering aquatic habitat. • Reduces structural damage to watercourse or stream system. <p>Reducing roadway or shoulder failure:</p> <ul style="list-style-type: none"> • Reduces risk of roadway/shoulder failure sediment from entering aquatic habitat watercourse or stream. • Open holes disturb road base/subgrade, which reduces erosion. Patching holes eliminates transport of sediment into drainage system and/or surface water. <p>Maintenance can reduce adverse effects on shoulders, open and closed drainage systems, stream crossings, and offsite habitat.</p> <p>Using appropriate erosion/sediment control BMPs during construction/maintenance.</p> <p>Re-vegetate disturbed soils</p>

Maintenance Category #2: ENCLOSED DRAINAGE SYSTEMS



Activities¹

Repair, replacement, installation, and maintenance tasks performed on enclosed drainage systems include the following: facilities, retention/detention facilities, pollution control devices, manholes, catch basins, vaults, pipes, access roads; and inlets/outlets. Facilities can be located on ROW, public property, separate tracts, easements, or on private property. Facilities are designed according to current standards, and installed according to permit conditions.

Purpose

The enclosed drainage system is part of the ROW structure that routes water and sediments from roadways and surface structures through water and sediment collection systems to outlet areas. Enclosed drainage systems—which are used for water quality and quantity treatment—are designed to accumulate sediment over time. Because of limited storage capacity, this sediment should be removed to maintain treatment effectiveness and environmental protection. Therefore, the purpose of such maintenance includes one or more of the following:

- Remove large quantities of sediment and debris from stormwater before it enters watercourses or streams.
- Improve the roadway drainage system to efficiently remove, collect and convey water from the ROW to permit the maximum use of the roadway.
- Reduce damage to roadway structures.
- Protect the abutting property from damages.
- Restore surface water drainage.
- Ensure structural integrity.
- Vegetation management.

BMP Outcomes

- Restore structure.
- Reduce sediment from entering watercourses or streams and aquatic habitat.
- Minimize worksite pollutants from construction/repair area.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



enclosed drainage systems

- Restore or maintain water quality:
 - Remove debris.
 - Remove trash.
 - Remove yard waste.
 - Remove sediment.
 - Reduce turbidity.

BMP

See table on next page.



BMPs

Maintenance Category #2: Enclosed Drainage Systems

BMPs	Description
Enclosed Drainage Systems	Perform repair, replacement, and maintenance of enclosed drainage systems.
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the following eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses, streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection,” • “Keep Water from Work Area,” and/or • “Reduce Potential for Soil Erosion.” <p>Refer to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of BMPs that protect soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	Prior to BMP removal, clean up accumulated sediments and seed or replant disturbed area.
Equipment/Tools	<p>Tool and equipment cleanup procedures:</p> <ul style="list-style-type: none"> • Routinely inspect equipment, tools, and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves.
	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system.

Continued on next page



enclosed drainage systems

BMPs

Maintenance Category #2: Enclosed Drainage Systems (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	<ul style="list-style-type: none"> • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction waste materials from site for disposal or recycling.
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.

POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Protect watercourse, stream and/or water body.
- Reduce work site pollutants to maintain water quality.
- Control the storage, delivery, and routing of surface and ground water to control volumes and velocities of stormwater discharge by cleaning and maintaining system.
- System maintenance and repairs reduce pollutant transport from system breaks.

Conservation objectives and how they are achieved are shown on the following table:



Repair, Replacement and Installation of Enclosed Drainage Systems	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or restore water quality.</p> <p>Maintain or restore functional components of the drainage system to trap and reduce sediment loading to watercourses or streams. The system includes, but is not limited to:</p> <ul style="list-style-type: none"> • Catch basins. • Manholes. • Inlets. • Pipes. • Facilities. • Vaults. • Retention/detention facilities. • Pollution control devices. • Outlets. • Other types of pollutant collection/separation facilities. <p>Maintain or restore flow volumes and velocities by removing sediments and repairing structures.</p> <p>Reduce/Remove sediment and debris from drainage system.</p> <p>Trap and remove sediment and debris before it enters watercourses, streams or water bodies.</p> <p>Repair plugged lines, breaks, or blockages to reduce:</p> <ul style="list-style-type: none"> • Turbidity. • Sediment loading. • Offsite flooding and/or erosion. • Offsite habitat impacts. • Debris loading. 	<p>Performing repairs, implementing replacements, and installing systems.</p> <p>Reducing drainage system failure:</p> <ul style="list-style-type: none"> • Reduces risk of enclosed system failure and resultant washout sediment and other pollutants and debris from entering aquatic habitat watercourses and/or streams. <p>Providing proper in-system storage to:</p> <ul style="list-style-type: none"> • Reduce peak flows. • Reduce offsite sediment transport. • Provide for silt collection system to reduce sediment loading to watercourse or stream. <p>Cleaning and removing of large quantities of sediment and other debris before it reaches watercourses, streams and/or water bodies.</p> <p>Using erosion/sediment controls during construction/maintenance.</p> <p>Reducing flooding, erosion, and sediment from broken, or damaged, system by making repairs.</p> <p>Reducing sediment conveyance through drainage system by trapping and removal.</p> <p>Re-vegetate disturbed soils.</p>



Maintenance Category #3: CLEANING ENCLOSED DRAINAGE SYSTEMS

Activities¹

Removing debris, sediments, and liquids from enclosed drainage systems using a vacuum/flush truck (“Vactor”), by hand, or other mechanical means. Enclosed drainage systems include the following: facilities, retention/detention facilities, manholes, catch basins, vaults, pipes, access roads, pollution control devices and inlets. Enclosed drainage systems can be located on ROW, separate tracts, easements, or on private property.

Purpose

To clean and remove large quantities of sediments and/or other debris from drainage systems before entering watercourses, streams and/or water bodies.

To ensure the enclosed drainage system efficiently removes, collects, and conveys water from the road ROW to permit the maximum use of the roadway.

- To reduce damage to roadway structures.
- To protect the abutting property from damages.
- To maintain or restore surface water drainage.
- To maintain or restore structural integrity.
- To manage vegetation.

BMP Outcomes

- Restore structure.
- Improve water quality.
- Minimize work site pollutants from leaving construction/repair area.
- Reduce turbidity.
- Restore surface water drainage.
- Clean up and remove sediment from drainage system.
- Minimize flooding from plugged system.
- Reduce potential plugging of systems.
- Reduce overflows/ flooding.
- Reduce sediment and debris loading to watercourses, streams and other water bodies.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



BMPs

Maintenance Category #3: Cleaning Enclosed Drainage Systems

BMPs	Description
Cleaning Enclosed Drainage Systems	Maintain drainage systems.
Pre-Activity	Use BMPs that include, but are not limited to: <ul style="list-style-type: none"> • Blocking facility outlet. • Using less water. • Blocking downgradient end of pipe.
Equipment/Tools	When using high-pressure flushing equipment, vacuum out solids to reduce sediment and turbidity from moving downgrade throughout the drainage system..
	Tool and equipment cleanup procedures: <ul style="list-style-type: none"> • Routinely inspect equipment, tools, and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves.
	Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations: <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
<i>Continued on next page</i>	If unable to move tools and equipment offsite, control and remove cleaning by-products.



BMPs

Maintenance Category #3: Cleaning Enclosed Drainage Systems (Continued)

BMPs	Description
Material/Debris Disposal	Remove and dispose of collected materials and liquids offsite
	Solid materials removed from the site will be taken to a disposal or recycling area
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none">• Absorbent• Pad• Shovel.



cleaning enclosed drainage systems

POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Reduce worksite pollutants to maintain water quality.
- Protect watercourse, stream and/or water body.
- Control the storage, delivery, and routing of surface and ground water to control volumes and velocities of stormwater discharge by removing sediments.
- Reduce sediment transport from system breaks by cleaning.
- Cleaning system reduces sediment and debris transport to watercourses, streams and/or water bodies.

Conservation objectives and how they are achieved are shown on the following table:

Cleaning Enclosed Drainage Systems	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or restore water quality.</p> <p>Maintain or restore sediment collection process by removing sediments from:</p> <ul style="list-style-type: none"> • Catch basins. • Maintenance holes. • Retention/detention facilities. • Pipes. • Inlets. • Vaults. • Other types of pollutant collection/separation facilities. <p>Maintain or restore flow volumes and velocities by cleaning system.</p> <p>Trap and remove sediment and other debris before it enters watercourses, streams and/or water bodies.</p> <p>Remove blockages or plugs to reduce:</p> <ul style="list-style-type: none"> • Turbidity. • Offsite erosion. • Offsite habitat impacts. 	<p>Removing sediments and debris from drainage system as a source control measure.</p> <p>Routine cleaning to reduce drainage system failure due to debris or sediment blockages:</p> <ul style="list-style-type: none"> • Reduce risk of roadway/shoulder failure sediment from entering aquatic habitat. • Reduce vehicle accidents. • Reduce pollutants from vehicle accidents. <p>Providing proper in-system storage to:</p> <ul style="list-style-type: none"> • Reduce peak flows. • Reduce flooding. • Reduce offsite sediment transport. • Maximize pollutant collection capabilities. <p>Cleaning and removing sediment and debris before it reaches watercourses, streams and/or water bodies.</p>



Maintenance Category #4: OPEN DRAINAGE SYSTEMS

Activities¹

Repair, replacement, installation and maintenance tasks performed on open drainage systems. These systems include facilities, retention/detention facilities, swales, pollution control devices, manholes, catch basins, vaults, pipes, culverts, ditches, and inlets/outlets. (Open drainage systems that are part of the watercourses and streams system are covered in Maintenance Category 5, Watercourses and Streams.)

Open drainage systems include stormwater conveyance systems that were created entirely by artificial means, such as roadside ditches and storm or surface water runoff facilities. These structures are not watercourses, streams or wetlands.

Open drainage systems can be located within the road ROW, on easements, tracts, public property or on private property.

PURPOSE

- Maintenance tasks performed on open drainage systems include, but are not limited to, activities such as the following:
 - Cleaning.
 - Reshaping/regrading.
 - Erosion control/bank stabilization of drainage system.
 - Vegetation management.
 - Removing debris, trash, yard waste, sediment.
 - Repairing structures.
- Open drainage systems are part of the ROW structure that routes water and sediment from roadways or surface structures to outlet areas. The system allows sediments to separate and settle from the water flow, a process that cleans and removes large quantities of sediments out of stormwater systems.
- Maintaining open drainage systems includes activities to preserve line and grade, depth and cross section, and inflow and outflow of culverts. Open systems should be kept free of trash, debris, sediment and vegetation that restricts or constricts the open drainage system (in compliance with federal and state regulations).

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



open drainage systems

- Roadside ditches generally consist of inslopes, a ditch, and back slopes (see Figure 4, Open Drainage System, under “Right of Way Structure,” in the Introduction). The inslopes can be vegetated with grass or small forbs. Small trees and brush may be allowed outside of the back slope of ditches (in compliance with federal and state regulations).
- Roadside ditch maintenance operations are performed when sediment, debris, or vegetation in a ditch impedes flows or storage of water and sediments to a point where safety or structural integrity of the roadway system is jeopardized. Maintenance of roadside ditches improve properly functioning systems, which can reduce:
 - Sheet flow of surface water across the roadway, which creates slope erosion.
 - Hazardous driving conditions, particularly during cold weather.
 - Roadway washouts during storm events.
 - Flooding of adjacent property.
 - Saturation of the road sub-base.
 - Large quantities of sediment transported to watercourses or streams.

BMP Outcomes

- Maintain and restore water quality by cleaning ditches or structures.
- Maintain or restore structure.
- Minimize sediment or debris from leaving construction/repair area.
- Maintain or restore surface water drainage and storage.
- Maintain or restore sediment storage capacity.
- Reduce flooding from plugging of system/reduced storage area.
- Keep structure clear of debris, trash, and yard waste.
- Reduce sediments and debris from entering watercourses or streams.
- Reduce sediment conveyance through drainage system by trapping and removal.
- Leave vegetated sections in ditch where sediment buildup has not impeded flow or infiltration.



open drainage systems

BMPs

Maintenance Category #4: Open Drainage Systems

BMPs	Description
Open Drainage Systems	Maintain drainage systems.
Permits	Maintenance activities within waters of the state will be covered under Maintenance Category #5, Watercourses and Streams.
Scheduling	Plan and schedule work in dry conditions, except in emergency situations
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses or streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection,” • “Keep Water from Work Area,” • “Reduce Potential for Soil Erosion,” • “Reduce Water Velocity/Erosive Forces” <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	Leave vegetative buffer outside of work zone to provide biofiltration and shading outside of the back slope of ditch.
	Leave vegetative buffer of grasses and small forbs between the shoulder and ditch if the area is wide enough.
	Leave vegetated sections of grasses and small forbs in ditchline, where sediment buildup does not impede flow or infiltration.
	After removal of sediments from ditch line, replant disturbed soils with grasses and small forbs.
	Prior to BMP removal, clean up accumulated sediments and seed or replant disturbed area.
Equipment/Tools	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. <p><i>Continued on next page</i></p>



Maintenance Category #4: Open Drainage Systems (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	<ul style="list-style-type: none"> • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	Remove and dispose of collected materials and liquids offsite
	Solid materials removed from the site will be taken to a disposal or recycling area
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Protect downgrade habitat by removing sediment.
- Protect water quality.
- Reduce work site pollutant runoff to watercourses, streams and/or water bodies.
- Maintain or restore the storage, delivery, and routing of surface and ground water to control volumes and velocities of discharge by removing sediment loading from drainage system.
- Maintain or restore storage area of sediment and other pollutants.
- Remove sediment from system.
- Vegetation management.

Conservation objectives and how they are achieved are shown on the following table:

Maintaining Open Drainage Systems	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Open drainage system maintenance activities reduce the potential for sediment and debris from reaching watercourses or streams.</p> <p>Maintain or restore water quality by removal of sediment and other pollutants.</p> <p>Revegetation provides biofiltration, shading and bank stabilization.</p> <p>Maintain or restore sediment collection process by removal of excess sediment. This maintenance activity reduces the potential for sediment to reach downgrade fish habitat.</p> <p>Control flow volumes and velocities by removing sediment and repairing structures.</p>	<p>Performing maintenance, repair, and upkeep of system.</p> <p>Reducing drainage system failure.</p> <p>Reducing risk of sediment from roadway/shoulder failure from entering aquatic habitat.</p> <p>Reducing erosion in unlined ditches by seeding ditch line.</p> <p>Increasing or improving biofiltration by seeding ditchline and disturbed soil.</p> <p>Maintaining or restoring velocities and peak flows by creating storage areas by cleaning ditches to reduce blockages.</p> <p>Providing erosion/sediment controls during maintenance work to protect water quality and reduce sediment.</p>

Maintenance Category #5: WATERCOURSES AND STREAMS



Determination of Watercourses and Streams for Maintenance Activities.

WAC 220-110-020 (83): “‘Watercourse’ and ‘river or stream’ means any portion of a channel, bed, bank, or bottom waterward of the ordinary high water line of waters of the state including areas in which fish may spawn, reside, or through which they may pass, and tributary waters with defined bed or banks, which influence the quality of fish habitat downstream. This includes watercourses which flow on an intermittent basis or which fluctuate in level during the year and applies to the entire bed of such watercourse whether or not the water is at peak level. This definition does not include irrigation ditches, canals, stormwater runoff devices, or other entirely artificial watercourses, except where they exist in a natural watercourse which has been altered by humans.”

Activities¹

Repair, replacement, installation, and maintenance tasks performed on watercourses or streams. These activities may include structural repair/replacement, slope stabilization, sediment removal, vegetation management, debris removal, access road maintenance, habitat maintenance and improvements (for example, fish ladders, weirs, and large woody material).

Some roadside ditches and stormwater facilities can be watercourses or streams. Watercourses and streams can be located within the road ROW, on easements, tracts, and public property or on private property. Proposed maintenance activities within waters of the state will be reviewed prior to work with the Washington State Department of Fish and Wildlife (WDFW) staff to ensure HPA compliance. In addition to project-specific HPA requirements, road crews will adhere to the provisions of these *Guidelines* to ensure compliance with the Regional Program. Environmental support staff will review the planned work and contact WDFW to determine if the facility meets the definition above.

Purpose

- Maintenance tasks performed on roadside ditches or stormwater facilities that are watercourses or streams include activities such as the following:
 - Cleaning.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



watercourses and streams

- Reshaping/regrading.
- Erosion control/slope stabilization.
- Vegetation management.
- Removing debris, trash, yard waste, and sediment.
- Repairing structures.
- Maintaining ditches or stormwater facilities that are watercourses or streams includes activities to preserve line and grade, depth and cross section, inflow and outflow of culverts (in compliance with federal, state and local regulations).
- Ditches or stormwater facilities that are watercourses or streams are maintained when sediment, debris, or vegetation impede flows, or storage of water and sediment to a point where safety or the ROW structure is compromised.
- Check dams, or similar BMP's should not be used when maintenance activities are conducted in locations that could reduce actual or potential high flow salmonid refuge functions.
- Providing maintenance can reduce:
 - Hazardous driving conditions, particularly during cold weather.
 - Roadway washouts during storm events.
 - Flooding of adjacent property.
 - Saturation of the road sub-base.
 - Large quantities of sediment transport.
 - Water quality impacts.
 - Impacts to habitat.
 - Jeopardizing structural integrity of roadway system
 - Facilities that are not properly functioning (from a transportation infrastructure, water quality, or habitat perspective).

BMP Outcomes

- Maintain and restore water quality by cleaning ditches and/or stormwater facilities that are watercourses or streams.
- Maintain or restore structure.
- Minimize sediment or debris from leaving construction/repair area.
- Maintain or restore surface water drainage and storage.
- Maintain or restore sediment storage capacity.
- Reduce flooding from plugging of system or reduced storage area.
- Keep structure clear of debris, trash, and yard waste.
- Reduce sediment and debris from entering watercourses or streams.



watercourses and streams

- Reduce sediment conveyance through drainage system by trapping and removal.
- Leave vegetated sections in ditch where sediment buildup has not impeded flow to the point of causing flood damage/hazard or overtopping a road.
- Improve in-stream biofiltration.
- Large woody material (LWM) may be relocated within the ROW to help maintain stream forming processes and to support fish habitat as permit, public safety, and ROW structure conditions allow.

BMPs

Maintenance Category #5: Watercourses and Streams

BMPs	Description
Watercourses & Streams	Maintain drainage systems that are watercourses and/or streams.
Permits	Maintenance activities within waters of the state will be reviewed with WDFW, and permitted with an HPA, as necessary.
	When required, habitat restoration will be designed and constructed in accordance with applicable permits.
Scheduling	Plan and schedule work in dry conditions or when flows are anticipated to be at their lowest when possible.
Fish Exclusion	Follow “Fish Exclusion Protocol” (Appendix E) and permit conditions during maintenance activities.
	Fish will be excluded from the construction area using appropriate methods such as the use of nets, dewatering at a controlled rate, and removal of stranded fish according to HPA permit conditions.
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses, streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection,” • “Keep Water from Work Area,” • “Habitat Protection/Maintenance” and/or • “Reduce Water Velocity/Erosive Forces.” <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade. <p><i>Continued on next page</i></p>



watercourses and streams

BMPs

Maintenance Category #5: Watercourses and Streams (Continued)

BMPs	Description
Disturbed Areas <i>Continued from preceding page</i>	Minimize disturbance to riparian vegetation: <ul style="list-style-type: none"> • Mark job site. • Flag work area. • Operate equipment to minimize damage to riparian habitat.
	Leave vegetative buffer of grasses and small forbs between the shoulder and ditch if the area is wide enough.
	Leave vegetated sections in ditchline, where sediment buildup does not impede flow or infiltration.
	Leave vegetative buffer outside of work zone to provide biofiltration and shading outside of the back slope of ditch.
	Monitor water quality in accordance with permit requirements.
	Monitor plantings in accordance with permit requirements.
	Prior to BMP removal, clean up accumulated sediment and seed or replant disturbed area.
Equipment/tools	Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations: <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials such as: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from work site and dispose of and/or recycle.
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Protect habitat.
- Protect water quality.
- Reduce work site pollutant runoff to watercourses, streams and/or water bodies.
- Maintain or restore the storage, delivery, and routing of surface and ground water to control volumes and velocities of discharge by removing sediment loading from drainage system.
- Remove sediment from system.
- Identify chronic sediment deposit problem sites that require frequent sediment removal.

Conservation objectives and how they are achieved are shown on the following table:

Maintaining Ditches and/or Stormwater Facilities which are Watercourses or Streams	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Reduce the potential for sediment and debris to adversely impact fish habitat.</p> <p>Maintain or restore water quality by removal of sediments and other pollutants.</p> <p>Revegetate to provide biofiltration, shading, and bank stabilization and promote macro-invertebrate population growth.</p> <p>Maintain or restore sediment collection process by removal of excess sediment.</p> <p>Control flow volumes and velocities by removing sediments and repairing structures.</p>	<p>Performing maintenance, repair, and upkeep of system.</p> <p>Reducing drainage system failure.</p> <p>Reducing risk of roadway/shoulder failure sediments from entering aquatic habitat.</p> <p>Reducing erosion in unlined ditches by seeding ditch line.</p> <p>Increasing or improving biofiltration by seeding ditch line and disturbed soil.</p> <p>Maintaining or restoring velocities and peak flows by creating storage areas by cleaning ditches to reduce blockages.</p> <p>Providing erosion/sediment controls during maintenance work to protect water quality and reduce sediments.</p> <p>Identifying chronic sediment deposit locations and potential sources of excess sediment. Provide information to agency watershed planning, regulatory agencies, and/or agency CIP program for permanent solution.</p>



Maintenance Category #6: STREAM CROSSINGS

Activities¹

Repair, cleaning, maintenance, installation or replacement/upgrade of stream crossing facilities, such as pipes, arch pipes, box culverts, fish ladders, weirs, sediment pools, access roads and bridges. Maintenance within waters of the state will be reviewed with the WDFW.

PURPOSE

This work is done to reduce flooding or catastrophic road failure as a result of facilities which have filled to capacity or are blocked with sediment or debris or which may be undersized, damaged, or deteriorated. Timely replacement or upgrade of these facilities is critical in terms of roadway safety, habitat protection, fish passage, and infrastructure preservation.

BMP Outcomes

- Maintain, repair or replace structure.
- Improve or maintain fish passage (HPA).
- Improve or maintain riparian habitat (HPA).
- Improve or maintain streambed habitat within pipe, culvert or area within work zone (HPA).
- Minimize construction/repair worksite area sediments and debris from entering watercourses, streams or water bodies.
- Maintain or restore surface water drainage by performing repairs.
- Reduce streambed/stream bank erosion by revegetation or stabilization of disturbed soils.
- Reduce flooding and erosion from blockages of system by removing obstructions such as debris, trash, yard waste, sediment.
- LWM may be relocated within the ROW to help maintain stream forming processes and to support fish habitat as permits, public safety and ROW structure conditions allow.
- Check dams, or similar BMP's should not be used when maintenance activities are conducted in locations that could reduce actual or potential high flow salmonid refuge functions.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



BMPs

Maintenance Category #6: Stream Crossings

BMPs	Description
Permits	Maintenance activities within waters of the state will be reviewed by WDFW and permitted with an HPA, as necessary.
	When required, habitat restoration will be designed and constructed in accordance with applicable permits.
Scheduling	If seasonal watercourse or stream, schedule work during dry conditions.
	Plan and schedule work in dry conditions or low flow conditions except in emergency situations if possible (HPA).
Fish Exclusion	Follow “Fish Exclusion Protocol” (Appendix E) and permit conditions during maintenance activities.
	Fish will be excluded from the construction area using appropriate methods such as the use of nets, dewatering at a controlled rate, and removal of stranded fish according to HPA permit conditions.
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses or streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection,” • “Keep Water from Work Area,” • “Habitat Protection/Maintenance” and/or • “Reduce Water Velocity/Erosive Forces.” <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>All exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	<p>Minimize disturbance to riparian vegetation:</p> <ul style="list-style-type: none"> • Mark job site. • Flag work area. • Position equipment to protect riparian habitat.
	Monitor water quality.
	Restore vegetation appropriate for site conditions within riparian areas.
	Protect outflows by bio-vegetation techniques or armoring to reduce erosion.
	Monitor vegetation and stream habitat in accordance with permit requirements.
	Prior to BMP removal, clean up accumulated sediments and seed or replant disturbed area.

Continued on next page



BMPs

Maintenance Category #6: Stream Crossings (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials such as: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from work site and dispose of and/or recycle.
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.

POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Repair, replace or maintain structure.
- Protect habitat and watercourse or stream by performing maintenance.
- Protect habitat and watercourse or stream while performing maintenance.
- Reduce work site pollutant runoff.



stream crossings

- Restore or maintain fish passage through structure.
- Maintain or restore the storage, delivery, and routing of surface and ground water to control volumes and velocities of discharge by maintaining structure.

Culvert replacement work in stream crossings can significantly contribute to conservation when that work meets the habitat goal to “restore or maintain fish passage through structure.” To that end, Washington State law and regulations require that new or retrofit culverts be designed for fish passage. (RCW 77.55.060; WAC 220-110-070). Culvert installation and replacement under these sections requires the issuance of a Hydraulic Project Approval (HPA) by the Washington Department of Fish and Wildlife (WDFW). All work done under this section will comply with the HPA. To clarify the fish passage criteria defined by WAC 220-110-070, the Washington Department of Fish and Wildlife prepared a design manual entitled “Fish Passage Design at Road Culverts” (the Manual) (WDFW 1999). The Manual was reviewed by the National Marine Fisheries Service, which concluded that, when designing retrofit or replacements of existing culverts (The WDFW guidelines should result in improved habitat conditions with the potential to bring impaired habitat on a trend to Properly Functioning Conditions (PFC), and that using the WDFW manual while designing a new culvert should not impair PFC as long as the hydraulic and other fish passage considerations are properly applied. NMFS memorandum, Assistant Regional Administrator for Hydro Division to Assistant Regional Administrator for Habitat Conservation Division, November 28, 2001). Therefore, the Regional Program incorporates the relevant considerations for the design of new and retrofit culverts stated in the Manual, as well as other fish passage and habitat considerations addressed in the last chapter of the Manual. (As of the date of this publication, the Manual can be viewed on the Internet at <http://www.wa.gov/wdfw/hab/engineer/cm/fpdr.pdf>.)

Conservation objectives and how they are achieved are shown on the following table:



stream crossings

Performing Stream Crossing Maintenance	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one of more or the following:
<p>Maintain structures.</p> <p>Improve fish passage.</p> <p>Reduce damage to shoulders, roadways and riparian habitat that may be caused by flooding from blockages.</p> <p>Maintain or restore water quality by repairing, replacing or maintaining structure.</p> <p>Maintain or restore nutrient process by re-vegetating after land disturbance to hold sediments and to remove nutrients.</p> <p>Maintain or restore natural flow volumes and stream velocities in the vicinity of the stream-crossing project.</p>	<p>Performing maintenance.</p> <p>Reducing flooding and drainage system failure.</p> <p>Reducing the risk of sediment from roadway/shoulder failure from entering aquatic habitat and watercourse or stream.</p> <p>Reducing adverse habitat impacts stemming from catastrophic culvert/pipe failures.</p> <p>Reducing stream bank erosion by repair work and re-vegetating.</p> <p>Providing stream shading by planting riparian area (HPA).</p> <p>Reducing habitat-detrimental flooding caused by a plugged system or reduced storage capacity. Flooding within the ROW can be detrimental to salmonids or habitat by introducing pollutants (bypassing structures that trap sediment or provide infiltration), stranding fish, destroying vegetation, and/or severely eroding stream channels.</p> <p>Providing appropriate erosion/sediment control BMPs during maintenance work.</p> <p>Maintaining or restoring flow capacity and stream velocities in the vicinity of stream-crossing projects.</p>

Potential Capital or Major Restoration Projects

In some cases, habitat restoration work—which is beyond the scope of routine maintenance activities—might be done as capital improvement projects or as major restoration projects. In these cases, the following BMPs may apply where ROW is available and to the extent that design/habitat considerations allow:

- Remove artificial bank hardening and/or channel confining structures.
- Enhance or add areas of spawning, migration, feeding, or rearing habitat.
- Create connections to off-channel habitat.

In all cases, capital or major restoration projects must be done in accordance with federal, state, and local regulations and permit requirements.

Maintenance Category #7: GRAVEL SHOULDERS



Activities¹

Maintenance tasks performed on gravel shoulders improve drainage, restore proper grade, restore filtering capability, maintain vegetation to provide adequate site distance, smooth rutting, and remove buildup of sediment before entering drainage system.

Purpose

Gravel shoulders are part of the ROW structure that runs along the edge of the roadway or surface structures. The removal of sediment, sod, and debris from the shoulder road edge is part of the sediment collection system. The filtering of sediments and the opportunity for infiltration is part of the water flow system.

Maintenance activities are performed to ensure the gravel shoulder functions as a filter for sediments, provides biofiltration, and controls surface water runoff. Maintenance of a vegetative buffer (grasses and small forbs) between the shoulder and ditch, if the area is wide enough, reduces erosion.

BMP Outcomes

- Restore structure.
- Minimize the amount of construction or repair to reduce the amount of worksite sediments and debris to from entering watercourses, streams or water bodies.
- Restore or maintain surface water drainage.
- Reduce or trap sediments in gravel.
- Reduce road surface flooding by allowing water to run off roadway.
- Reduce turbidity.
- Allow infiltration of water through gravel.
- In areas where open ditch sections abut the roadway, use gravel and vegetation on the roadway shoulder to provide a filter strip for runoff before water enters the ditch.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



gravel shoulders

BMPs

Maintenance Category #7: Gravel Shoulders

BMPs	Description
Gravel Shoulders	Perform Maintenance.
	Remove buildup sediment and sod.
	Restore gravel shoulder.
	Roll shoulder material to ensure proper grade and retention of sediment control qualities.
Scheduling	Periodically remove sediment deposits and vegetation during the dry season when possible with a motor grader.
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories as appropriate at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses or streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection” <p>Go to Part 2 BMPs for selection and/or installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	Prior to BMP removal, clean up accumulated sediment and seed or replant disturbed area.
	Minimize disturbance to vegetation outside of shoulder area. Leave vegetative strip where possible between the gravel and ditch line for biofiltration.
Equipment/Tools	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible.

Continued on next page



BMPs

Maintenance Category #7: Gravel Shoulders (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	<ul style="list-style-type: none"> • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from work site and dispose of and/or recycle.
	Use pickup sweepers to remove materials from roadway in assigned areas.
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Protect watercourse, stream and other water bodies.
- Restore or maintain water quality.
- Control the storage, delivery, and routing of surface and ground water to control volumes and velocities of stormwater discharge by cleaning and maintaining shoulders for sheet flow and infiltration.
- Reduce sediment transport by removing sediment before it enters watercourses and/or streams.
- Maximize opportunities for increased infiltration and/or biofiltration.

Conservation objectives and how they are achieved are shown on the following table:

Gravel Shoulder Maintenance	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or restore water quality by reducing worksite pollutants.</p> <p>Maintain or restore sediment transport process. Gravel and grass trap and remove sediment before entering ditch or surface water.</p> <p>Maintain or restore nutrient process by re-vegetating disturbed soil.</p> <p>Control flow volumes and velocities (sheet flow vs. point discharge) by performing shoulder maintenance.</p> <p>Increase opportunities for infiltration by placing gravel on the edge of the roadway.</p> <p>Maintain, repair, or replace shoulder area to:</p> <ul style="list-style-type: none"> • Slow velocity. • Reduce turbidity. • Reduce flooding and ponding on roadway. • Reduce splashing off roadway. 	<p>Reducing environmental damage from vehicle accidents, which, in turn, reduces risk of pollutants such as petroleum hydrocarbons, heavy metals, road wash-off, and debris from entering aquatic habitat. In addition it reduces structural damage to watercourses and stream systems.</p> <p>Reducing roadway or shoulder failure that reduces the risk of sediment entering aquatic habitat as a result of roadway and shoulder failure, and reduces sub-base damage.</p> <p>Using erosion/sediment control BMPs during maintenance activities.</p> <p>Controlling, reducing and/or removing sediment before it reaches watercourses, streams or water bodies.</p>

Maintenance Category #8: STREET SURFACE CLEANING



Activities¹

Removing soil, organic material, dust, trash and other debris to keep road surfaces clean and remove sediment from the roadway before it enters the storm drain system, surface water system, watercourses, streams or other water bodies. The removal of dust also reduces airborne pollution and sediment loading.

Purpose

Street cleaning the ROW surface structure traps and removes large quantities of sediment. Roadways and surface structures are part of the sediment and water collection system.

Street surface cleaning activities are performed to provide a safe roadway surface for the traveling public. Sweeping reduces sediment loading to the drainage system, surface waters, watercourses, streams and other water bodies. Soil, organic material, other debris and pollutants are removed before entering watercourses, stream and/or other water bodies.

BMP Outcomes

- Clean roadway surface.
- Remove soil, organics, solid waste and debris from entering watercourses, streams and/or water bodies.
- Reduce turbidity.
- Restore surface water drainage by cleaning curbs and drain inlets.
- Improve water quality by removing sediment.
- Minimize flooding caused by plugged drains.
- Reduce sediment loading of shoulders, ditches, detention ponds and watercourses and/or streams.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



street surface cleaning

BMPs

Maintenance Category #8: Street Surface Cleaning

BMPs	Description
Pre-Activity	Use cleanup procedures that protect water quality.
Equipment/Tools	Control speed of sweeper to minimize airborne particulates and remove maximum amount of debris.
	Use water spray system on sweeper to reduce dust.
	Use pickup sweepers to remove materials from roadway in assigned areas.
	Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations: <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	Remove construction/maintenance waste materials from work site and dispose of and/or recycle.
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Restore or preserve water quality.
- Protect watercourses, streams and/or other water bodies by performing maintenance.
- Reduce sediment transport and loading of drainage systems, watercourses or streams, or other water bodies.
- Reduce sediment and pollutant transport and loading of drainage systems, watercourses, streams or other water bodies.

Conservation objectives and how they are achieved are shown on the following table:

Street Cleaning	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or restore water quality by reducing sediment, pollutants, and debris from entering drainage systems, watercourses, streams and/or other water bodies.</p> <p>Maintain or restore sediment transport process by removing sediment before it enters:</p> <ul style="list-style-type: none"> • Catch basins/Manholes. • Detention/Retention ponds. • Swales. • Pipes. • Inlets. • Ditches. • Shoulders. 	<p>Reducing environmental damage from vehicle accidents that, in turn, reduces risk of pollutants such as petroleum hydrocarbons, heavy metals, road wash-off, and debris from entering aquatic habitat. In addition it reduces structural damage to watercourses and stream systems.</p> <p>Reducing sediments and contaminants from reaching the stormwater, watercourse, stream system and other water bodies.</p> <p>Reducing occurrence of debris clogged drain inlets.</p> <p>Reducing flooding and drainage system failure by removing surface and curb line sediments and debris.</p>



Maintenance Category #9: BRIDGE MAINTENANCE

Activities¹

Bridge maintenance activities include inspecting, testing, repairing, replacing, maintaining, painting or resurfacing components of the bridge such as the electrical system, substructure, superstructure, surface footings, piers, supports, access roads, abutments, ramps, and vegetation management.

Purpose

Bridge repair, replacement, installation, and maintenance activities are performed to provide a safe roadway system for the traveling public, and to protect bridge infrastructure according to local, state and federal regulations. This, in turn, protects the stream, riparian habitat, and streambank by limiting the number of crossings through the habitat area.

BMP Outcomes

- Improve or maintain fish passage (HPA).
- Improve or maintain riparian habitat (HPA).
- Improve or maintain streambed habitat (HPA).
- Reduce sediment at construction or repair area.
- Reduce streambed or streambank erosion.
- Reduce flooding by removal of blockages.
- Reduce failure of structure.
- Reduce debris from entering waterway.
- Large woody material (LWM) may be relocated within the ROW to help maintain stream forming processes and to support fish habitat as permit, public safety, and ROW structure conditions allow.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



BMPs

Maintenance Category #9: Bridge Maintenance

BMPs	Description
Permits	Bridge maintenance activities requiring an HPA will be reviewed with the WDFW and permitted prior to construction in accordance with the HPAs.
Scheduling	If bridge maintenance is to be performed in a seasonal watercourse or stream, schedule the work during dry conditions if possible.
Habitat Measures	Maintain or add areas of spawning, migration, feeding, or rearing habitat as directed by WDFW (HPA) permit, public safety, and ROW structure conditions allow.
	Place appropriate streambed material (HPA)
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses or streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection,” • “Reduce Potential for Contaminants Falling into Water,” • “Settling,” • “Habitat Protection/Maintenance” and/or • “Reduce Water Velocity/Erosive Forces.” <p>Go to Part 2 BMPs for selection and/or installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	Monitor water quality in accordance with permit requirements.
	Restore vegetation where appropriate for site conditions within riparian areas (HPA).
	<p>Minimize disturbance to riparian vegetation:</p> <ul style="list-style-type: none"> • Mark job site. • Flag work area. • Operate equipment to minimize damage to riparian habitat.
	Prior to BMP removal, clean up accumulated sediment and seed or replant disturbed area.
Equipment/Tools	<p>Tool and Equipment cleanup procedures:</p> <ul style="list-style-type: none"> • Routinely inspect equipment, tools and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves.

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BMPs

Maintenance Category #9: Bridge Maintenance (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	Clean equipment and tools offsite in an area where pollutants can be contained.
	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from work site and dispose of and/or recycle.
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Contribute to the restoration and/or enhancement of aquatic habitat (HPA).
- Control worksite pollutant run-off.
- Maintain or restore fish passage through structure.
- Maintain or restore water quality off bridge by maintaining drainage system.
- Repair, replace or maintain structure.
- Maintain habitat and watercourse or stream by performing maintenance.
- Reduce flooding.
- Preserve or restore watercourse or stream velocities impaired by blockages in the vicinity of the bridge maintenance activity.

Conservation objectives and how those objectives are achieved are shown on the following table:

Bridge Maintenance	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Modify artificial barriers that are not part of structure to maintain or enhance fish habitat (HPA).</p> <p>Maintain or restore water quality by performing maintenance such as:</p> <ul style="list-style-type: none"> • Surface repair/cleaning. • Drainage repair/cleaning. • Structure repair/cleaning. 	<p>Performing maintenance.</p> <p>Reducing flooding on bridge surface.</p> <p>Reducing environmental damage from vehicle accidents that, in turn, reduces risk of pollutants such as petroleum hydrocarbons, heavy metals, road wash-off, and debris from entering aquatic habitat.</p> <p>Structural damage to watercourses and stream systems is reduced by not having vehicles leave the road surface.</p> <p>Providing shade along watercourses or streams by planting riparian area outside of bridge site (HPA, federal, state, or other regulations).</p> <p>Providing erosion/sediment control BMPs during maintenance work.</p>



Maintenance Category #10: SNOW AND ICE CONTROL

Activities¹

Road maintenance crews are responsible for sanding and plowing operations during periods of freezing weather. Snow and ice removal is considered to be work of such importance that it is classified as an emergency operation. Safety for the traveling public and road department personnel shall be given primary consideration at all times. Snow and ice removal reduces vehicle accidents that may adversely impact sensitive areas. Post-event cleanup is considered a continuation of the event and removal of sediment from the road surface reduces sediment loading and preserves water quality.

Purpose

These activities are performed to provide a reasonably safe roadway surface for the traveling public, which in turn protects the environment by reducing accidents and vehicles leaving the roadway.

BMP Outcomes

- Provide a reasonably safe roadway surface for the traveling public.
- Minimize pollutants resulting from vehicle accidents such as petroleum hydrocarbons, heavy metals, and road wash-off from entering storm drainage/stream system.
- Reduce salt and other chemicals from entering water bodies.
- Reduce the occurrence of vehicles leaving the road surface and entering sensitive areas.
- Reduce sediment loading to sensitive areas.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



BMPs

Maintenance Category #10: Snow and Ice Control

BMPs	Description
Operational	Minimize use of salt by reducing salt-to-sand ratios.
	Treat sand cleanup as part of the emergency: remove sand as a priority in order to remove sediments.
	Plow snow in areas that allow vegetation to filter and contain sand.
	Prioritize cleanup efforts to aquatic habitat areas to minimize impacts.
	Prioritize cleanup in areas <u>without</u> sediment collection systems.
Equipment/Tools	<p>Tool and Equipment cleanup procedures:</p> <ul style="list-style-type: none"> • Routinely inspect equipment, tools and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves.
	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires.
	Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	Remove construction/maintenance waste materials from work site and dispose of and/or recycle.
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Maintain or restore water quality.
- Protect aquatic habitat and riparian area.

Conservation objectives and how those objectives are achieved are shown on the following table:

Snow and Ice Control	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
Maintain or restore water quality. Reduce vehicle accidents to: <ul style="list-style-type: none">• Reduce risk of petroleum and debris entering aquatic habitat.• Reduce structural damage to stream system.• Reduce vehicles from entering drainage, surface water or habitat. Reduce sediment transport by cleaning sand from roadway.	Removing sand from roadway surface reduces sediment contribution to adjacent water bodies and reduces dust and minimizes resulting air quality impacts. Reducing salt and chemical use maintains water quality. Improving traction reduces accidents, which reduces pollutants from entering aquatic habitats. Improving traction to keep vehicles on roadway and out of aquatic habitats or riparian areas.

Maintenance Category #11: EMERGENCY SLIDE/WASHOUT REPAIR



Activities¹

Slides and washouts are caused by the impact of heavy rainfall or freeze and thaw conditions on unstable and/or saturated soils. Slides and washouts may occur on the slope above or below roadways, private property, or sensitive areas. Slide or washout repair activities may include the following: removal of slide/washout material from ROW; backfilling or stabilizing slope, reestablishment of damaged roadway structures; repairing and cleaning drainage system, restoring access road, revegetating, and/or armoring with rock.

Purpose

This emergency response activity is done to protect the public, to repair the roadway system, and to prevent further damage to the roadway, private property and/or the environment. The initial response to emergencies relating to slide and washout repair is covered under Program Element 7, Emergency Response. After the emergency is stabilized, the work is covered under this maintenance category.

BMP Outcomes

- Control sediment and debris from ROW.
- Stabilize slide/washout area within the ROW to reduce environmental, transportation and/or structural impacts.
- Repair roadways, repair access roads, surface drainage, storm water system, and/or other ROW structures.

BMPs

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



emergency slide/washout repair

Maintenance Category #11: Emergency Slide/Washout Repair

BMPs	Description
Permits	Maintenance within waters of the state will be reviewed by WDFW, and permitted with an HPA, as necessary.
	When required habitat restoration will be designed and constructed in accordance with applicable permits.
Fish Exclusion	Where practical and without jeopardizing the emergency response, in a timely manner, "Fish Exclusion Protocol" (Appendix E) and permit conditions will be followed during maintenance activities.
	Fish will be excluded from the construction area using appropriate methods such as the use of nets, dewatering at a controlled rate, and removal of stranded fish according to HPA permit conditions.
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses, streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • "Filter/Perimeter Protection," • "Reduce Water Velocity/Erosive Forces," and/or • "Keep Water from Work Area." <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of effective BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade
	Prior to BMP removal, clean up accumulated sediment and seed or replant disturbed area.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from site for disposal or recycling.
Equipment/Tools	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field.

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BMPs

Maintenance Category #11: Emergency Slide/Washout Repair (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceding page</i>	<ul style="list-style-type: none"> • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



emergency slide/washout repair

POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Reduce erosion/sedimentation to restore water quality.
- Reduce sediment loading offsite.
- Contribute to the restoration of aquatic habitat (HPA).
- Encourage revegetation to stabilize slope and provide riparian habitat near aquatic habitat.
- Maintain or restore the storage, delivery, and routing of surface and ground water in order to control flow rate and velocity of discharge by restoring the damaged structure.

Conservation objectives and how they are achieved are shown on the following table:

Slide/Washout Repair	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Preserve or restore water quality by removing slide material.</p> <p>Maintain or restore sediment transport process by opening roadway, ditches, and closed drainage systems.</p> <p>Maintain or restore nutrient process by revegetating after land disturbance in order to hold sediments and to remove nutrients.</p> <p>Maintain or restore flow volumes and stream velocities.</p>	<p>Reducing catastrophic road failure.</p> <p>Removing slide material from the ROW.</p> <p>Reducing the risk of slide material entering aquatic habitat.</p> <p>Reducing flooding on roadway by clearing roadway, ditches, and/or closed drainage systems. Flooding within the ROW can be detrimental to aquatic habitat by introducing pollutants (bypassing structures which trap sediment or provide infiltration), stranding fish, destroying vegetation, or severely eroding stream channels.</p> <p>Providing erosion/sediment control BMPs during, and following, maintenance work within the slide or washout area.</p> <p>Re-vegetate disturbed soils.</p>

Maintenance Category #12: CONCRETE



Activities¹

Maintenance activities performed on the concrete structures, such as concrete roadways, sidewalks, driveways, curb and gutter sections include the following: removal or repair of damaged sections and installation of new structures.

Purpose

These activities are performed to provide a safe roadway and pedestrian traffic infrastructure and to maintain adequate conveyance of surface water to drainage systems.

BMP Outcomes

- Reduce velocities by opening curb cuts for sheet flow when possible.
- Increase infiltration by opening curb cuts when possible.
- Minimize pollutants from leaving maintenance or repair area.
- Improve surface water drainage.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



BMPs

Maintenance Category #12: Concrete

BMPs	Description
Part 2 BMP (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses, streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection” • “Containment” <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade. <p>Prior to BMP removal, clean up accumulated sediment and seed or replant disturbed area.</p>
Material/Debris Disposal	<p>After repairs are completed, remove construction/maintenance waste materials from site for disposal or recycling.</p>
Equipment/Tools	<p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident. <p>At end of shift, park equipment in designated areas.</p> <p>Clean equipment and tools offsite in an area where pollutants can be contained.</p> <p>If unable to move tools and equipment offsite, control and remove cleaning by-products.</p>
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> • Absorbent. • Pad. • Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Reduce pollutant runoff to restore water quality.

Conservation objectives and how they are achieved are shown on the following table:

Concrete	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or improve water quality.</p> <p>Maintain or restore stormwater conveyance.</p> <p>Maintain or restore sediment transport process by repairing road, curb or other ROW structure.</p>	<p>Reducing environmental damage from vehicle accidents. Lowering the number of accidents reduces the risk of pollutants such as petroleum hydrocarbons, heavy metals, road wash-off, and debris from entering aquatic habitat. In addition, it reduces structural damage to watercourses and stream systems.</p> <p>Reducing roadway or shoulder failure which reduces the risk of sediment entering aquatic habitat as a result of roadway and shoulder failure and reduces sub-base damage.</p> <p>Using appropriate erosion/sediment control BMPs.</p>



Maintenance Category #13: SEWER SYSTEMS

Activities¹

Repair, replace, install, and maintain operating components of sewer facilities, including, but not limited to, treatment facilities, lift stations, pump stations, main lines, collection lines, trunk lines, interceptors, lake lines, access roads, associated ROW and storage/detention facilities.

Purpose

To maintain the integrity of the infrastructure, to provide additional services or components, to maintain operational reliability, and to protect public health and safety.

Ensure that the sewer/storm system efficiently collects and removes water from the ROW to achieve the following:

- Permit the maximum use of the roadway.
- Reduce damage to roadway structures.
- Protect the abutting property from damages.
- Restore surface water drainage in combined sewer/storm systems.
- Manage vegetation.

BMP Outcomes

- Restore structure.
- Minimize work site pollutants from construction/repair area.
- Reduce sediment conveyance by trapping and removal of sediment from the work site.
- Restore or maintain surface water drainage.
- Restore or maintain water quality:
 - Remove debris.
 - Remove trash.
 - Reduce turbidity.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.

**BMPs****Maintenance Category #13: Sewer Systems**

BMPs	Description
Sewer System	Maintain sewer system.
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses, streams, wetlands, lakes, or other water bodies:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection” • “Keep Water from Work Area” and/or • “Reduce Potential for Soil Erosion” <p>Go to Part 2 BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by application of BMPs that protect the soil from the erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season –October through June–no soils shall remain exposed and unworked for more than 2 days. • During the summer season –July through September–no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade. <p>Prior to BMP removal, clean up accumulated sediments and seed or replant disturbed area.</p>
Equipment/Tools	<p>Tool and equipment cleanup procedures:</p> <ul style="list-style-type: none"> • Routinely inspect equipment, tools and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves. <p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials such as: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.

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BMPs

Maintenance Category #13: Sewer Systems (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceeding page</i>	If unable to move tools and equipment offsite, control and remove cleaning by-products.
	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from site for disposal or recycling.
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none">• Absorbent.• Pad.• Shovel.

POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Protect watercourse and/or stream.
- Reduce worksite pollutants to restore or maintain water quality.
- Control the storage, delivery, and routing of surface and ground water to control volumes and velocities of stormwater discharge by repairing and maintaining sewer system.
- Reduce sediment transport from system breaks by maintaining and repairing system.
- Maximize opportunities for increased infiltration or biofiltration.

Conservation objectives and how those objectives are achieved are shown on the following table:



Repair, Replacement, and Installation of Sewer Systems	
<u>Conservation Objectives</u> include one or more of the following:	<u>Conservation Objectives Achieved By</u> one or more of the following:
<p>Maintain or restore water quality.</p> <p>Maintain or restore functional components of the sewer system reduce sediment loading to:</p> <ul style="list-style-type: none"> • Watercourses and/or streams. • Manholes. • Pump stations. • Main lines, trunk lines, lake lines and outfalls. • Side sewer connections. <p>Maintain or restore functional components of sewer system to reduce sewage released to watercourses and/or streams.</p> <p>Maintain or restore flow volumes and velocities by repairing surface areas, roadway, ditches, shoulder and repairing structures.</p> <p>Reduce/Remove sediment from drainage system.</p> <p>Trap and remove sediment before entering watercourses and/or streams.</p> <p>Repair plugged lines, brakes, or blockages to reduce:</p> <ul style="list-style-type: none"> • Turbidity. • Sediment loading. • Offsite erosion. • Offsite habitat impacts. <ul style="list-style-type: none"> • Sewage releases. 	<p>Performing repairs, replacement, and installation of systems.</p> <p>Reducing sewer system failure:</p> <ul style="list-style-type: none"> • Reduces risk of roadway/shoulder failure sediment from entering aquatic habitat and watercourses and/or streams. <p>Using erosion/sediment controls during construction/maintenance.</p> <p>Reducing flooding, erosion, sediment and sewage releases from broken, or damaged, system by making repairs.</p> <p>Re-vegetate disturbed soils</p>



Maintenance Category #14: WATER SYSTEMS

Activities¹

Repair, replace, install and maintain operating components of water system facilities including, but not limited to, treatment plant, transmission mains, distribution lines, fire flow systems, reservoirs, tunnels, pump stations, meters, flushing, dewatering, services, access roads, and associated ROWs or water system structures.

Purpose

To maintain the integrity of the infrastructure, to collect, treat and distribute, clean drinking water, to provide additional service and components, to maintain operational reliability, and to protect health and safety issues.

BMP Outcomes

- Restore structure.
- Reduce sediment from entering watercourses, streams and aquatic habitat areas as a result of maintenance work.
- Minimize work site pollutants from construction/repair area.
- Reduce sediment conveyance by repairing damaged, broken, or leaking parts of a system.
- Restore or maintain water quality by making repairs:
 - Remove debris.
 - Remove sediment.
 - Restore surface grade.
 - Restore ditch line.
 - Restore road surface.
- Reduce turbidity by making repairs.
- Reduce flooding from broken pipes.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



BMPs

Maintenance Category #14: Water Systems

BMPs	Description
Water System	Maintain water system.
Operational	Develop protocols for dechlorination of water. Develop a flushing program.
Part 2 BMPs (Site-specific BMPs)	Use any of the eight BMP outcome categories at or around the work site to reduce turbidity, sediment and/or pollutants from entering watercourses, streams, wetlands, lakes, or other water bodies: <ul style="list-style-type: none"> • “Filter/Perimeter Protection” • “Keep Water from Work Area” and/or • “Reduce Potential for Soil Erosion.” Go to Part 2 BMPs for selection and installation guidelines.
Disturbed Areas	Exposed and unworked soils shall be stabilized by application of BMPs that protect the soil from the erosive forces of raindrop impact and flowing water: <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season – July through September – no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade. Prior to BMP removal, clean up accumulated sediment and seed or replant disturbed area.
Equipment/Tools	Tool and equipment cleanup procedures: <ul style="list-style-type: none"> • Routinely inspect equipment, tools and vehicles for leaks or damage. • Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. • Promptly repair or replace leaking connections, pipes, hoses and/or valves. Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations: <ul style="list-style-type: none"> • Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. • Remove buildup of oils and grease on equipment. • Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. • Use drip pans under equipment when maintaining, repairing or servicing in the field. • Use non-toxic solvents whenever possible. • Clean maintenance area storm drain grates regularly. • Collect and properly manage (recycle or dispose of) used materials: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. • Surfaces shall be cleaned following any discharge or spill incident.

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BMPs

Maintenance Category #14: Water Systems (Continued)

BMPs	Description
Equipment/Tools <i>Continued from preceeding page</i>	At end of shift, park equipment in designated areas.
	Clean equipment and tools offsite in an area where pollutants can be contained.
	If unable to move tools and equipment offsite, control and remove cleaning by-products.
Material/Debris Disposal	After repairs are completed, remove construction/maintenance waste materials from site for disposal or recycling.
Spill Prevention & Control	Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements: <ul style="list-style-type: none">• Absorbent.• Pad.• Shovel.



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Protect watercourse and/or stream.
- Reduce worksite pollutants to restore or maintain water quality.
- Control the storage, delivery, and routing of surface and ground water to control volumes and velocities of stormwater discharge by restoring surface after installation, repair or replacement of underground piping.
- Reduce sediment transport from system breaks by maintaining and repairing system.
- Maximize opportunities for increased infiltration or biofiltration where possible.

Conservation objectives and how they are achieved are shown on the following table:

Repair, Replacement, and Installation of Water Systems	
<i>Conservation Objectives</i> include one or more of the following:	<i>Conservation Objectives Achieved By</i> one or more of the following:
<p>Maintain or restore water quality.</p> <p>Maintain or restore functional components of the water system and reduce sediment loading to watercourses and/or streams from:</p> <ul style="list-style-type: none"> • Leaks. • Breaks. • Damaged. • Replacement. <p>Maintain or restore flow volumes and velocities by repairing water system structures.</p> <p>The repair of breaks or leaks reduces:</p> <ul style="list-style-type: none"> • Turbidity. • Sediment loading. • Offsite erosion. • Offsite habitat impacts. 	<p>Performing repairs, replacement, and installation of systems.</p> <p>Repairing water system failure:</p> <ul style="list-style-type: none"> • Reduces risk of roadway/shoulder failure sediment from entering aquatic habitat and watercourses and/or streams. <p>Using erosion/sediment controls during construction/maintenance.</p> <p>Reducing flood erosion and sediment loading from broken or damaged system by making repairs.</p> <p>Re-vegetate disturbed soils</p>



Maintenance Category #15: Vegetation

Activities¹

Activities include repair, replacement, installation, removal and/or maintenance of the vegetation within the ROW. Vegetation is an integral part of the road ROW structure. Vegetation maintenance includes, but is not limited, to mechanical, chemical, cultural and biological control. It also includes the systems and structures that support the vegetation.

Purpose

The primary purpose of vegetation maintenance is to promote, maintain, sustain, manage, or encourage vegetation growing within the ROW to comply with a variety of regulations and standards. Activities include suppressing non-desirable vegetation and enhancing desirable vegetation to accomplish the following:

- Minimize competition between desirable and non-desirable vegetation.
- Control or suppress pest infestations.
- Protect disturbed soils.
- Meet public safety requirements.
- Improve visibility.
- Improve surface and subsurface drainage.
- Reduce potential fire risk.
- Pollution control.
- Reduce dust.
- Reduce erosion.
- Maintain water quality.
- Protect habitat.
- Reduce pavement deterioration.
- Reduce deterioration of ROW structures.
- Encourage infiltration.

¹Maintenance activities are NOT development or redevelopment activities but are mitigation over the life of the structure and are as defined on page x of the Introduction Section of the RRMP Guidelines.



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Complying with vegetation regulations and standards for each system within the ROW structure may involve coordination with but not limited to any of the following regulations:

- Labor & Industry (L&I) regulations.
- Pipeline safety.
- Electrical regulations.
- Water regulations.
- Sewer regulations.
- Roadway regulations.
- HPA regulations.
- U.S. Army Corps of Engineers (Corps) regulations.
- Ecology regulations
- Dike and dam regulations.
- Local ordinances and codes.
- Department of Agriculture regulations.
- Noxious Weed control regulations.

Although the Services are not considering herbicide use for take limits, reduction or elimination of the take prohibition, BMPs for road maintenance herbicide use are included in the *Guidelines*. These BMPs are included to ensure that agencies electing to use herbicides as part of their vegetation management program do so appropriately. This includes fertilizers that contain herbicides and pesticides.

Roadside Vegetation Management Zones

For the purposes of this program, roadsides are divided into three typical vegetation management zones reflecting specific roadside management objectives for curbed and non-curbed roadways. The zones are: 1) vegetation-free, 2) operational, and 3) transitional. All zones should be managed to support the dual vegetation management roles for maximum environmental benefits while meeting regulations and standards. Although three zones are described in this maintenance category, not all zones are applicable to every ROW.



1. Zone 1 (Vegetation-Free Zone)

The vegetation management objective in Zone 1 is to maintain an area free of vegetation. This maintenance is performed for fire control and to improve surface drainage to expedite runoff from paved surfaces into drainage structures. Zone 1 maintenance is also performed to improve visibility and reduce breakup of pavement and deterioration of roadside structures and hardware.

Curbed Roadways. Zone 1 begins at the curb face and extends to the back of the sidewalk, including guardrails, signs, and other roadway hardware.

Non-curbed Roadways. Zone 1 on non-curbed roadways begins at the edge of the traveled way or paved shoulder. It extends to include all unpaved shoulder areas, guardrails, and other roadway hardware to a point where rock base material intercepts native soil or dirt fill.

2. Zone 2 (Operational Zone)

The objective of vegetation management in Zone 2 is to maintain the functional characteristics of the ROW structure while complying with regulations and standards. The ROW structure includes drainage facilities such as ditches and gutters. Landscaping, both public and private, may be included in Zone 2. Zone 2 maintenance preserves or enhances sight distances to signs, on curves, and at intersections. It also reduces erosion and undesirable plant species while enhancing motorists' ability to see pedestrians and animals.

Curbed Roadways. On curbed roadways, Zone 2 begins at the back of the curb or sidewalk. Zone 2 extends away from the road to include the roadside ditch or other drainage features, regulatory signs, and the remainder of the ROW involving sight distances, developed ROW, clear zones or public safety. Zone 2 extends to the edge of Zone 3, when Zone 3 exists.

Non-curbed Roadways. On non-curbed roadways, Zone 2 begins at the outside edge of Zone 1, or at the pavement edge if no Zone 1 exists. Zone 2 extends away from the road to include the roadside ditch or other drainage features, regulatory signs, and the remainder of the ROW involving sight distances, developed ROW, clear zones, or public safety. Zone 2 extends to the edge of Zone 3, when Zone 3 exists.



3. ZONE 3 (TRANSITION ZONE)

The objective of vegetation management in Zone 3 is to minimize maintenance efforts in the outer edges of undeveloped portions of the ROW. Zone 3 creates a compatible transition area between Zone 2, the operating road ROW, and the abutting land until the ROW is needed for its dedicated purpose.

When Zone 3 occurs, it extends away from the edge of Zone 2, to the limit of the road ROW.

TYPES OF VEGETATION MAINTENANCE ACTIVITIES

There are four types of vegetation maintenance activities, which are generally called “controls.” They are mechanical, chemical, cultural and biological controls:

1. MECHANICAL CONTROL

Mechanical control techniques involve the use of mechanical tools or motorized equipment to manage desirable vegetation or suppress non-desirable vegetation to minimize competition. The work involves grass mowing, brush mowing, manual or power brush cutting. Another mechanical control is tree maintenance, which includes pruning and removing trees to maximize longevity, environmental benefits, and public safety.

a. Grass Mowing

Grass mowing is used to control the growth of planted or natural grasses and other types of vegetation from encroaching upon the ROW, road pavement, gravel shoulder, and flow lines of roadside ditches. Grass mowing may be used to meet regulation and operational requirements within the other maintenance categories.

The actual area mown should reflect the need to meet specific, pre-defined goals and objectives for a particular ROW area. The actual number of cuts, however, may vary depending on the vegetation makeup and budget. Generally, road ROW areas are mowed twice a year and most access road ROW areas once a year. (Mowing in certain areas may be higher or lower than these stated generalities due to regulations or operational requirements.)



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Finished cut height for grasses is generally 2 to 6 inches aboveground. The finished cut height for other ground cover species is generally 12 inches or greater aboveground.

Grass mowing at some sites is the only way to control vegetation. Sites such as culvert ends, streams, ponds, ditches with year-round water and other 'herbicide sensitive' sites are often maintained by mowing if the site is accessible to suitable equipment.

Mowing equipment could consist of tractor-mounted rotary or flail mowers equipped with either grass- or brush-cutting blades. Trimming and edging tools are usually handheld string trimmers or blade trimmers and edgers. Hand tools for trimming may be used on special occasions.

b. Brush Mowing

Mechanical brush mowing is used as a control technique to remove the undesirable growth of brush species, small trees, and other vegetation. Such growth may interfere with safe operation of the facility and/or maintenance of the ROW structure including drainage systems. This work is usually done in the area beyond the grass-mowing limit, most often beyond the backslope of the ditch in Zone 2 to the edge of Zone 3. Brush mowing in Zone 3 would be used for selective control of brush. (Brush mowing, however, may be used to control brush in all three zones.)

Brush mowing can be done in conjunction with herbicide treatments. The timing of cutting is critical to enhancing rather than negating herbicide activity. Consult the herbicide label to determine proper sequencing or delay of mowing either before or after herbicide application.

At some sites, mowing brush is the only way to accomplish vegetation control without herbicide application. Sites such as culvert ends, streams, ponds, ditches with year-round water and other 'herbicide sensitive' sites can be maintained by mowing.

(Herbicide application can also be used following proper regulations and types of herbicides that are allowed at a specific site.)

Equipment usually involves a tractor-mounted boom flail-type mower with blades designed to cut either brush or small trees.



c. Manual Brush Cutting

Manual brush cutting is a technique to control the growth of brush species, small trees, and other vegetation in small areas, where mobilization of brush mowing equipment and associated flaggers and signs is not practicable.

This work is often used to accomplish selective removal, and is usually done in Zones 2 or 3 on the portion of ROW structure that is beyond grass mowing limits.

Equipment used in manual brush cutting could be chainsaws, brush saws (string, wire or blade types), pruning saws, lopper/pruners or any other type of hand-held power equipment. Chippers or grinders may be used to dispose of the debris resulting from the cutting operation. Chips should be spread over the site if desirable or hauled offsite.

d. Aerial Saw Work

Aerial saw work includes any work accomplished by raising a worker up, or having a worker climb off the ground to maintain vegetation. Aerial saw work is a method used to trim tree limbs and remove both undesirable trees and vegetation. The goal is to meet clearance heights over roads, electrical wires, sidewalks, and other ROW structures to promote better public safety and to minimize future damage to utilities and equipment.

e. Cultivation

Disturbance of soil and/or weeds by cultivation is another method of vegetation management. This method can be used to keep Zone 1 areas free of vegetation or for selective prevention or elimination of weeds around desirable plants in Zones 2 or 3.

Cultivation can be accomplished with either hand tools or power equipment. Hoes, rakes, rototillers and road graders are examples of equipment.



2. CHEMICAL CONTROL

Application of herbicides may occur at any time of the year allowed by the product label and the following guidelines:

- Zone 1 treatments will generally be accomplished by the use of pre- and post-emergent non-selective herbicides applied in early spring.
- Zones 2 and 3 vegetation management generally involves the use of selective herbicides.
- Applications in Zones 2 and 3 may be summer foliage, or dormant stem, stump or modified basal treatments when allowed by the label.
- Where site conditions or herbicide label restrictions preclude the use of herbicides, mowers and other methods will be utilized.

3. CULTURAL CONTROL

Cultural control involves enhancing the vigor of desirable plants so that they can eventually crowd out or prevent encroachment by undesirable plants. Cultural control techniques only work within Zones 2 and 3.

a. Fertilizers on Weak Stands of Grass

An example of cultural control is the use of fertilizers on weak grass stands to enable vigorous grass stands to overtake weeds.

b. Barriers

Use of physical barriers can be classified as a cultural control technique. Barriers stop plant growth originating below the barrier by physically preventing it from reaching the soil surface. In the case of germinating weed seed above the barrier, control is accomplished by preventing the roots of seedlings from reaching the soil.

4. BIOLOGICAL CONTROL

Biological control of vegetation involves using living organisms to destroy or compete with the undesirable plant. These living organisms include insects, disease organisms (parasites, viruses, bacteria, fungi, etc.), plants, livestock, rodents, and fish. These natural enemies are usually brought in from areas of the world where the undesirable plant is native and is controlled by these natural predators. Predators are tested to make sure that they affect only the target plant and not any other economically important plants or animals. Once deemed safe, they are turned loose against the target plant. Examples of



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effective biological control utilizing natural predators in ROW areas are the Cinnabar Moth and Flea Beetle on Tansy Ragwort, and the Chrysolina Beetle on Klamathweed or Goatweed.

Another application of biological control agents involves reintroducing native plants to a site. These plants are introduced to an area where they grow more rapidly and outcompete existing weeds and exotic vegetation. Native species are well adapted to site conditions and most will overtake and outcompete weeds.

Where applicable, vegetation maintenance will be conducted in all 15 maintenance categories described in the *Guidelines*.

BMP Outcomes:

- Improved water quality.
- Improved air quality.
- Increased sight distance.
- Improved visibility of shoulder for emergencies and obstacles.
- Reduce shading on roadway (reduced icing, reduced accidents).
- Reduced fire hazard.
- Compliance with pipeline safety and easement regulations.
- Facilitation of inspection and maintenance of other features and structures.
- Reduced flooding.
- Improved driver guidance (provides visual definition).
- Improved pedestrian safety (divides uses: pedestrian rather than vehicular).
- Reduced storm (blow down) hazard.
- Reduced overspray (irrigation system malfunction) hazard.
- Improve drainage by increasing infiltration and percolation.
- Reduce spread of noxious weeds and undesirable vegetation.
- Limit erosion.
- Increase biofiltration.
- Lower herbicide use when used in conjunction with other BMPs or other integrated management components.



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BMPs

Maintenance Category #15: Vegetation

BMPs	Description
ROW	Perform repairs, replacement, and maintenance of roadway vegetation.
Shoulder Work	Maximize opportunities for shoulder work, which will increase infiltration or biofiltration. (See also Maintenance Category #7, Gravel Shoulders).
Part 2 BMPs (Site-specific BMPs)	<p>Use any of the eight BMP outcome categories in Part 2 at or around the worksite to reduce turbidity, sediment and/or worksite pollutants from entering watercourses or streams, wetlands, lakes, or other water bodies.</p> <p>Types of BMP categories:</p> <ul style="list-style-type: none"> • “Filter/Perimeter Protection” • “Reduce Potential for Soil Becoming Water or Air Borne,” and/or • “Reduce Water Velocity/Erosive Forces.” <p>Go to Part 2-BMPs for selection and installation guidelines.</p>
Disturbed Areas	<p>Exposed and unworked soils shall be stabilized by applying BMPs that protect soil from erosive forces of raindrop impact and flowing water:</p> <ul style="list-style-type: none"> • During winter season – October through June – no soils shall remain exposed and unworked for more than 2 days. • During the summer season –July through September–no soils shall remain exposed and unworked for more than 7 days. • These conditions apply to all soils onsite, whether or not at final grade.
	Prior to BMP removal, clean up accumulated sediments and seed or replant disturbed area.
Mowing	<ul style="list-style-type: none"> • Grass mowing finished height of 2 to 6 inches to minimize scalping of soil surface. • Do not mow below ordinary high water mark of streams or waterways.
Brush Cutting	<ul style="list-style-type: none"> • Grass cutting finished height 2 to 6 inches to minimize scalping of soil surface. • Native brush vegetation cutting finished height of 12 inches to maximize growth of desirable vegetation. • Do not brush cut below the ordinary high water mark of streams and waterways.
Hand Cutting	<ul style="list-style-type: none"> • Grass mowing finished height of 2 to 6 inches to minimize scalping of soil surface. • Do not mow below the ordinary high water mark of streams or waterways.
Seeding	<ul style="list-style-type: none"> • Avoid overspray into streams, ponds, lakes or wetlands. • Cover all exposed soil within project limits to avoid erosion.
Chipping	<ul style="list-style-type: none"> • Spread chips evenly along Zones 2 or 3. • Remove chips from project site.

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BMPs

Maintenance Category #15: Vegetation (Continued)

BMPs	Description
Chemical Application	<ul style="list-style-type: none"> Follow state and federal requirements, along with product label instructions.
Equipment/Tools	<p>Tool and equipment cleanup procedures:</p> <ul style="list-style-type: none"> Routinely inspect equipment, tools, and vehicles for leaks or damage. Keep cleanup materials, such as dry absorbent materials, onsite to allow prompt cleanup of spills. Promptly repair or replace leaking connections, pipes, hoses and/or valves. <p>Vehicle and equipment maintenance, repair and/or service will be performed at designated repair facilities whenever possible. Use the following practices to reduce the potential for discharge of pollutants to watercourses or streams from vehicle and equipment maintenance, service and repair operations:</p> <ul style="list-style-type: none"> Prohibit discharge of any wastewaters to stormwater drains. Do not pour material down drains or hose down work areas. Use either dry sweeping or damp mopping. Remove buildup of oils and grease on equipment. Perform equipment and vehicle maintenance in areas that prevent discharges to the storm drain system. Use drip pans under equipment when maintaining, repairing or servicing in the field. Use non-toxic solvents whenever possible. Clean maintenance area storm drain grates regularly. Collect and properly manage (recycle or dispose of) used materials such as the following: grease, oil, oil filters, antifreeze, cleaning solutions, lead-acid batteries, hydraulic and transmission fluids, and tires. Surfaces shall be cleaned following any discharge or spill incident. <p>At end of shift, park equipment in designated areas.</p> <p>Clean equipment and tools offsite in area where pollutants can be contained.</p> <p>If unable to move tools and equipment offsite, control and remove cleaning by-products.</p>
Material/Debris Disposal	<p>After repairs are completed, remove construction/maintenance waste materials from site for disposal or recycling.</p> <p>If area is swept with a pick-up sweeper, the material will be hauled out of the area to appropriate disposal site.</p>
Spill Prevention & Control	<p>Carry Spill Kit used for small spills related to equipment failure. Desired outcome is to control, absorb, or contain spill for cleanup and disposal. Minimum requirements:</p> <ul style="list-style-type: none"> Absorbent. Pad. Shovel



POTENTIAL CONSERVATION OUTCOMES

Habitat Goals:

- Improve drainage by reducing erosion.
- Reduce the spread of noxious weeds and undesirable vegetation.
- Limit erosion.
- Provide shading/reduce water temperature.
- Suppress non-desirable vegetation.
- Enhance desirable vegetation.
- Provide habitat for macro-invertebrates upon which aquatic species feed.
- Increase biofiltration.
- Lower herbicide use.

Conservation objectives and how they are achieved are shown on the following table:

Repair, Replacement, Installation and Maintenance of ROW Vegetation	
Conservation Objectives include one or more of the following:	Conservation Objectives Achieved By one or more of the following:
<p>Maintain or restore water quality.</p> <p>Reduce erosion.</p> <p>Re-vegetation of disturbed areas provides:</p> <ul style="list-style-type: none"> • Biofiltration. • Shading. • Bank stabilization. • Food. • Cover. • Nutrient process. <p>Maintain or restore flow volumes and velocities by repairing ROW system structures and vegetation maintenance provides:</p> <ul style="list-style-type: none"> • Holds sediments. • Removes nutrients. • Reduces erosion. • Offsite erosion. • Offsite habitat impacts. 	<p>Performing repairs, replacement, installation and maintenance of vegetation in the ROW</p> <ul style="list-style-type: none"> • Re-vegetation of disturbed soils. • Reduce noxious weeds. • Reduce undesirable vegetation. • Increase shading. • Enhance desirable vegetation. <p>Using erosion/sediment controls during maintenance.</p> <p>Reducing flood erosion and sediment from broken or damaged system by managing vegetation.</p> <p>Leave vegetation within ditches if not affecting flow or operation.</p> <p>Protect vegetation outside of work site.</p>



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PART 2 — BEST MANAGEMENT PRACTICES



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PART 2 — BEST MANAGEMENT PRACTICES

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PROCESSES AND PRINCIPLES OF EROSION AND SEDIMENTATION



Soil disturbance, whether by natural forces or by construction and maintenance activities, can accelerate the rate of erosion. Careful planning combined with proper selection and installation of erosion control measures can reduce the impact of construction and maintenance related erosion.

SOIL EROSION PROCESS

- Splash erosion results when raindrops fall on bare or sparsely vegetated soil and detach the soil particles.
- Sheet erosion occurs when these soil particles are transported in a thin layer, or sheet, by flowing water.
- Rills and gullies are formed by concentrated, high velocity sheet flow. More soil detaches, increasing the erosion damage.
- Stream and channel erosion occurs by even higher rates of velocity and steepness of slope.
- Wind erosion occurs during dry weather conditions and high winds. Size of particles being moved is related to wind velocity. Particles moved by wind may cause air pollution, soil loss and/or water quality degradation.

Water quality and fish habitat are the major concerns associated with soil movement. BMPs combined with training and oversight will enable road maintenance personnel to lessen the effects of soil erosion from the work site.

PRINCIPLES OF EROSION AND SEDIMENTATION CONTROL

Effective erosion and sedimentation control requires first that the soil surface be protected from the erosive forces of wind, rain, and runoff, and second that eroded soil is controlled onsite. The following principles shall be integrated into a system of control measures and management techniques to control erosion and reduce offsite sediment migration.

Minimize the Extent and Duration of Exposure

Scheduling can be a very effective means of reducing the hazards of erosion. Schedule construction activities to minimize the exposed area and the duration of exposure. Maintenance activities can not always be scheduled, it is important to stabilize disturbed areas as quickly as possible in scheduled or unscheduled maintenance.



Protect Areas to be Disturbed from Stormwater Runoff

Use berms, diversions, pumps, dams, barriers, sediment traps and constructed waterways to intercept runoff and divert it away from cut-and-fill slopes or other disturbed areas. Install these measures before beginning maintenance and/or land disturbing activities.

Stabilize Disturbed Areas

Removing the vegetative cover and altering the soil structure by clearing the surface may increase an area's susceptibility to erosion. Apply stabilizing measures after the land is disturbed and implement temporary or permanent vegetation, mulches, or other BMP's to correspond with maintenance activities. During the winter season, October through June, no soils shall remain exposed and unworked for more than 2 days. During the summer season, July through September, 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.

Minimize Runoff Velocities

Clearing existing vegetation may reduce the surface roughness and infiltration rate, thereby increasing runoff velocities and volumes. Use measures that break the slopes to reduce the problems associated with concentrated flow volumes and runoff velocities.

Retain Sediment on the Site

Even with careful planning, some erosion is unavoidable. The resulting sediment can be reduced by BMP placement that reduce on site erosion. Plan the location where sediment deposition will occur and maintain access for maintenance cleanout. Plan, install and use sediment trap and basin BMPs before other land-disturbing activities (except in emergencies).

Inspect and Maintain BMPs

Inspection and maintenance of BMPs is vital to the performance of erosion and sedimentation BMPs. It is essential to inspect all BMPs to determine that they are working properly and to ensure that problems are corrected as they are detected.

ACTIVITY AND BMP Planning and Selection Sample Checklist #1

Figure 14

ACTIVITY INFORMATION		
Location:	Maintenance Activity:	
Lead:	Date:	
Description of Activity:		
CHECKLIST		
Steps	Completed	Comments
1. Make site visit before starting work.		
2. Define activity, scope and limits.		
3. Identify sensitive areas and drainage features.		
4. Is environmental staff required to review plans or provide crew support?		
5. Are fish present (or likely to be present) in work area or activity impact area. (If yes, contact environmental support staff or WSDFW.)		
6. Will fish exclusion be required? (If yes, coordinate with designated staff or agency.)		
7. Review Maintenance Category BMP options related to site-specific conditions.		
8. Select applicable BMPs from Part 1 and 2 of the <i>Guidelines</i> .		
9. Secure permits.		
10. Read and understand all permit conditions. Resolve permit conditions before moving forward.		
11. Prepare construction/maintenance schedule, and/or sequence (Including installing, monitoring, maintaining, and removing BMP(s).)		
12. Schedule a pre-maintenance or pre-construction meeting as necessary.		
13. Review activity as possible model for training and/or adaptive management discussions.		

ACTIVITY AND BMP

Pre-construction and Pre-maintenance Meeting

Sample Checklist #2

Figure 15

ACTIVITY INFORMATION		
Location:	Maintenance Activity:	
Lead:	Date:	
Description of Activity:		
CHECKLIST		
Steps	Completed	Comments
1. Invite appropriate personnel and/or agencies.		
2. Prepare agenda and attendance/sign-in form.		
3. Outline construction/maintenance, schedule, and/or sequence (Including installation, monitoring, maintaining, & removing BMP(s)).		
4. Identify sensitive areas and drainage features.		
5. If fish exclusion required, follow Fish Exclusion Protocol in Appendix E.		
6. Clarify roles & responsibilities of all personnel & agencies related to all aspects of the activity.		
7. Discuss permits, approvals and their conditions.		
8. If environmental staff is required to be onsite during work activities: introduce personnel and their role(s).		

ACTIVITY AND BMP

Installation, Monitoring, Maintianing and Removal Sample Checklist #3

Figure 16

ACTIVITY INFORMATION		
Location:	Maintenance Activity:	
Lead:	Date:	
Description of Activity:		
CHECKLIST		
Steps	Completed	Comments
1. Identify/mark work area and location of BMP(s).		
2. Arrange for delivery of BMP(s) products.		
3. Environmental staff support as appropriate.		
4. Make sure BMP(s) are installed in accordance with the <i>Guidelines</i> , permit conditions and/or specifications.		
5. Monitor/check BMP(s) routinely to make sure BMP outcomes are achieved, and make repairs, adjustments, and/or additions as necessary.		
6. Remove BMP(s) and re-vegetate in accordance with the <i>Guidelines</i> .		



ACTIVITY AND BMP

Routine Part 1

Sample Checklist #4

Figure 17

Task	Yes	No
1. Make site visit before starting work		
2. Define activity, scope, and limits		
3. Review Part 1 BMPs		
• Permit needed		
• Scheduling considerations		
• Equipment maintenance		
• Disturbed soil		
• Waste material removed		
• Spill kit		
• Part 2 BMPs needed		
• Evaluate using detailed checklist 1, 2, and/or 3		
4. Is environmental staff required? NO – continue maintenance YES – contact environmental staff for review		
5. In water work		
• Stop work		
• Contact environmental staff for review		
• Evaluate using detailed checklist 1, 2, and/or 3		

OUTCOME CATEGORY: KEEP WATER FROM WORK AREA



Definition: The BMPs in this category are used to keep water from reaching the work area or disturbed soils generally by means of a bypass, diversion or interception process.

Desired Outcome: The desired outcome of these BMPs is to bypass or divert sheet flow, stormwater or stream flow around or through the work area. The intercepted water will be discharged to an acceptable storm drainage system or outfall.

Applications: These BMPs work well:

- In streams or ditches where the normal flow can be piped around the work area by temporarily damming and conveying the flow by pumping or gravity. (HPA)
- Covering stock piles or disturbed soils with impermeable fabric to intercept rainfall. Sheet flows shall be collected and diverted at the bottom of the covering.
- Diverting sheet flow around work area or disturbed soils by constructing upslope berms or channels.

Limitations: These BMPs are often used in combination with other BMPs (i.e., dewatering work area, grass-lined swales). Refer to *individual* (Part 2) BMP limitations.

Permit Conditions: Follow acceptable procedures, if required in HPA, to exclude fish from work area. Reintroduce water flow into the work area to reduce sediment transport. Comply with permit requirements. Inspect and maintain BMPs according to these Guidelines.

BMP Options (include but not limited to):

- Aqua Barrier.
- Cofferd Dam.
- Dewatering.
- Diversion Berm.
- Diversion Channel.
- Plastic Covering.
- Sandbag.
- Stream Bypass.
- Vactoring.



OUTCOME CATEGORY: REDUCE POTENTIAL FOR SOIL FROM BECOMING WATER BORNE– OR AIR BORNE

Definition: The BMPs in this category work to keep soil particles in disturbed areas from becoming water borne or air borne.

Desired Outcome: The desired outcome of these BMPs is to reduce erosion by reducing soil particles from becoming water borne or air borne.

Application: These BMPs work well to stabilize:

- Slopes.
- Soils.
- Roadways.
- Channels.

Limitations: Often used in combination with other BMPs allowing the disturbed area to stabilize. Refer to individual BMP (Part 2) limitations.

Permit Conditions: Comply with permit requirements. Inspect and maintain BMPs according to these guidelines.

BMP Options (include but not limited to):

- Back of Slope Planting.
- Construction Access Road.
- Ditch Lining.
- Dust Control.
- Filter Fabric.
- Grass Lined Channel.
- Hand Seeding.
- Hydroseeding.
- Live Staking.
- Mulching.
- Plastic Covering.
- Soil Stabilization (Blankets/Matting).
- Surface Roughening.
- Sweeping.
- Vegetative Buffer.

OUTCOME CATEGORY: FILTER/PERIMETER PROTECTION



Definition: The BMPs in this category reduce erosion and sedimentation of soil particles/contaminants as the water passes through a filtering device. This outcome will also apply to perimeter protection around the job site.

Desired Outcome: The desired outcome of these BMPs is to reduce soil particles/contaminants before the water discharges from the job site.

Application: These BMPs work well:

- When the rate of flow is relatively low and the filter can be inspected and maintained to ensure the BMP continues to function.
- Perimeter protection around job site.

Limitations: Not effective in areas of high flows. Refer to individual BMP (Part 2) limitations.

Permit Conditions: Comply with permit requirements. Inspect and maintain BMPs according to these guidelines.

BMP Options (include but not limited to):

- Coir Log.
- Continuous Berm.
- Curb Inlet Sediment Trap.
- Excelsior Filled Log.
- Filter Fabric.
- Grass Lined Channel.
- Gravel Filled Sump.
- Half Round Filter.
- Inlet Protection.
- Kimble Filter Pipe.
- Silt Fence.
- Silt Mat.
- Straw Bale Barrier (1).
- Straw Bale Barrier (2).
- Straw Bale Barrier (3).
- Straw Log.
- Washed Rock.



OUTCOME CATEGORY: SETTLING

Definition: The BMPs in this category allow particles/contaminants to settle as the water velocity decreases.

Desired Outcome: The desired outcome of these BMPs is to allow sediment to settle out of the water. This will reduce soil particles/contaminants from leaving the job site.

Application: These BMPs work well:

- When the rate of flow is relatively low.
- When there is sufficient space or volume to properly size a settling BMP.

Limitations: Not effective in areas of high flows. Refer to individual BMP (Part 2) limitations.

Permit Conditions: Comply with permit requirements. Inspect and maintain BMPs according to these guidelines.

BMP Options (include but not limited to):

- Coir Log.
 - Continuous Berm.
 - Curb Inlet Sediment Trap.
 - Excelsior Filled Log.
 - Filter Fabric.
 - Rock Check Dam.
 - Sandbag.
 - Sedimentation Sump.
 - Silt Fence.
 - Silt Mat.
 - Siltation Pond/Tank.
 - Straw Bale Barrier (1).
 - Straw Bale Barrier (2).
 - Straw Bale Barrier (3).
 - Straw Log.
 - Temporary Sediment Trap.
 - Triangular Silt Dike.
 - Turbidity Curtain.
-

OUTCOME CATEGORY: REDUCE WATER VELOCITY/EROSIVE FORCES



Definition: The BMPs in this category reduce or diminish the water velocity, thereby dissipating its erosive force.

Desired Outcome: The desired outcome of these BMPs is to create energy dissipation and reduce erosion.

Application: These BMPs work well:

- On stream and ditch banks.
- In swales/grass lined channels.
- In waterbodies.
- On slopes.
- On large disturbed areas.

Limitations: These BMPs should not be used when maintenance activities are conducted in locations that could reduce actual or potential high flow salmonid refuge functions. These BMPs may be used if required by permit conditions. Refer to individual BMP (Part 2) limitations.

Permit Conditions: Comply with permit requirements. Inspect and maintain BMPs according to these guidelines.

BMP Options (include but not limited to):

- | | |
|---------------------------|--------------------------------|
| • Back of Slope Planting. | • Sandbag. |
| • Coir Fabric. | • Silt Fence. |
| • Coir Log. | • Silt Mat. |
| • Continuous Berm. | • Straw Bale Barrier (1). |
| • Ditch Lining. | • Straw Bale Barrier (2). |
| • Excelsior Filled Log. | • Straw Bale Barrier (3). |
| • Hand Seeding. | • Straw Log. |
| • Hydroseeding. | • Stream Bank Bio-Engineering. |
| • Large Woody Material. | • Surface Roughening. |
| • Live Staking. | • Triangular Silt Dike. |
| • Mulching. | • Turbidity Curtain. |
| • Rip Rap. | • Vegetative Buffer. |
| • Rock Check Dam. | |



OUTCOME CATEGORY: CONTAINMENT

Definition: The BMPs in this category retain water and soil particles/contaminants on the work site.

Desired Outcome: The desired outcome of these BMPs is to reduce water discharge from the job site.

Application: These BMPs work well:

- In enclosed drainage systems.
- In swales.
- In open drainage systems.
- In waterbodies. (bridge maintenance etc)

Limitations: These BMPs should not be used when maintenance activities are conducted in locations that could reduce actual or potential high flow salmonid refuge functions. These BMPs may be used if required by permit conditions. Refer to individual BMP (Part 2) limitations.

Permit Conditions: Comply with permit requirements. Inspect and maintain BMPs according to these guidelines.

BMP Options (include but not limited to):

- Concrete Containment (1).
- Concrete Containment (2).
- Vactoring.

OUTCOME CATEGORY: HABITAT PROTECTION/MAINTENANCE



Definition: The BMPs in this category maintain or protect habitat.

Desired Outcome: The desired outcome of these BMPs is to maintain or protect habitat by providing:

- Bank/slope stabilization.
- Spawning/rearing areas.
- Habitat shading.
- Reducing erosion by providing ground cover, binding soil particles with roots, and lowering water velocity.
- Habitat for primary production.
- Habitat for prey base organisms such as macro-invertebrates.

Application: These BMPs work well in:

- Riparian areas.
- Sensitive areas.
- Watercourses and streams.

Limitations: These BMPs should be done in accordance with project design. Refer to individual BMP (Part 2) limitations.

Permit Conditions: Comply with permit requirements. Inspect and maintain BMPs according to these guidelines.

BMP Options (include but not limited to):

- Coir Fabric.
- Coir Log.
- Excelsior Filled Log.
- Hand Seeding.
- Hydroseeding.
- Large Woody Material.
- Live Staking.
- Streambed Gravel.



OUTCOME CATEGORY: REDUCE POTENTIAL FOR CONTAMINANTS FALLING INTO WATER

Definition: The BMPs in this category reduce the potential for the contaminants from the work area from entering the water. This outcome can be achieved by capturing falling particles from bridge or other over-water work.

Desired Outcome: The desired outcome of these BMPs is to reduce contaminants from entering the water.

Application: These BMPs work well:

- On bridge or pipeline maintenance projects.

Limitations: Refer to individual BMP (Part 2) limitations.

Permit Conditions: When used in watercourses or streams, these BMPs must be used in accordance with permit requirements. Inspect and maintain BMPs according to these guidelines.


BMP Options (include but not limited to):























































- Diaper Netting.
- Plywood Work Platform.



BMP Outcome Category Matrix

Figure 13


 = Recommended BMP Application but not limited to












































		BMP OUTCOME CATEGORY							
BMP	PAGE	Keep Water From Work Area	Reduce Potential for Soil Erosion	Filter / Perimeter Protection	Settling	Reduce Water Velocity / Erosive Forces	Containment	Habitat Protection / Maintenance	Reduce Potential for Contaminants Falling Into Water
AQUA BARRIER	2.20								
BACK OF SLOPE PLANTING	2.23								
COFFERDAM	2.25								
COIR FABRIC	2.28								
COIR LOG	2.30								
CONCRETE CONTAINMENT (1)	2.33								
CONCRETE CONTAINMENT (2)	2.36								
CONSTRUCTION ACCESS ROAD	2.38								
CONTINUOUS BERM	2.41								
CURB INLET SEDIMENT TRAP	2.44								
DEWATERING	2.49								
DIAPER NETTING	2.51								
DITCH LINING	2.53								
DIVERSION BERM	2.55								
DIVERSION CHANNEL	2.57								
DUST CONTROL	2.60								
EXCELSIOR FILLED LOG	2.62								
FILTER FABRIC	2.64								
GRASS LINED CHANNEL	2.66								
GRAVEL FILLED SUMP	2.70								
HALF ROUND FILTER	2.71								
HAND SEEDING	2.73								
HYDROSEEDING	2.75								
INLET PROTECTION	2.77								
KIMBLE FILTER PIPE	2.84								
LARGE WOODY MATERIAL	2.86								
LIVE STAKING	2.91								
MULCHING	2.95								
PLASTIC COVERING	2.97								
PLYWOOD WORK PLATFORM	2.99								



BMP Outcome Category Matrix

Figure 13 Continued

 = Recommended BMP Application but not limited to

BMP	PAGE	BMP OUTCOME CATEGORY							
		Keep Water From Work Area	Reduce Potential for Soil from Becoming Water- or Airborne	Filter / Perimeter Protection	Settling	Reduce Water Velocity / Erosive Forces	Containment	Habitat Protection / Maintenance	Reduce Potential for Contaminants Falling Into Water
RIP RAP	2.101								
ROCK CHECK DAM	2.103								
SANDBAG	2.107								
SEDIMENTATION SUMP	2.111								
SILT FENCE	2.112								
SILT MAT	2.115								
SILTATION POND/SETTLING TANK	2.117								
SOIL STABILIZATION (Blankets/Matting)	2.120								
STRAW BALE BARRIER (1)	2.125								
STRAW BALE BARRIER (2)	2.128								
STRAW BALE BARRIER (3)	2.133								
STRAW LOG	2.136								
STREAM BANK STABILIZATION	2.139								
STREAM BYPASS	2.140								
STREAMBED GRAVEL	2.144								
SURFACE ROUGHENING	2.146								
SWEEPING	2.150								
TEMPORARY SEDIMENT TRAP	2.153								
TRIANGULAR SILT DIKE	2.156								
TURBIDITY CURTAIN	2.160								
VECTURING	2.164								
VEGETATIVE BUFFER	2.166								
WASHED ROCK	2.168								



DESCRIPTION

An aqua barrier is a manufactured vinyl tube filled with water to provide a temporary/portable dam or barrier positioned to contain or divert the movement of water.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Providing a dry construction area in a stream or waterway.
- Providing a bypass for a stream or waterway.
- Temporary reservoirs for water storage.
- Excluding waters from work area under and around bridges or piers.

APPLICATIONS

This BMP may be used for stream diversion at a construction site. It may be used in fish habitat restoration, flood control, erosion control through diversion or containment of flowing water, silt containment, sedimentation collection or settling ponds, and/or as a portable dam.

LIMITATIONS

This BMP should not be used:

- To cross more than 2/3 of the main flow of any salmonid bearing water at the time of the year when any life history stage of salmonids are expected to be present. (unless required by permit)
- Other than specified by the manufacturer's guidelines.

CONSTRUCTION GUIDELINES

- When used in watercourses or streams, aqua barriers must be used in accordance with permit requirements.
- Refer to Appendix E for Fish Exclusion Protocols.
- Follow manufacturer recommendations and guidelines for installation and safety measures.
- Knives shall be worn by workers for emergency deflation.
- Keep a repair kit on site in case of small punctures.



*Aqua barrier used as
coffer dam*

- Remove any visible rocks or sharp objects prior to installing barrier.
- The aqua barrier can be deployed on dry ground, in standing and/or flowing water.
- Multiple aqua barriers can be joined with connections.

BMP MAINTENANCE

- Inspect BMPs several times daily during the workweek. Schedule additional inspections during storm events. Any required repairs shall be made.
- Repair punctures with repair kit immediately.
- Allow to dry before rolling up for storage.
- Store away from chemicals, and above 10° F.

BMP REMOVAL

- Follow manufacturer recommendations for removal.
- Remove BMP (recycle and/or reuse if applicable).
- Water discharged from water barrier shall meet water quality temperature standards at the point of discharge.



BMP: AQUA BARRIER (continued)



Installing aqua barrier in river to provide a dry construction area





BMP

BACK OF SLOPE PLANTING

DESCRIPTION

Back of slope planting requires leaving the roadway slope clear for public safety. This BMP includes planting grass, forbs, small trees and brush. This BMP provides long term soil stabilization and/or reduces water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Ditch slopes vegetated with grass and forbs to reduce exposed soil.
- Planting trees and brush outside of the ditch on the back of the slope allowing plants to grow over the ditch or channel.
- Providing shade as long as it does not become a public safety hazard (No trees larger than 4-inches allowed in clear zone or recovery area).

APPLICATIONS

This BMP may be used in ditches (including ditches which are watercourses or streams) parallel to roadways or at road crossings. Revegetation plans will be done in accordance with permit requirements and federal highway safety design or standards. It may be used in combination with other BMPs.

This BMP provides long term soil stabilization once plantings have been established. Soil stabilization can only be achieved in combination with other BMPs. For example; Grasses and forbs on shoulder and in ditch slopes with brush, shrubs or trees behind the ditch.

LIMITATIONS

This BMP should not be used:

- If it creates a potential public safety hazard.
- In clear zone areas.
- If it could cause water flow problems that may result in flooding of the roadway..

CONSTRUCTION GUIDELINES

- Select appropriate native vegetation for the location.
-



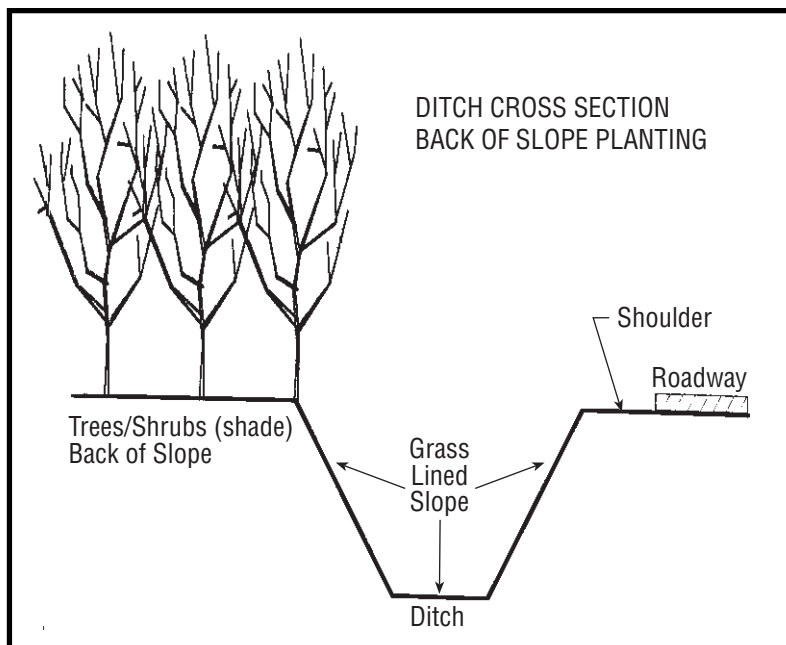
- Review planting guidelines; plant at the appropriate time of year.
- Planting must be done in accordance with design and/or permit conditions.

BMP MAINTENANCE

- Inspect during plant establishment period. Replant, due to plant mortality, as necessary.

BMP REMOVAL

- BMP removal is not necessary.





BMP COFFERDAM

DESCRIPTION

A cofferdam is a temporary structure built into a waterway to enclose a construction area and reduce sediment pollution from construction work in and under water. Cofferdams can be made of steel, rock, sand bags, wood or aqua barriers.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Dewatering construction areas.

APPLICATIONS

This BMP may be used in construction activities such as culvert installation, bridges, piers, or abutments. It may be used in combination with other barriers and is commonly used in conjunction with stream bypass and/or pumps.

LIMITATIONS

This BMP should not be used:

- In deep water unless designed or reviewed by an engineer.

CONSTRUCTION GUIDELINES

- When used in watercourses or streams, cofferdams must be used in accordance with permit requirements.
- Refer to Appendix B for Fish Exclusion Protocols.
- Construction guidelines depend on cofferdam material selection. See pictures for construction details.

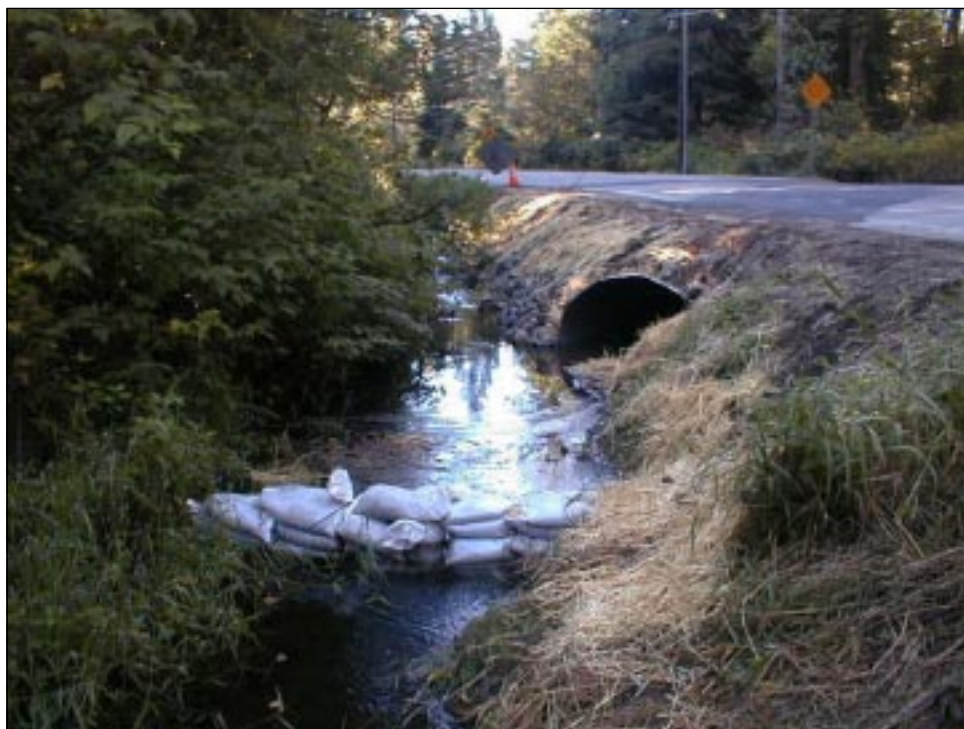
BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Repair gaps, holes or scour.



BMP REMOVAL

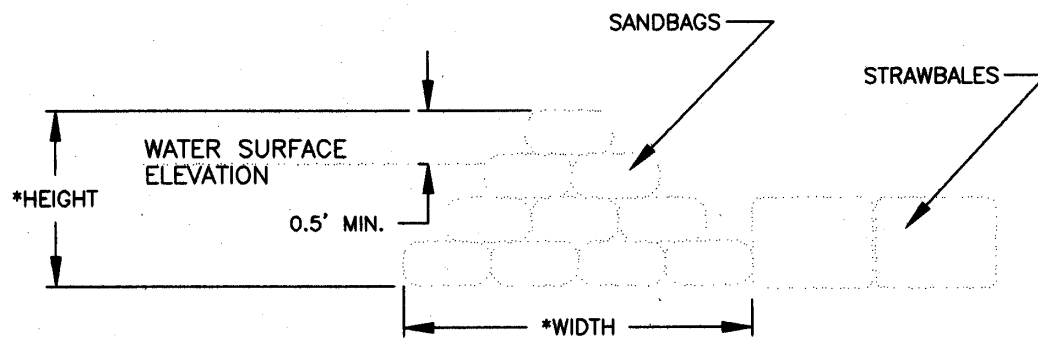
- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



Sandbags used as a cofferdam



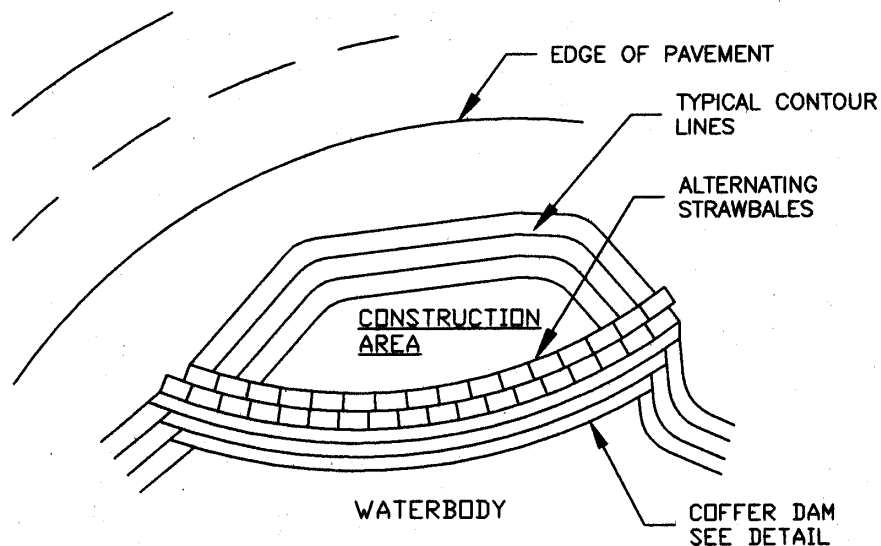
SANDBAG COFFER DAM DETAIL



* HEIGHT AND WIDTH OF COFFER DAM SHALL BE DETERMINED BY THE WATER SURFACE ELEVATION AT THE TIME OF CONSTRUCTION.

NOTES:

1. SANDBAGS SHALL BE USED IN ACCORDANCE WITH APPLICABLE PERMITS.
2. INSTALL COFFER DAM AND DEWATER SITE PRIOR TO CONSTRUCTION
3. PROVIDE ADEQUATE FREEBOARD.





DESCRIPTION

Coir Fabric is a geo-textile product made from coconut fibers loosely woven into a fabric usually packaged in roll form. This fabric can be used to provide a reduction in water velocity/erosive forces and/or habitat protection/maintenance.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Decreasing bank erosion in high flow/high velocity channels.
- Long term slope stabilization.
- Stream and riverbank stabilization.
- Revegetation projects.

APPLICATIONS

This BMP may be used to provide stabilization/protection to the soil surface of steep slopes, stream and/or river banks. It can be used in combination with vegetation to reinforce soil in high flow/high velocity waters and on slopes as steep as 1 horizontal to 1 vertical. It may be used as bank stabilization before vegetation/re-vegetation has occurred.

LIMITATIONS

This BMP should not be used:

- In the streambed of a channel.
- When short term biodegradability is required.

CONSTRUCTION GUIDELINES

- When used in water courses or streams, this BMP must be used in accordance with permit requirements.
- The fabric may be laid out horizontally or vertically on a slope.
- Use stakes or staples to anchor fabric to ground. Use anchoring devices on the edges and in the field of the fabric.
- Lay loosely on the surface so fabric makes contact with the ground. (Don't stretch the fabric.)



- If the seam is perpendicular with water flow, overlap fabric at least 18-inches in the direction of water flow.
- If the seam is parallel with the water flow, overlap edges at least 8-inches, staking both edges securely.
- The fabric should be trenched at least 12" deep at top and bottom ends of the installation to prevent undercutting of the fabric.
- Hand Seeding and/or Hydroseeding should occur prior to coir fabric placement.
- Live staking may be done after coir fabric placement by piercing fabric.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the work week. Schedule additional inspections during storm events. Make any required repairs.

BMP REMOVAL

- BMP removal is not necessary.



Coir fabric



DESCRIPTION

A coir log is a manufactured coconut fiber log used as a structural and rooting mechanism for bioengineered systems. These logs can be used to provide filter/perimeter protection, settling, reduction in water velocity/erosive forces and habitat protection/maintenance. They may be cut or folded, to the appropriate length, to fit the desired location.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting sheet flow.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to promote settling of soil particles.
- Filtering soil particles and debris.
- Trapping topsoil and retaining moisture from rainfall, which aids in growth of seedlings planted along the upslope side of the rolls.

APPLICATIONS

This BMP may be used for temporary check dams in ditches of any dimension, temporary soil stockpile protection, drop inlet protection, temporary interceptor dike and swale, check dam in ditches and/or bank stabilization. Coir logs may also be used for habitat protection at the toe of a bank and can be incorporated with vegetative planting. This BMP may be used for perimeter sediment control. This BMP is particularly useful in areas where the effects of soil disturbance need to be minimized. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- Where flow volume or velocity inhibit BMP function.
- When maintenance activities conducted in locations could reduce actual or potential high flow salmonid refuge functions, this BMP will be used if required by permit conditions.



CONSTRUCTION GUIDELINES

- Coir log installation must be done in accordance with applicable design and/or permit conditions.
- Install to prevent water from going around or under BMP.
- BMP must be staked (wood only) to insure soil particle containment.
- When using as a check dam, prior to installation, cut or fold to proper length.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Removal of BMP may not always be necessary.
- Depending upon BMP placement, re-vegetation of site may be necessary.



Coir logs used as habitat protection at the toe of a bank



*Coir log used to allow settling and to decrease
water velocity/erosive forces*



BMP

CONCRETE CONTAINMENT (1)

DESCRIPTION

Concrete containment is the method(s) of containing uncured concrete that is pumped or poured into forms while repairing structures in or around watercourses.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing uncured concrete and chemicals from leaving the work site and entering the adjacent body of water.

APPLICATIONS

This BMP may be used when dewatering is not possible for bridge repair work. Concrete containment devices may include fiberglass/steel column forms, a "Sea-form" bag system and/or steel plates to line work area. It may be used in combination with other BMPs such as cofferdams, turbidity curtains and/or dewatering/silt ponds.

LIMITATIONS

- Limitations are site specific.

CONSTRUCTION GUIDELINES

- When used in watercourses or streams, this BMP must be used in accordance with permit requirements.
- Concrete containment systems should be designed or reviewed by an engineer.
- Identify work site.
- Isolate work area. If possible, dewater construction area.
- As conditions allow, provide approved secondary containment.
- Have adequate fuel supply and backup pumps in the event of emergency or mechanical failure.
- For tool and/or equipment cleanup onsite, a temporary sump may be used to contain water from cleanup.
- Remove material from sump after cleanup is complete.



BMP MAINTENANCE

- Inspect structure during construction for leaks.
- Repair any leaks in structure.
- Contain and remove any excess materials, such as chemicals and/or concrete.

BMP REMOVAL

- Remove BMP as concrete and permit conditions require; this may be immediately or it may be up to 10 days after the concrete is cured (recycle and/or re-use if applicable).

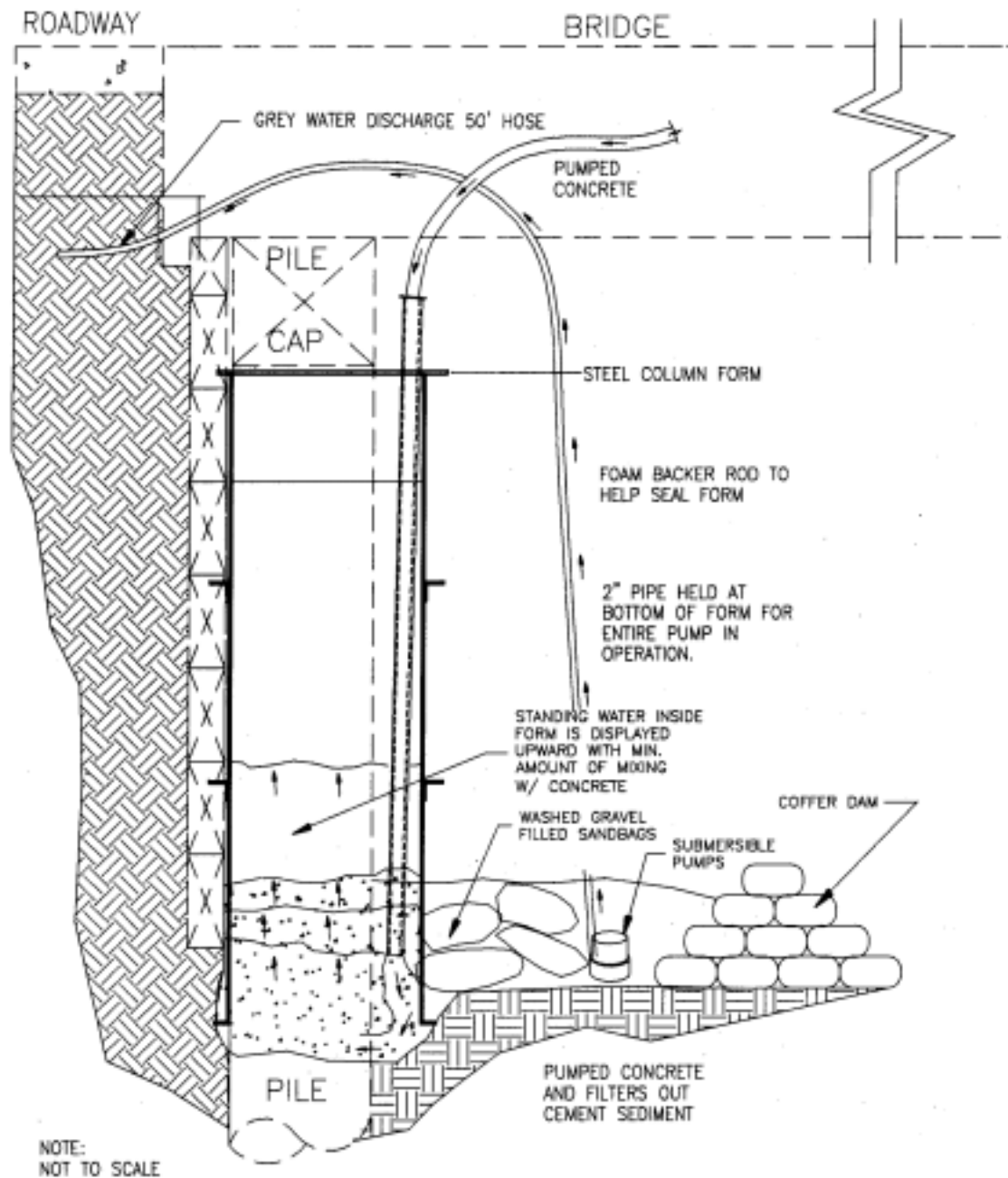


FIGURE : CONCRETE CONTAINMENT FOR BRIDGE ABUTMENT SCOUR REPAIR WORK

BMP **CONCRETE CONTAINMENT (2)**



DESCRIPTION

Concrete containment is a method of containing uncured concrete pumped or poured into forms while constructing and/or repairing structures, such as sidewalks, curbs, gutters, manholes and catch basins.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Containing uncured concrete and chemicals from leaving the work site.
- Containing water from exposed aggregate work areas.
- Containing water from equipment cleanup.

APPLICATIONS

This BMP may be used when performing flatwork, curb and gutter or utility concrete repair work. It may be used in combination with other BMPs.

LIMITATIONS

- Limitations are site specific.

CONSTRUCTION GUIDELINES

- When used in watercourses or streams, this BMP must be used in accordance with permit requirements.
- Locate work area.
- Isolate work area.
- Install drain protection downslope, for example, filter fabric, drainage plug and/or use a Vactor truck.
- Cover catch basins adjacent to work area with filter fabric.
- For tool and/or equipment cleanup onsite, a temporary sump may be used to contain water from cleanup.
- Remove material from sump after cleanup is complete.



BMP MAINTENANCE

- Contain and remove any excess materials, such as chemicals and/or concrete.
- Make sure onsite cleanup sump is of adequate size and overflow does not occur.
- Remove sediment buildup as required.

BMP REMOVAL

- Remove waste material.
- Re-vegetate and/or restore area disturbed by BMP.

BMP

CONSTRUCTION ACCESS ROAD



DESCRIPTION

A construction access road is a stabilized rock (or an alternative material) pad located at points of vehicular ingress and egress at a construction site. The construction access road may include a fabric underliner.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Allowing stability for vehicle access to construction sites.
- Limiting mud and debris deposited on roadways from adjacent construction sites.

APPLICATIONS

This BMP may be used at construction sites with unstable soils and/or steep slopes to gain traction, especially during wet weather. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- As the sole BMP.

CONSTRUCTION GUIDELINES

- Unsuitable material should be excavated prior to placement of fabric and rock.
- Place an optional "fabric underliner" the full width and length of the access road, as required by design.
- Compact road as appropriate.
- Drainage is designed to state and local design standards (see sediment ponds).

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Materials spilled, dropped or tracked from vehicles onto roadways should be removed.



BMP: CONSTRUCTION ACCESS ROAD (continued)

- Water trucks will not be used to remove dropped, spilled, or tracked materials, unless the water can be treated by other BMPs.

BMP REMOVAL

- Remove BMP if appropriate (recycle and/or re-use if applicable).
- Re-vegetate and/or restore area disturbed by BMP.

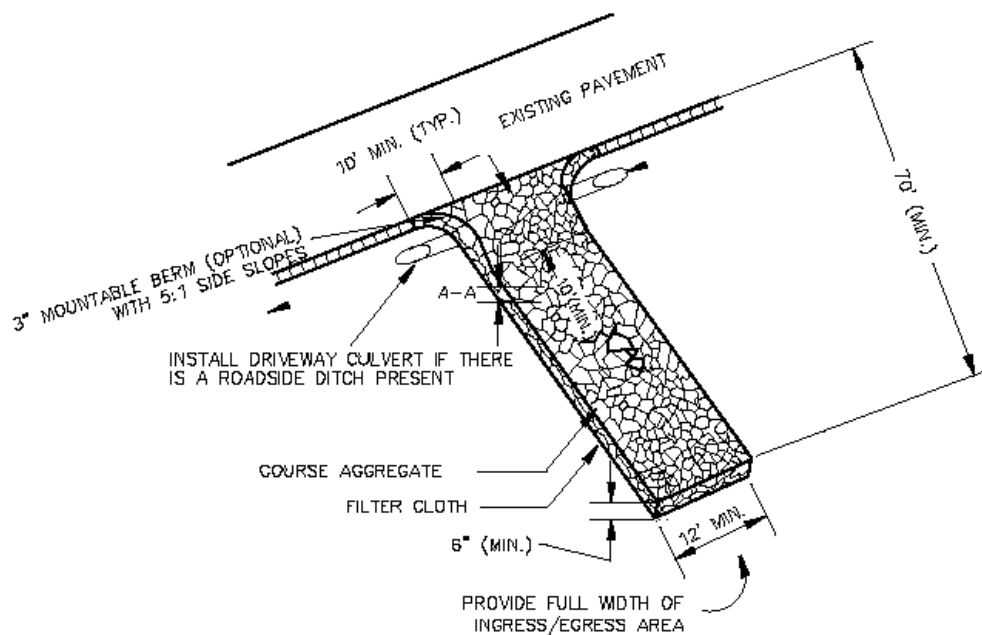


Access road installation

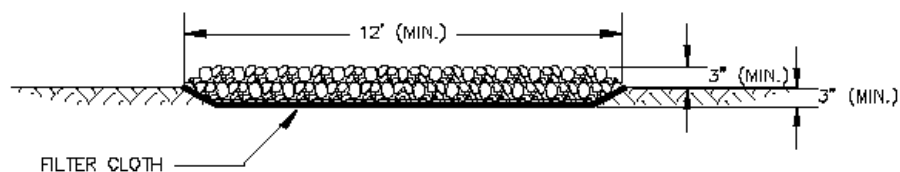


BMP: CONSTRUCTION ACCESS ROAD (continued)

ACCESS ROAD



SECTION A-A



Construction access road detail



BMP **CONTINUOUS BERM**

DESCRIPTION

A continuous berm is a temporary diversion dike or sediment barrier constructed with infill material, either soil, sand or gravel, encased within geosynthetic fabric. This BMP requires a Continuous Berm Machine (CBM) for filling and placing. A continuous berm can be used to provide filter/perimeter protection, settling, and reduction in water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Diverting sheet flow.
- Intercepting sheet flow.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to allow settling of soil particles.
- Decreasing down slope sheet flow velocity.
- Retaining soil particles/debris on site.

APPLICATIONS

This BMP may be used for perimeter sediment control. It may be used in combination with other BMPs.

This BMP may be used below disturbed areas subject to sheet and rill erosion where drainage area is no greater than .25 acre per 100 lineal feet of barrier and the slope behind the barrier should be no steeper than 2 horizontal feet to 1 vertical foot. On relatively flat slopes the maximum disturbed slope distance should not exceed 100 feet. The allowable disturbed slope distance decreases as the slope gets steeper.

LIMITATIONS

This BMP should not be used:

- Directly in water courses.
- In front of storm outlets.



CONSTRUCTION GUIDELINES

- Use a Continuous Berm Machine (follow operating manual).
- Apply to relatively smooth surfaces to form a tight seal with ground.
- A source of infill material is required (sand, gravel, or local soils).
- Increase the elevation at the ends of the BMP installation to prevent "end runs."

BMP MAINTENANCE

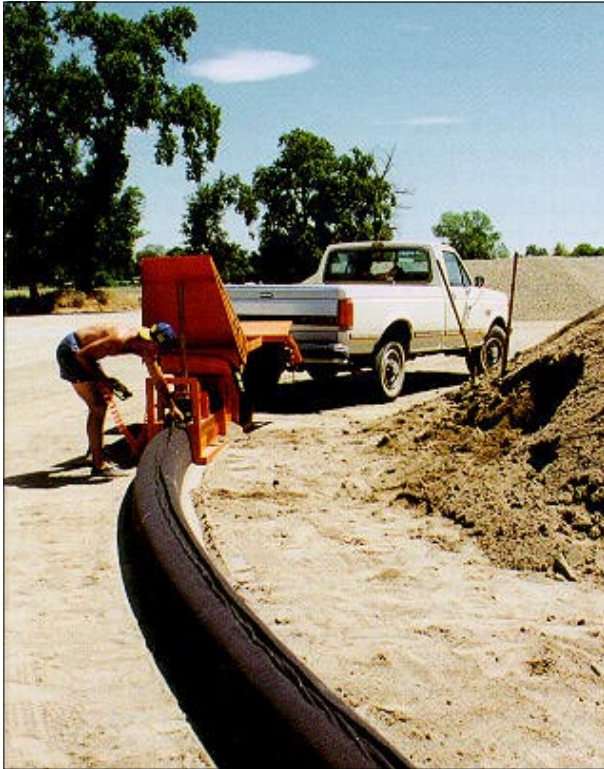
- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Repair any damaged BMPs due to end runs or undercutting.
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use is applicable).
 - Removal consists of slitting and removing the fabric.
 - Remove the infill material from the site or grade infill material into the existing shoulder or soil.
- Depending upon BMP placement, re-vegetation of site may be necessary.



BMP: CONTINUOUS BERM (continued)



Continuous berm



Continuous berm machine



*Continuous berm retaining
soil particles and debris*



*Continuous berm intercepting
water from construction area*

BMP

CURB INLET SEDIMENT TRAP



DESCRIPTION

A curb inlet sediment trap is a temporary barrier constructed from concrete blocks, gravel, filter fabric or gravel bag filter. Geotextile grade covers and geotextile collectors (inserts) are available pre-manufactured. Curb inlet sediment traps can be used to provide filtering and settling of soil particles.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing the soil particles discharged into storm drains by settling and/or filtering the runoff.
- Allowing for overflow from high runoff events.
- Allowing the ponded water to filter rapidly through gravel.

APPLICATIONS

These BMPs are used at curb inlets on gently sloping streets where water can pond and allow particles to filter or settle.

LIMITATIONS

This BMP should not be used:

- Where the ponding area will encroach into the travel lanes or pedestrian walkways.
- Steep grades.

CONSTRUCTION GUIDELINES

- A spillway structure shall be constructed with the sandbags to allow overflow.
- Place sandbags in a curved row from the top of curb at least 3 feet into the street; curve the ends upward.
- Overlap several layers of bags and pack tightly.
- Leave a one-sandbag gap at the upstream end in the top row to act as a spillway.
- Slope runoff should flow over blocks and gravel and not be bypassed over the curb.



- Install pre-manufactured grade covers and geo-textile collectors in accordance with manufacturer specifications.
- Install grade covers, geo-textile collectors, or filter fabric on top of or in front of the inlet. Construct a small dam immediately downstream of the inlet to stop flow.

BMP MAINTENANCE

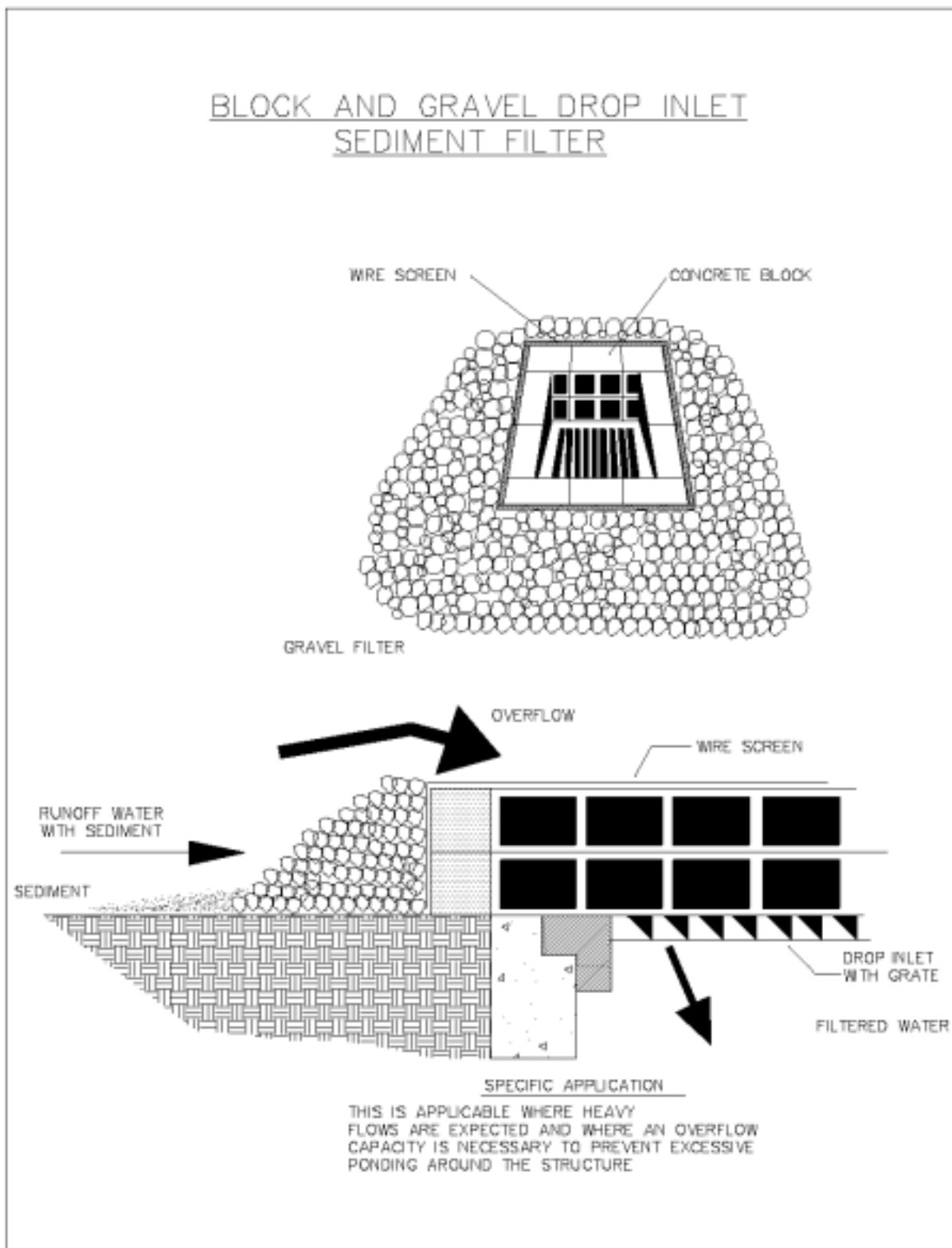
- Sediment shall be removed.
- If the gravel becomes clogged with sediment, it must be carefully removed from the inlet and either cleaned or replaced.
- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Use vacuum sweeper or hand broom to clean road surface.
- Use "Vactor-Truck" to clean drainage system.

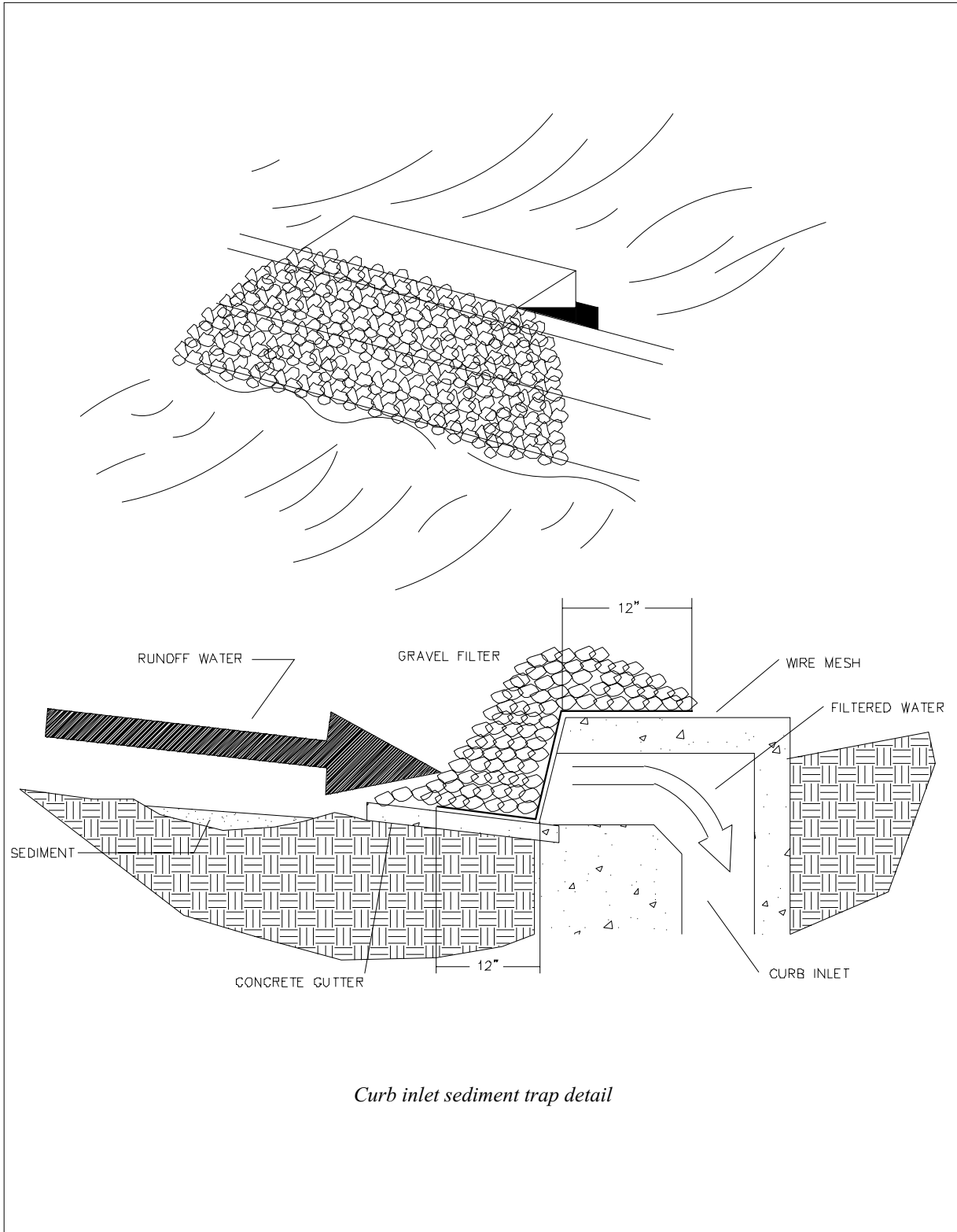


A silt sock installed in a catch basin to trap/filter waterborne soil particles





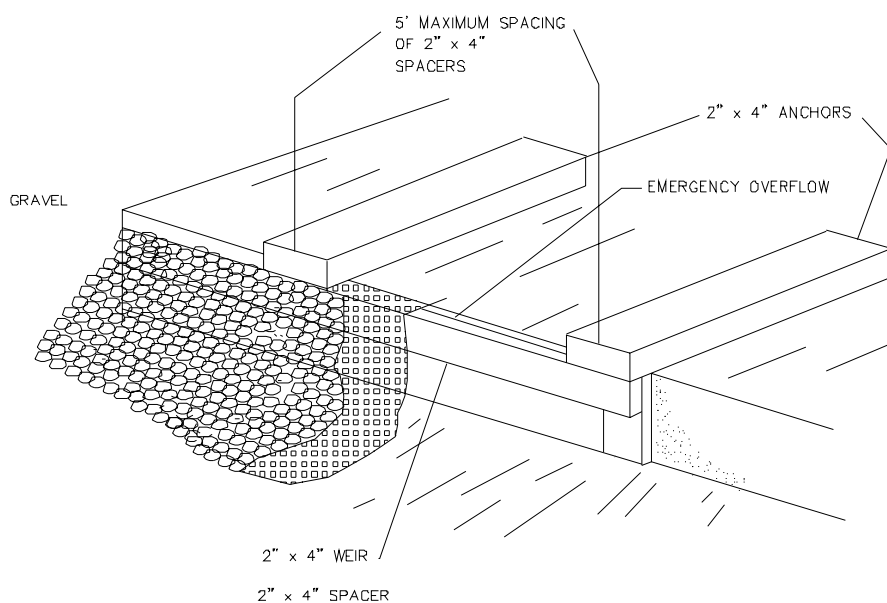
BMP: CURB INLET SEDIMENT TRAP (continued)



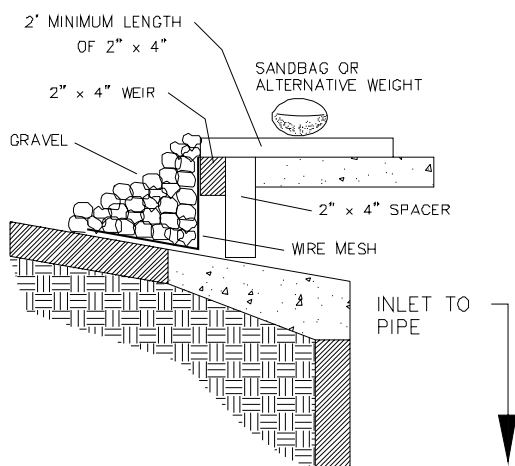


Curb inlet sediment trap detail

PERSPECTIVE VIEW



SIDE ELEVATION



SPECIFIC APPLICATION

THIS IS APPLICABLE TO CURB INLETS WHERE A STURDY, COMPACT INSTALLATION IS DESIRED. EMERGENCY OVERFLOW CAPABILITIES ARE MINIMAL. EXPECT SIGNIFICANT PONDING WITH THIS MEASURE.



BMP DEWATERING

DESCRIPTION

Dewatering can be used to keep water from a work area by using any or all of the following: pump, barrier, vactor, or bypass culvert.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Allowing work to be performed in dewatered conditions.
- Reducing the transport of soil particles by flowing water.
- Reducing the liquefaction of soils.

APPLICATIONS

This BMP may be used in, but not limited to, ditches, watercourses or streams, channels, swales and excavations. It will generally be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- Where flows are greater than pump capacity.

CONSTRUCTION GUIDELINES

- Determine if the project will require continuous dewatering.
- Schedule pumping, monitoring, equipment and maintenance activities accordingly.
- Dewatering must be used in accordance with applicable design and/or permit conditions.
- Refer to Appendix E for Fish Exclusion Protocols.
- Install a "Keep Water from Work Area" BMP.
- Install dewatering devices.
- Install site specific barrier, prior to dewatering, to prevent exterior water from entering construction area.
- Ensure water discharged from the site reduces erosion.



- Dewatered water will be discharged to:
 - A containment device.
 - A sanitary sewage system.
 - Other BMPs to reduce water borne soil particles prior to the water being reintroduced to a storm drainage system, water course or stream.

BMP MAINTENANCE

- Schedule pumping, monitoring, equipment and maintenance activities in accordance with dewatering needs.
- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs as needed.
- Inspect bypass, pump, and barrier periodically. Make necessary repairs.
- Check for erosion at discharge. Repair or move as necessary.
- Have adequate fuel supply and backup pumps in the event of mechanical failure.

BMP REMOVAL

- Remove BMP (recycle and/or re-use if applicable).
- Reintroduce water gradually.
- Re-vegetate area disturbed by BMP removal (if applicable).



BMP **DIAPER NETTING**

DESCRIPTION

Diaper/netting is a fine mesh netting or canvas suspended under a bridge, pipeline or pier to catch debris during construction or maintenance activities.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Catching and containing falling debris (such as: concrete, wood chips, sawdust, slag and metal) from entering water during construction, maintenance and repair activities.

APPLICATIONS

This BMP is used in bridge, pipeline or pier construction and repairs. It may also be used in maintenance activities such as cleaning and painting. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- During periods of high winds that reduce the effectiveness of the BMP.

CONSTRUCTION GUIDELINES

- Multiple nets with different mesh sizes may be required, depending upon the work tasks performed. Mesh size gets progressively smaller from top to bottom.
- Attach diaper/netting securely prior to starting work.
- Remove diaper/netting carefully after work, not allowing debris to fall.
- Maintain separation between diaper/netting and water surface.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Crew must provide progressive clean up of debris during the day.



BMP REMOVAL

- Evaluate site to determine BMP is no longer needed.
- Remove debris on BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Inspect after job is complete to make sure diaper/netting is in good repair for next project.



Diaper netting under bridge



Netting with suspended framework



BMP DITCH LINING

DESCRIPTION

Ditch lining provides a long/short-term erosion resistant lining of the ditch flow line and side slopes utilizing biodegradable or non-biodegradable geo-textile fabrics and/or angular rock to stabilize ditches and channels from erosion and soil particle movement.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Protecting the soil from erosive forces of concentrated runoff.
- Slowing the velocity of concentrated runoff while enhancing the potential for infiltration and vegetation growth.
- Stabilizing slopes adjacent to ditches which have seepage problems and/or non-cohesive soils.

APPLICATIONS

This BMP may be used in ditches, channels, swales and banks or slopes. It may be used in conjunction with other BMPs.

LIMITATIONS

This BMP should not be used directly in water courses unless required by permit.

CONSTRUCTION GUIDELINES

- When used in watercourses or streams, this BMP must be used in accordance with permit requirements.
- Plan for site specific uses.
- Use design specifications when available.
- Channels should be constructed with a wide and shallow cross section.

BMP MAINTENANCE

- During the initial establishment, inspection should occur and any necessary repair made.



- Grass seed should be applied in accordance with manufacturer specifications.
- After implementation, the channel should be inspected periodically to determine if channel is withstanding flow velocities without damage.
- Check the channel for debris, scour, or erosion and make necessary repairs.
- Remove all significant sediment accumulations to maintain the desired flow line and capacity during maintenance activity.
- Check channel slopes, outlets and all road crossings for bank stability and evidence of erosion, during maintenance activity, and make repairs as necessary.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove BMP (recycle and/or re-use if applicable).
- BMP removal is not always necessary.



BMP

DIVERSION BERM

DESCRIPTION

A diversion berm is a temporary ridge of compacted soil constructed at the top or base of a disturbed slope.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Diverting storm runoff from upslope drainage areas away from unprotected disturbed areas and toward a stabilized outlet.
- Diverting sediment-laden runoff from a disturbed area to a sediment-containment facility such as a sediment trap or a sediment basin.

APPLICATIONS

This BMP may be used wherever stormwater runoff must be temporarily diverted away from a disturbed slope and toward a sediment containment facility. These structures generally have a life expectancy of 18 months or less. This BMP may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- If water flow is likely to erode the berm.
- If there is inadequate space for construction.

CONSTRUCTION GUIDELINES

- Berms should be installed as a first step in the land-disturbing activity.
- The berm should be adequately compacted to reduce failure.
- Minimum freeboard can be 0.3 feet.
- Temporary seeding and mulch can be applied to the berm following construction of the berm.
- Clear plastic may be used as an additional erosion control method. See "Plastic Covering" BMP construction guidelines.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek.

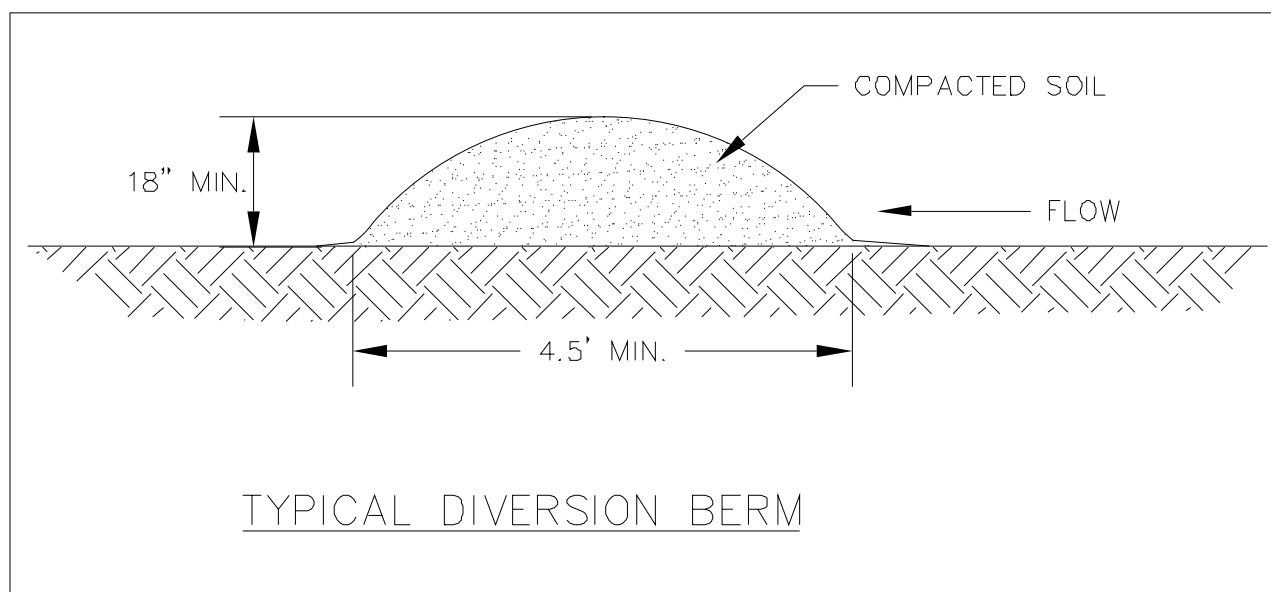


Schedule additional inspections during storm events. Make any required repairs.

- During long term implementation inspect once every two weeks, whether a storm has occurred or not.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



Diversion berm detail



BMP **DIVERSION CHANNEL**

DESCRIPTION

A diversion channel is constructed across a slope with a supporting earthen ridge on the lower side.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing slope length.
- Intercepting and diverting stormwater runoff to stabilized outlets at non-erosive velocities.
- Intercepting sheet flow.
- Decreasing down slope sheet flow velocity.

APPLICATIONS

This BMP may be used where runoff from areas of higher elevation may damage property, cause erosion, or interfere with the establishment of vegetation on downslope areas. It may also be used where surface and/or shallow subsurface flow is damaging a slope and where the slope length needs to be reduced to minimize soil loss. This BMP may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- If the downslope is greater than 2 horizontal by 1 vertical.
- If water flow is likely to erode the channel.
- If there is inadequate space for construction.

CONSTRUCTION GUIDELINES

- The diversion channel shall be excavated or shaped to line, grade and cross-section as required:
 - Side slopes of the channel shall be no steeper than 2 horizontal by 1 vertical.
 - Minimum freeboard shall be 0.3 feet.
- Compact fill material as needed to prevent unequal settlement.



- Temporary seeding and mulch can be applied to the channel following construction of the channel.
- Clear plastic may be used as an additional erosion control method. See "Plastic Covering" BMP construction guidelines.

BMP MAINTENANCE

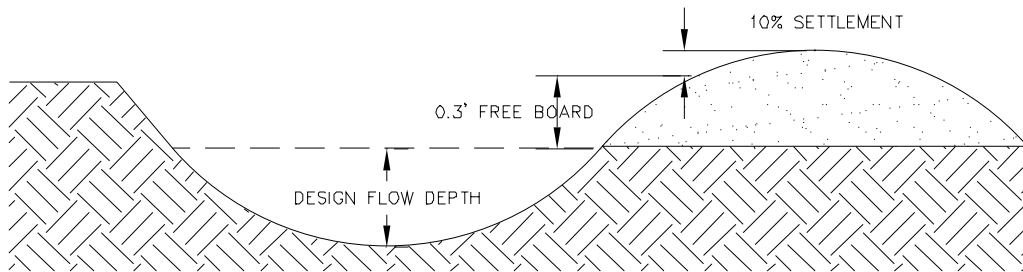
- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Seeded areas which fail to establish a vegetative cover shall be reseeded as necessary.
- During long term implementation inspect periodically, whether a storm has occurred or not.

BMP REMOVAL

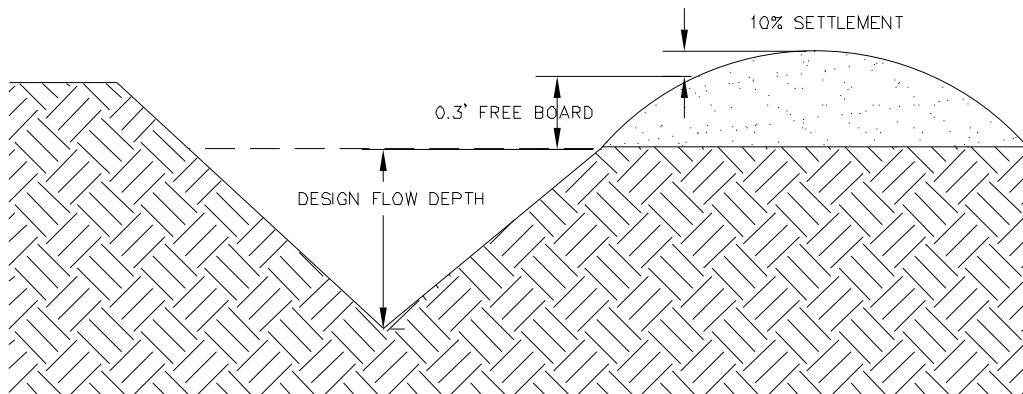
- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



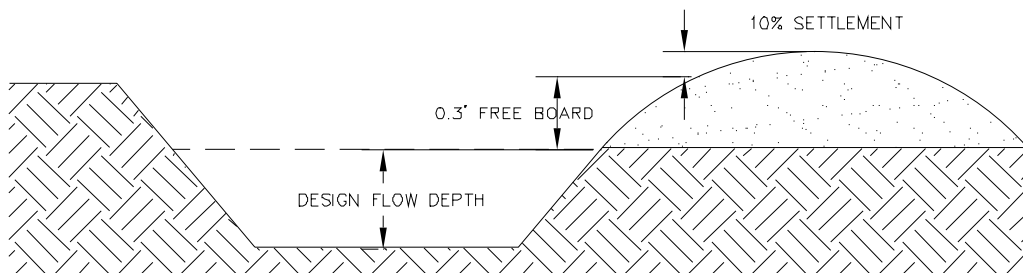
BMP: DIVERSION CHANNEL (continued)



TYPICAL PARABOLIC DIVERSION



TYPICAL V-SHAPED DIVERSION



TYPICAL TRAPEZOIDAL DIVERSION



DESCRIPTION

Dust control is the use of water, products, and/or measures for reducing wind erosion. Particles moved by wind may cause air pollution, soil loss and/or water quality degradation.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing soil particle travel by wind due to construction or maintenance operation activities.
- Reducing air and water pollution.

APPLICATIONS

This BMP may be used on construction sites, roads, shoulders, operating headquarters or pit/quarry sites. It may be used in combination with other BMPs. Protecting the soil surface is accomplished through measures such as roughening the soil to reduce the surface wind velocity, applying straw/mulch, water, matting, hydroseeding, plastic covering, Lignum derivative, or Magnesium Chloride.

LIMITATIONS

This BMP should not be used:

- With straw in locations where compaction is required (for example, roadway shoulders or road bases).
- If a chemical suppressant could enter watercourses or streams.

CONSTRUCTION GUIDELINES

- Water, Lignum derivative, or Magnesium Chloride can be applied by mechanical means.
- A temporary straw covering may be applied by hand to a small area of exposed soil where compaction is not required.
- Surface roughening may be accomplished by using a machine.
- Create a berm downslope to control possible runoff from watering.



BMP MAINTENANCE

- During the construction period, inspect BMPs daily during the workweek. Make any required repairs.
- Reapply BMP as needed.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of wind erosion has passed).
- Straw removal may be necessary if the area is to be re-vegetated.
- Re-vegetate area disturbed by BMP removal.



*Water wagon wetting down
field for dust control*



*Wetting down stockpiles to
reduce airborne soil particles*



DESCRIPTION

An excelsior filled log is a manufactured log filled with curled wood excelsior. When cut or folded to appropriate length, these logs can be used to provide filter/perimeter protection, settling, reduction in water velocity/erosive forces and habitat protection/maintenance.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing slope length to capture and retain sediment on the slope.
- Temporarily stabilizing slopes by reducing soil creep, sheet and rill erosion until permanent vegetation can be established.
- Trapping topsoil and retaining moisture from rainfall, which aids in growth of seedlings planted along the upslope side of the rolls.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to promote settling of soil particles.
- Filtering soil particles and debris.
- Reducing water velocity and erosive forces.

APPLICATIONS

This BMP may be used in ditches or across culvert ends of any dimension. Excelsior filled logs may also be used for habitat protection at the toe of a bank and can be incorporated with vegetative planting. It may be used instead of straw logs, coir logs, or straw bale filtering systems. Excelsior filled logs may also be used for perimeter sediment control.

This BMP may be used in gullies and stream channels as check dams in conjunction with gabions, rip rap, articulated block, or cellular confinement systems. It may be used to anchor and enhance the effectiveness of willow wattles (fascines), turf reinforcement mats, coir mats, continuous berms and other erosion control material. Excelsior filled logs may be used to replace silt fences or straw bales on steep slopes. It may be used in combination with other BMPs.



LIMITATIONS

This BMP should not be used:

- Where flow volume or velocity inhibit BMP function.
- For long term applications.
- When maintenance activities conducted in locations could reduce actual or potential high flow salmonid refuge functions, this BMP will be used if required by permit conditions.

CONSTRUCTION GUIDELINES

- Excelsior filled log must be placed in accordance with applicable design and/or permit conditions.
- Logs are placed and staked along the contour of newly constructed or disturbed slopes, in 2-3 inch deep trench.
- Spacing depends on soil type and slope steepness.
- Tightly abut any adjacent logs.
- Install to prevent water from going around or under BMP.
- See "Live Staking", "Handseeding" and/or "Hydroseeding" BMP for planting.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Depending upon BMP placement, re-vegetation of site may be necessary.
- BMP removal may not be necessary.



DESCRIPTION

Filter fabric is a permeable material made with synthetic fibers. It may be a woven or non-woven fabric and is usually packaged in roll form. This fabric can be used to reduce potential for soil becoming water borne, filter/perimeter protection and/or settling.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Filtering soil particles from water.
- Stabilizing and reinforcing soils.

APPLICATIONS

This BMP may be used in drainage filtration, to reinforce paved and unpaved roads, stabilize access or haul roads and to separate soils.

LIMITATIONS

This BMP should not be used:

- In the streambed of a channel.
- When short term biodegradability is required.

CONSTRUCTION GUIDELINES

- When used near watercourses or streams, this BMP must be used in accordance with permit requirements.
- Some applications may be designed or reviewed by an engineer.
 - Woven filter fabric should only be used for soil separation, road reinforcement and soil separation.
 - Non-woven filter fabric should only be used for drainage filtration although it may be used under unpaved roads in certain circumstances.
 - Use according to manufacturers details.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek.



Schedule additional inspections during storm events. Make any required repairs.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- If used as a filter, remove sediment buildup from in front of the BMP.
- Re-vegetate area disturbed by BMP removal (if applicable).
- BMP removal may not be necessary when it is part of the final structure.

BMP **GRASS LINED CHANNEL**



DESCRIPTION

A grass lined channel is the vegetative lining of a ditch, watercourse, stream, or swale to protect it from erosion and to provide filter/perimeter protection.

PURPOSE

The purpose of this BMP includes, but is not limited:

- Reducing erosion by providing ground cover, binding soil particles with roots, and lowering water velocity.
- Providing filter/perimeter protection.
- Providing habitat for primary production.
- Providing habitat for prey base organisms such as macro-invertebrates.

APPLICATIONS

This BMP may be used where a vegetative lining can provide sufficient stability for the channel grade by decreasing velocity; where site conditions require establishment of vegetation (climate, soil and topography are present). This BMP may be used in combination with other bank stabilizing methods.

LIMITATIONS

This BMP should not be used:

- When maintenance activities are conducted in locations which could reduce actual or potential high flow salmonid refuge functions.
- In locations where there is frequent turbulence with flows likely to rip out grass lining, creating erosion and downstream plugging of system.

CONSTRUCTION GUIDELINES

- This BMP must be used in accordance with applicable permit requirements.



BMP MAINTENANCE

- During initial vegetation establishment, inspection should occur and any necessary repairs made.
- After vegetation establishment, the channel should be inspected periodically to determine if the channel is withstanding flow velocities without damage.
- Check the channel for debris, scour, or erosion and make repairs.
- Remove all significant sediment accumulations to maintain the designed carrying capacity. Debris such as litter, car parts, appliances and items that pose a risk to public safety should be removed. Any LWM that falls into the channel and does not pose a threat to public safety or structure damage should be left in place or relocated to an area that is not a public safety hazard or ROW structure problem.

- Check channel outlet and all road crossings for bank stability, evidence of piping or scour holes and make repairs.

BMP REMOVAL

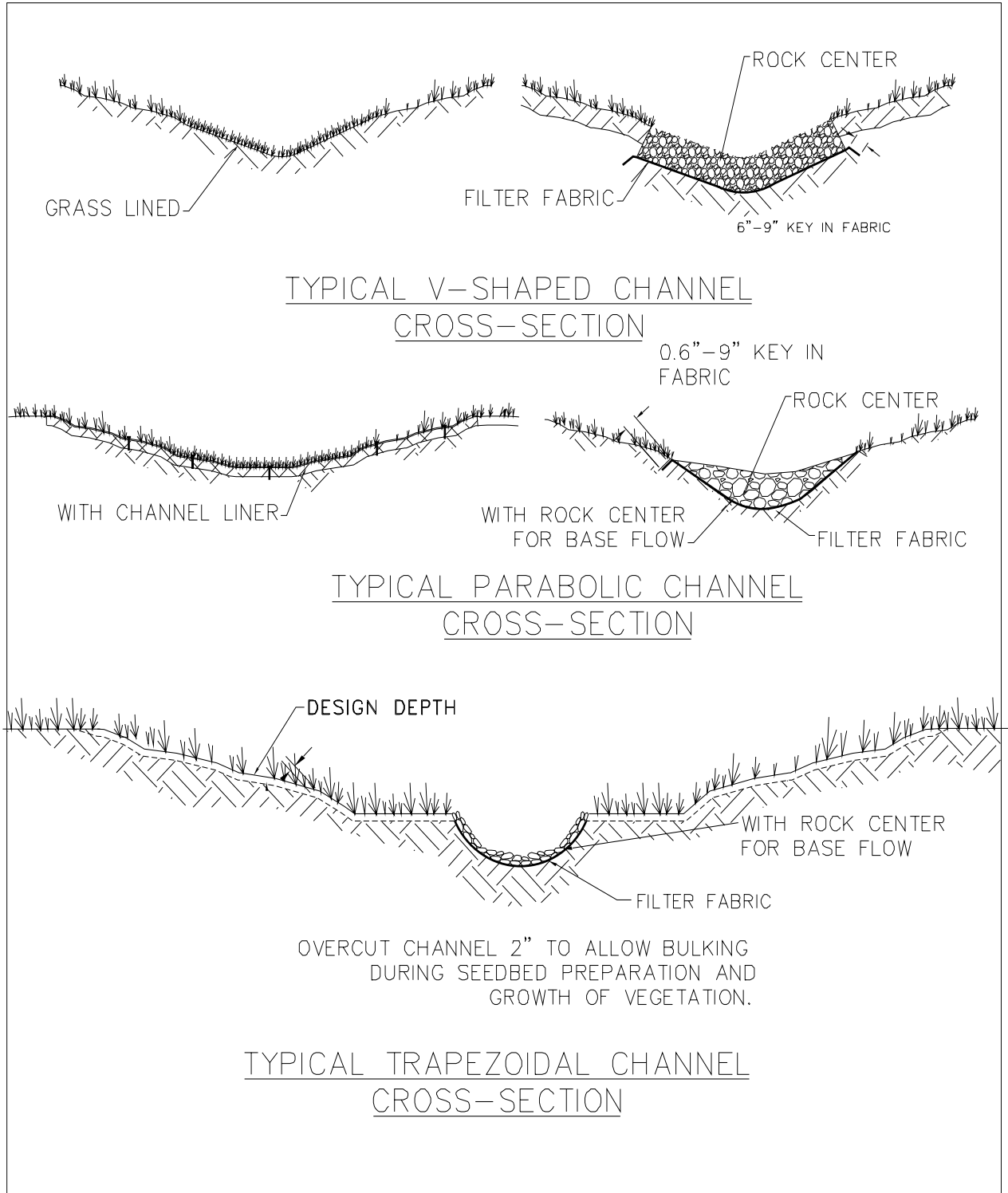
- BMP removal is not necessary.



Grass lined channel: reducing erosion by providing ground cover

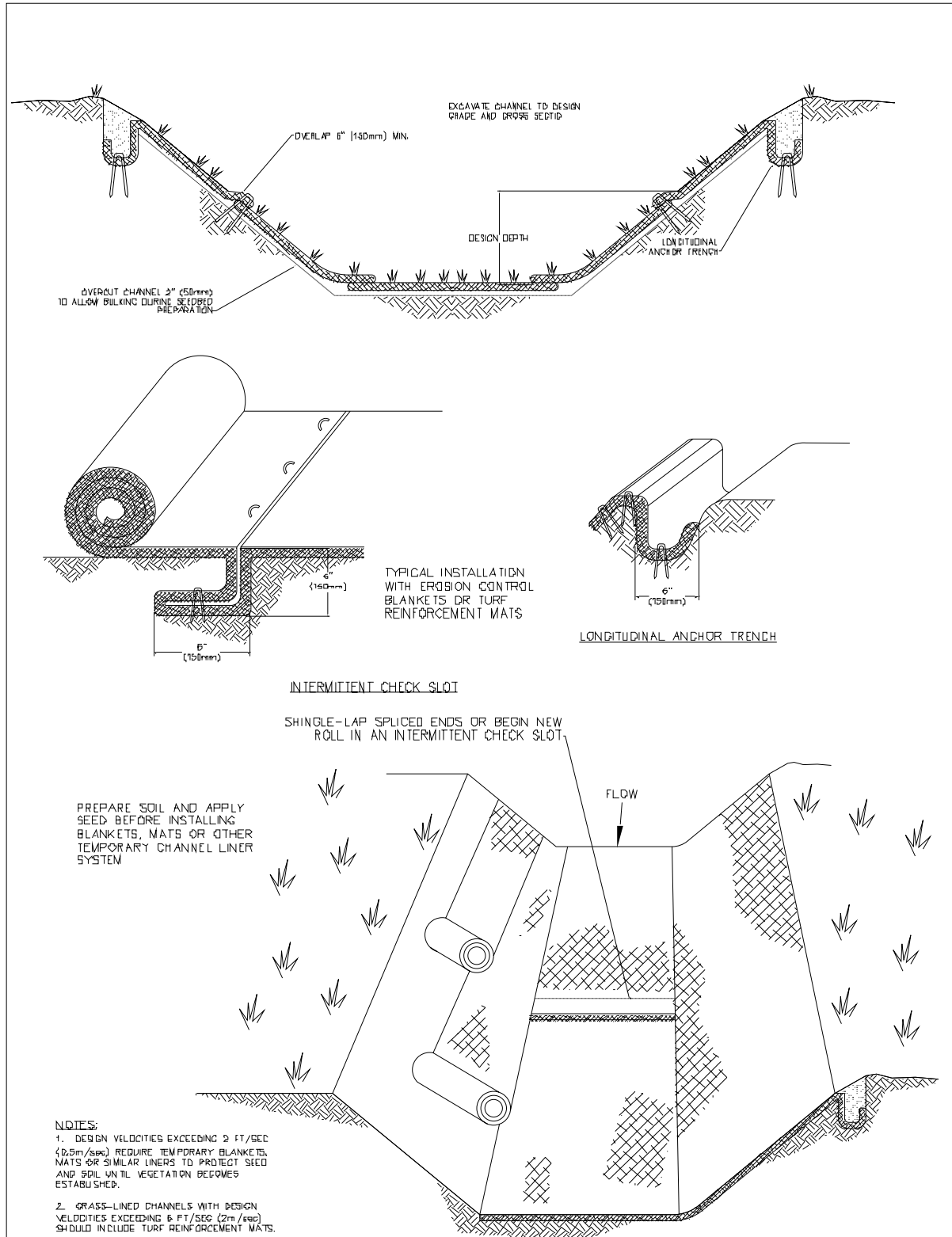


Grass lined channel: providing a filter





BMP: GRASS LINED CHANNEL (continued)



BMP

GRAVEL FILLED SUMP



DESCRIPTION

A gravel filled sump is a constructed sump filled with gravel and a standing perforated pipe or bucket that allows pumping filtered water out of a non-erosive location.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Dewatering construction sites.
- Filtering sediment from water.

APPLICATIONS

This BMP is used in conjunction with flow bypass.

LIMITATIONS

This BMP should not be used:

- When peak flows exceed the pump capacity.

CONSTRUCTION GUIDELINES

- Excavate hole at least 3 feet deep.
- Line the base and sides of the hole with filter fabric.
- Place perforated pipe inside the hole.
- Shore up pipe by adding washed rock to space between hole and pipe exterior.
- Have adequate fuel supply and backup pumps in the event of mechanical failure.

BMP MAINTENANCE

- Inspect bypass, pump, and sump periodically. Repair any leaks immediately.
- Check for scour at bypass outfall. Repair or move as necessary.
- Provide downstream sediment filtration.

BMP REMOVAL

- Remove BMP when in water work is complete.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



BMP HALF ROUND FILTER

DESCRIPTION

The half round filter BMP is one-half section of perforated pipe cut lengthwise (with optional filter fabric lining) and filled with washed rock.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Filtering sediment from water.
- Reducing water velocity.

APPLICATIONS

This BMP may be used at construction sites to filter sediment-laden water pumped from construction area. This BMP may be used with other sediment control BMPs.

LIMITATIONS

This BMP should not be used:

- In fast flowing water.
- To filter water with a high percentage of fines.
- As the sole BMP.

CONSTRUCTION GUIDELINES

- Make sure pump head (if used) is secured within washed rock.
- Make sure length of pipe and amount of rock is sufficient for site.
- Have additional washed rock available on site.
- Have adequate fuel supply and backup pumps in the event of mechanical failure.

BMP MAINTENANCE

- Evaluate half round filter and pump (if used) periodically to ensure BMP is functioning properly.
- Check for scour at outfall.
- Check outlet to make sure water is running clear. If not, add washed rock.



BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



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DESCRIPTION

Hand seeding is broadcasting grass seed on disturbed areas by hand or a hand seeding device. This BMP is used to reduce potential for soil becoming water or air borne, to reduce water velocity/erosive forces after vegetation establishment and to aid in habitat protection/maintenance.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Establishing vegetation in sparse, bare and/or exposed soil areas.
- Decreasing soil erosion.

APPLICATIONS

This BMP may be used after soil disturbance is completed at construction sites. This BMP may be used in areas that need to be permanently or temporarily vegetated. It may be used in conjunction with other BMPs.

LIMITATIONS

This BMP should not be used:

- In months when seed germination will not occur. (In winter months, see "Mulching" and/or "Plastic Covering" BMPs).

CONSTRUCTION GUIDELINES

- Seed mixes vary. Seed selection should be based on the intended use of the area it is applied to, for example, low growing grass versus ditch bank grass.
- Spread seed uniformly and according to manufacturer's recommendations.
- Cover with other methods as needed to protect surface (for example, light application of mulch, jute matting).

BMP MAINTENANCE

- Inspect during seed establishment period. Re-seed, due to mortality, as necessary.
- Schedule additional inspections during storm events and/or heavy



BMP: HAND SEEDING (continued)

rainfall. Check for scour and sloughing; any required repairs shall be made.

BMP REMOVAL

- BMP removal is not necessary.



DESCRIPTION

Hydroseeding is broadcasting grass seed, tackifier, wood fiber mulch and water on disturbed areas by using a hydroseeding machine. This BMP is used to reduce potential for soil becoming water or air borne, to reduce water velocity/erosive forces after vegetation establishment and to aid in habitat protection/maintenance.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Establishing vegetation in sparse, bare and/or exposed soil areas over a large site.
- Decreasing soil erosion.

APPLICATIONS

This BMP may be used after soil disturbance is completed at construction sites. This BMP may be used in areas that need to be permanently or temporarily vegetated. It may be used in conjunction with other BMPs.

LIMITATIONS

This BMP should not be used:

- In months when seed germination will not occur. (In winter months, see "Mulching" and/or "Plastic Covering" BMPs).
- During strong winds or freezing weather.

CONSTRUCTION GUIDELINES

- Seed mixes vary. Seed selection should be based on the intended use of the area it is applied to. For example low growing grass versus ditch bank grass.
- Spread seed uniformly and according to manufacturer's recommendations.
- Cover hydroseeded area with other methods as needed.
- Hydroseeding should be applied after finish grading and/or surface roughening. Application may depend on slope, soil, exposure and time of year.
- Tackifier and/or moisture retention agent may need to be added, per state



standard.

BMP MAINTENANCE

- Inspect during seed establishment period. Re-seed, due to mortality, as necessary.
- Schedule additional inspections during storm events and/or heavy rainfall. Check for scour and sloughing; any required repairs shall be made.

BMP REMOVAL

- BMP removal is not necessary.



Erosion protection and vegetation establishment after maintenance work



DESCRIPTION

Inlet protection is a sediment filter located at the inlet to a storm drainage conveyance. It may be an external structure such as a filter fence box or a gravel berm. Inlet protection may also be an internal device such as a silt sock or a silt trap.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing soil particles from entering storm drainage systems.

APPLICATIONS

This BMP may be used in ditches at the inlet to enclosed drainage systems. They may also be used in manholes or catch basins. This BMP may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- Where there are traffic conflicts.
- In areas where it creates excessive ponding.
- To remove excessive fines.

CONSTRUCTION GUIDELINES

- Refer to sketches on following pages for details and specific construction guidelines.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Sediment should be removed when deposits reach one-half the height of the BMP.



BMP REMOVAL

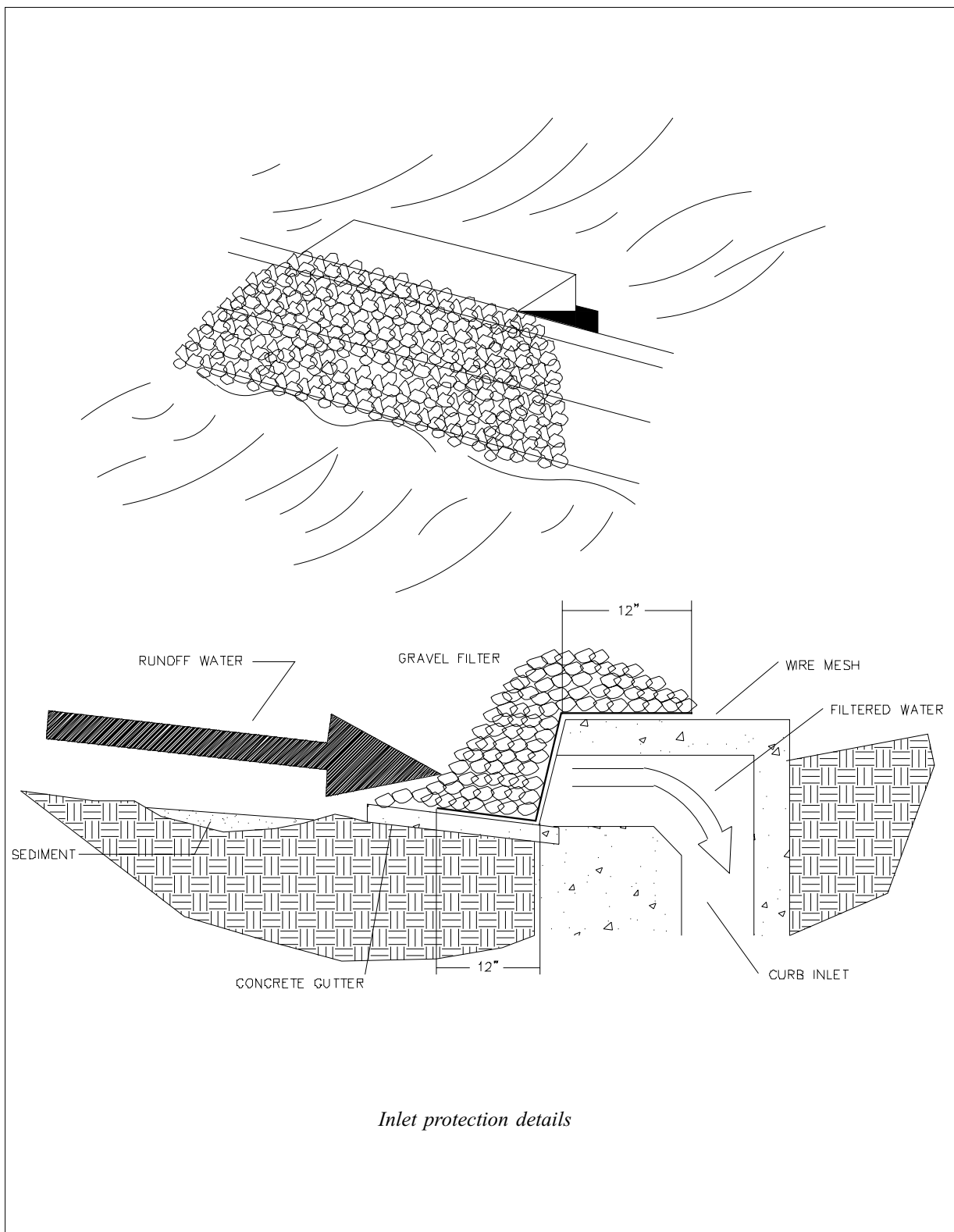
- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



Inlet protection: filter fence surrounding catch basin to reduce soil particles from entering drainage system



BMP: INLET PROTECTION (continued)

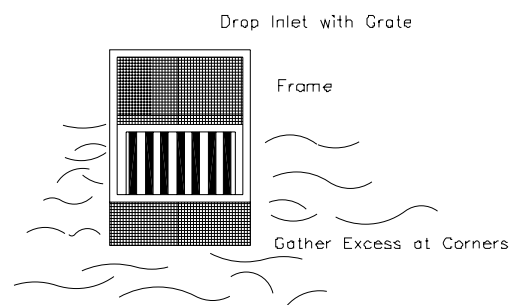
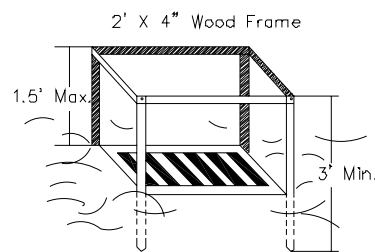




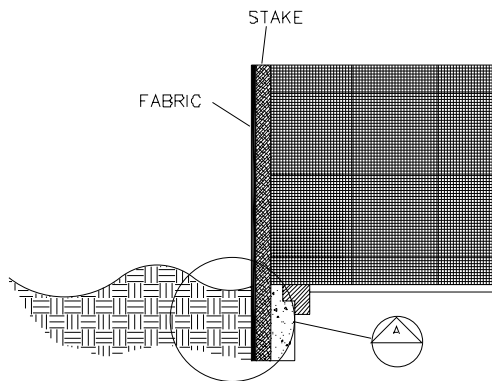
BMP: INLET PROTECTION (continued)

SILT FENCE DROP INLET PROTECTION

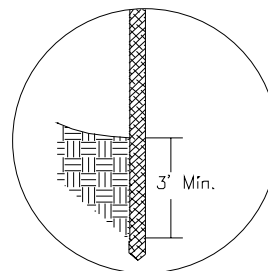
PERSPECTIVE VIEWS



ELEVATION OF STAKE AND FABRIC ORIENTATION

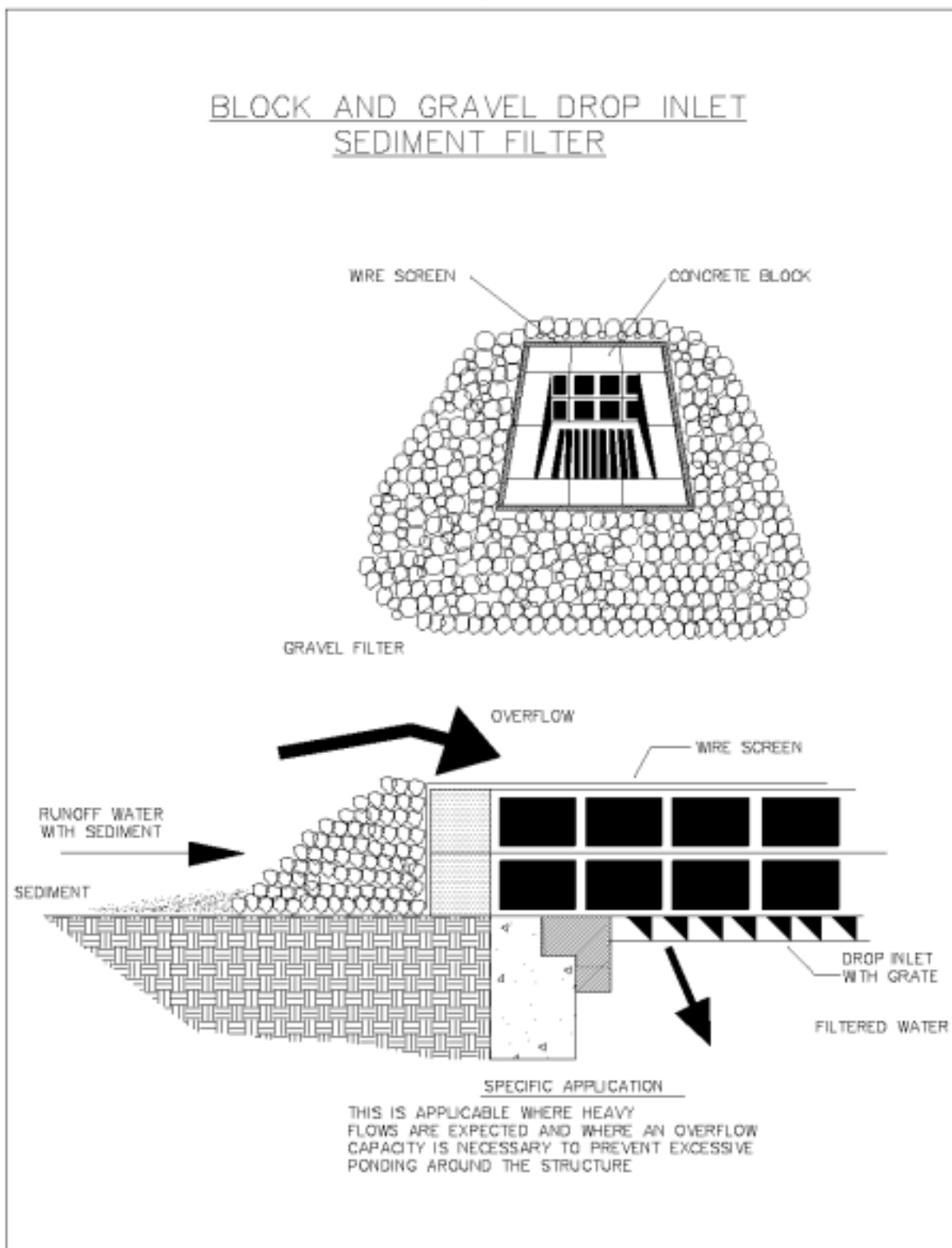


DETAIL A



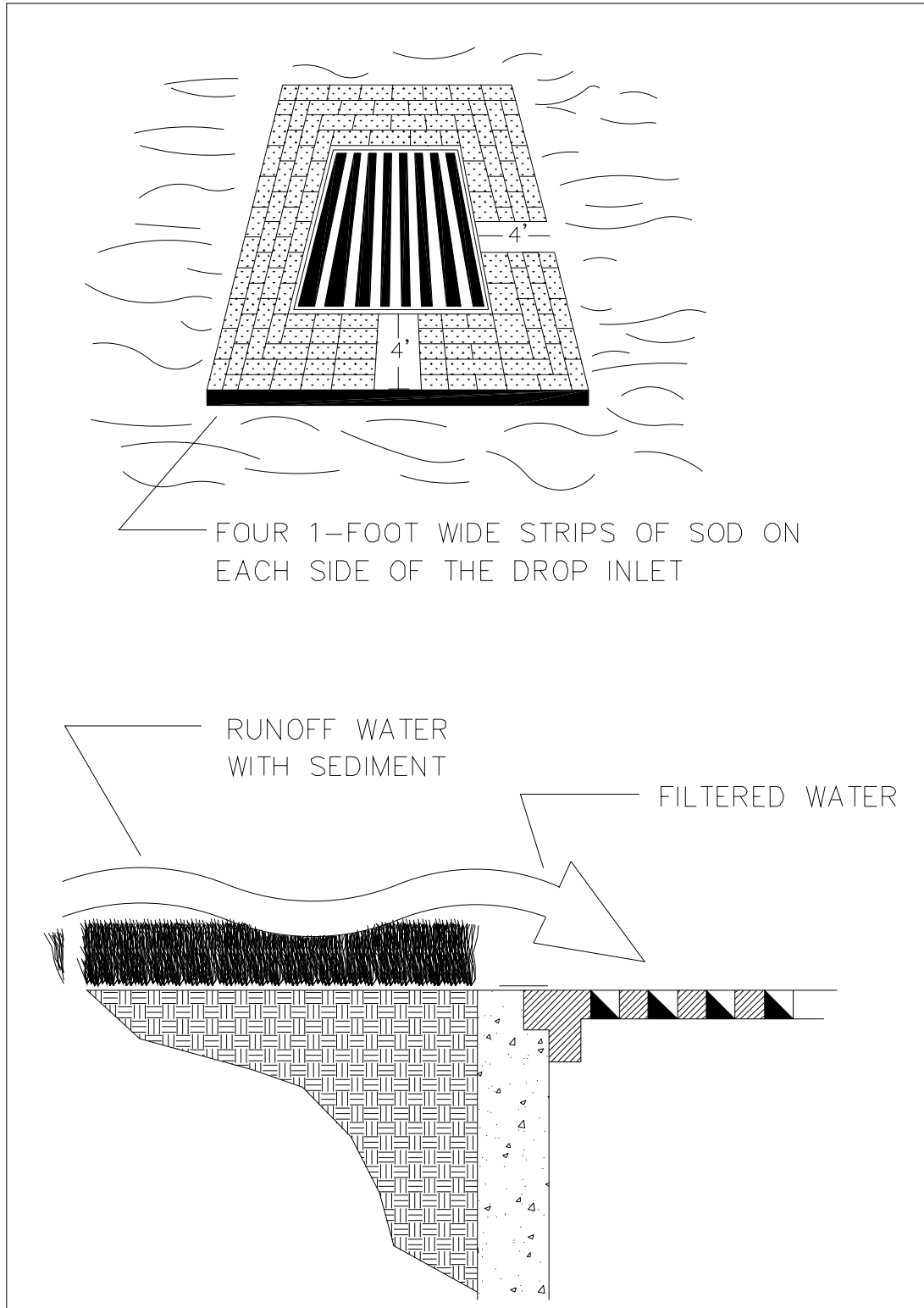
SPECIFIC APPLICATION

THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAIN IS A RELATIVELY FLAT AREA (SLOPE CANNOT EXCEED 5%). WHERE INLET SHEET OR OVERLAND FLOWS ARE TYPICAL AND CANNOT EXCEEDING 1 CFS. THIS METHOD SHALL NOT BE USED WHERE THE INLETS ARE RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREETS OR HIGHWAY MEDIANS





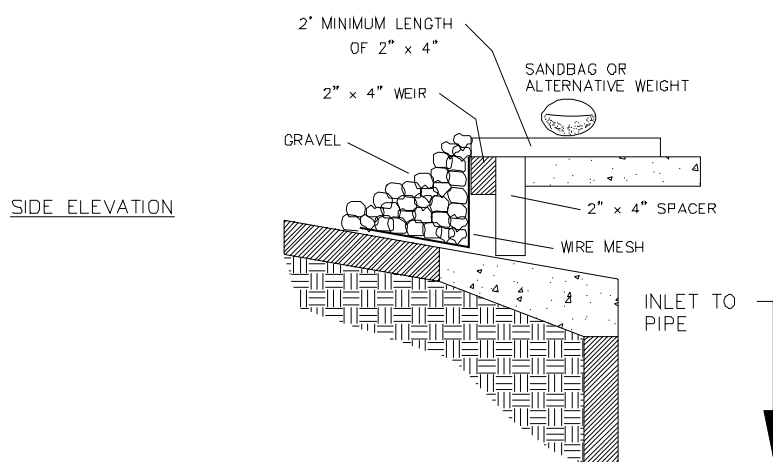
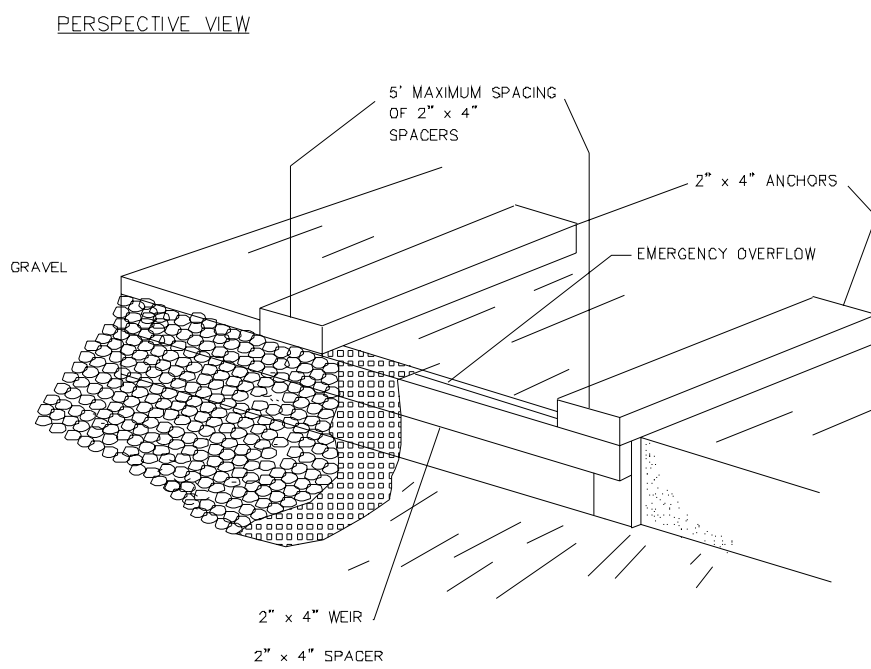
BMP: INLET PROTECTION (continued)



Inlet protection detail



BMP: INLET PROTECTION (continued)



SPECIFIC APPLICATION
THIS IS APPLICABLE TO CURB INLETS WHERE A STURDY, COMPACT INSTALLATION IS DESIRED. EMERGENCY OVERFLOW CAPABILITIES ARE MINIMAL. EXPECT SIGNIFICANT PONDING WITH THIS MEASURE.

Inlet protection detail



BMP

KIMBLE FILTER PIPE

DESCRIPTION

A Kimble filter is a perforated pipe (with an optional filter fabric wrap, depending on soil types) added to an existing inlet pipe, surrounded by washed rock.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Filtering sediment from water entering existing pipe at construction area.

APPLICATIONS

This BMP may be used in open drainage system maintenance and in conjunction with other BMPs.

LIMITATIONS

This BMP should not be used:

- When the inlet elevation for the perforated pipe extension exceeds the surrounding bank height.
- To remove excessive fines unless the optional filter fabric is used.

CONSTRUCTION GUIDELINES

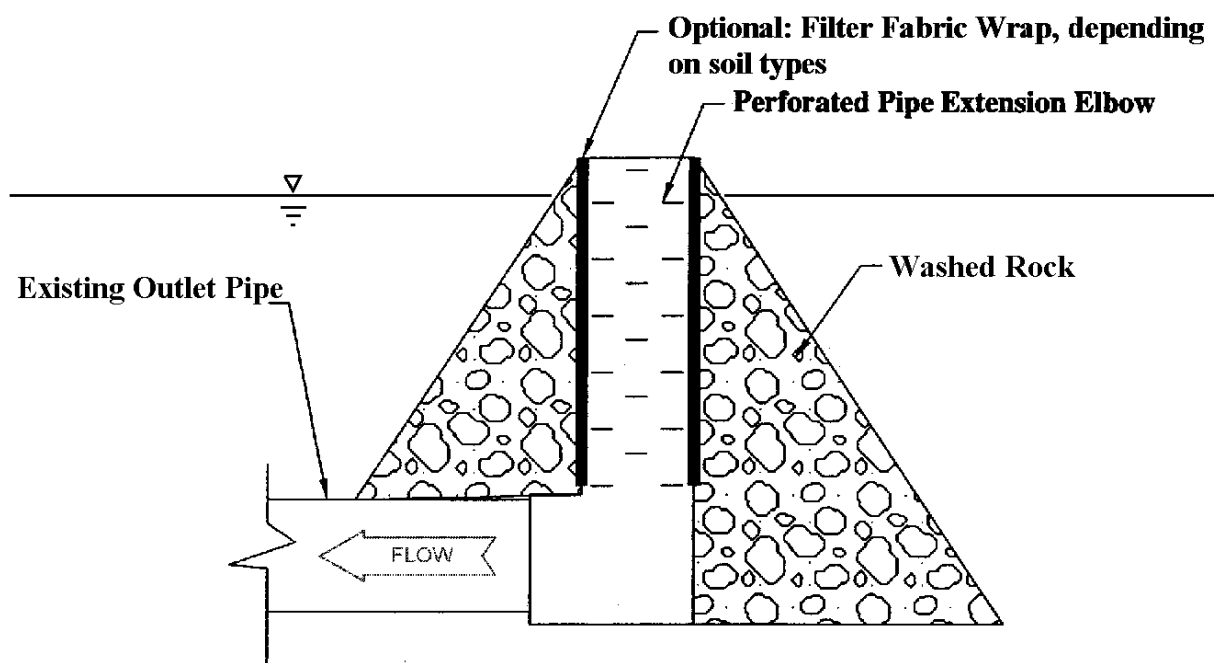
- Secure perforated pipe onto existing pipe and wrap in filter fabric as needed.
- Fill washed rock high enough to ensure filtration.

BMP MAINTENANCE

- Check outfall periodically. Revise methods if water is not running clear.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



Kimble filter detail



BMP

LARGE WOODY MATERIAL

DESCRIPTION

Large Woody Material (LWM) is any large piece of woody material (including the trunk and root mass) that intrudes or is imbedded in the stream channel. Woody materials affects local flow velocities, streambed and streambank stability, and local stream characteristics. For example: see DOE, WDFW, and/or King County Bank Stabilization Guidelines. LWM is used to reduce water velocity/erosive forces and to provide habitat for fish.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Improving aquatic habitat by re-directing flows away from eroding banks, providing cover, creating pools and storing sediment.
- Providing stream bed and bank stabilization.

APPLICATIONS

When incorporating woody material into projects, it is necessary to identify the desired engineering performance and the desired habitat benefits. Each project must be specifically tailored to meet the engineering objectives identified for the habitat requirements of the target species. It can be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- When the specific design requirements and desired habitat benefits have not been identified.
- Without consideration of the factors that influence the relative permanence of the wood in the stream channel.

CONSTRUCTION GUIDELINES

- These will vary based on existing site conditions, design features, size and shape of the wood, its exposure to the forces exerted by moving water, and its resistance to movement because of wedging, or embedding with adjacent materials.



BMP: LARGE WOODY MATERIAL (continued)

- Construct in accordance with design, specifications and permit conditions.

BMP MAINTENANCE

- Monitor the large woody material to ensure it remains "as built" during construction.
- Consult a biologist for specific repairs.

BMP REMOVAL

- BMP removal is not applicable.



Large woody debris placed in streambed to provide salmonid refuge. Note use of streambed gravel, dewatering with pump, and mulching



BMP: LARGE WOODY MATERIAL (continued)



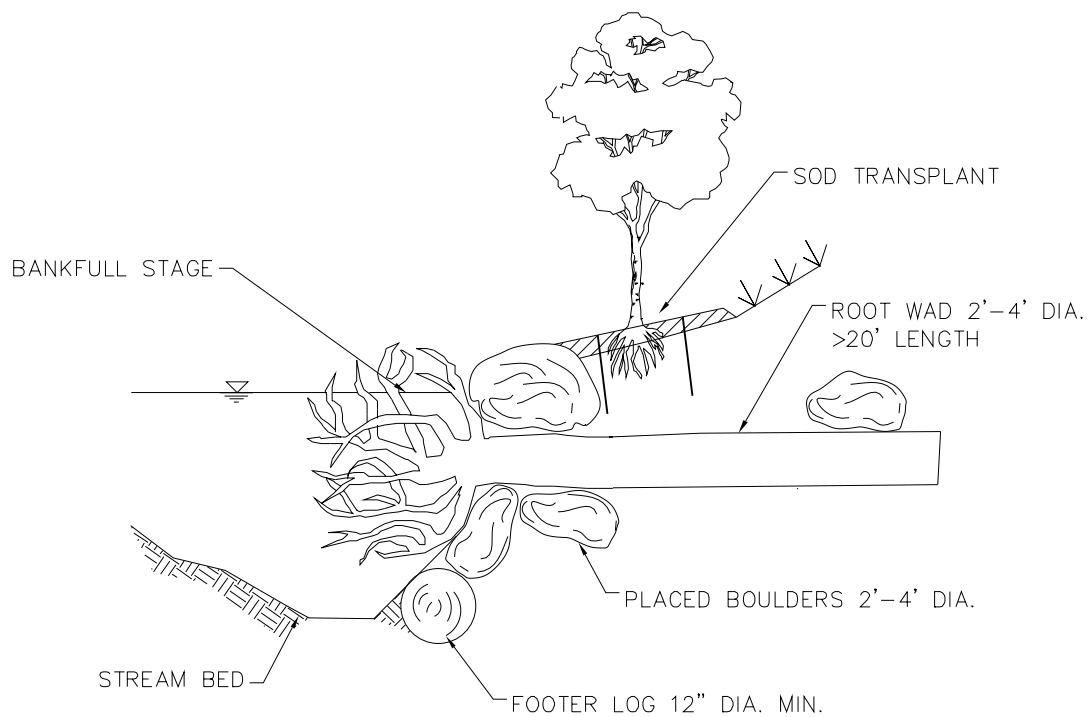
Large woody material placed in a streambed to provide salmonid refuge. Note use of turbidity curtain, streambed gravel, silt fence, coir fabric, mulching, and stream bypass



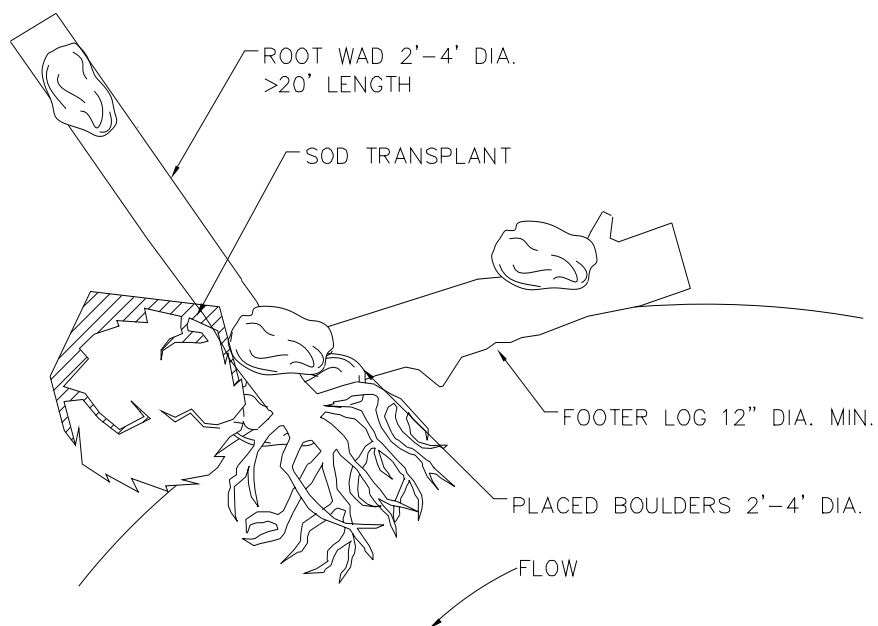
Large woody material placed in streambed to provide fish refuge. Note use of streambed gravel, mulch, and coir fabric



BMP: LARGE WOODY MATERIAL (continued)



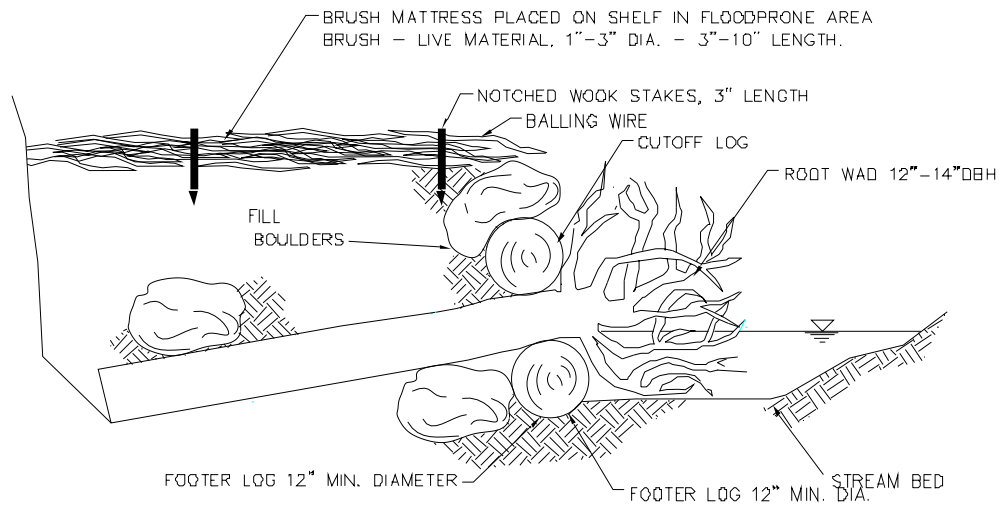
ROOT WAD: PLAN VIEW



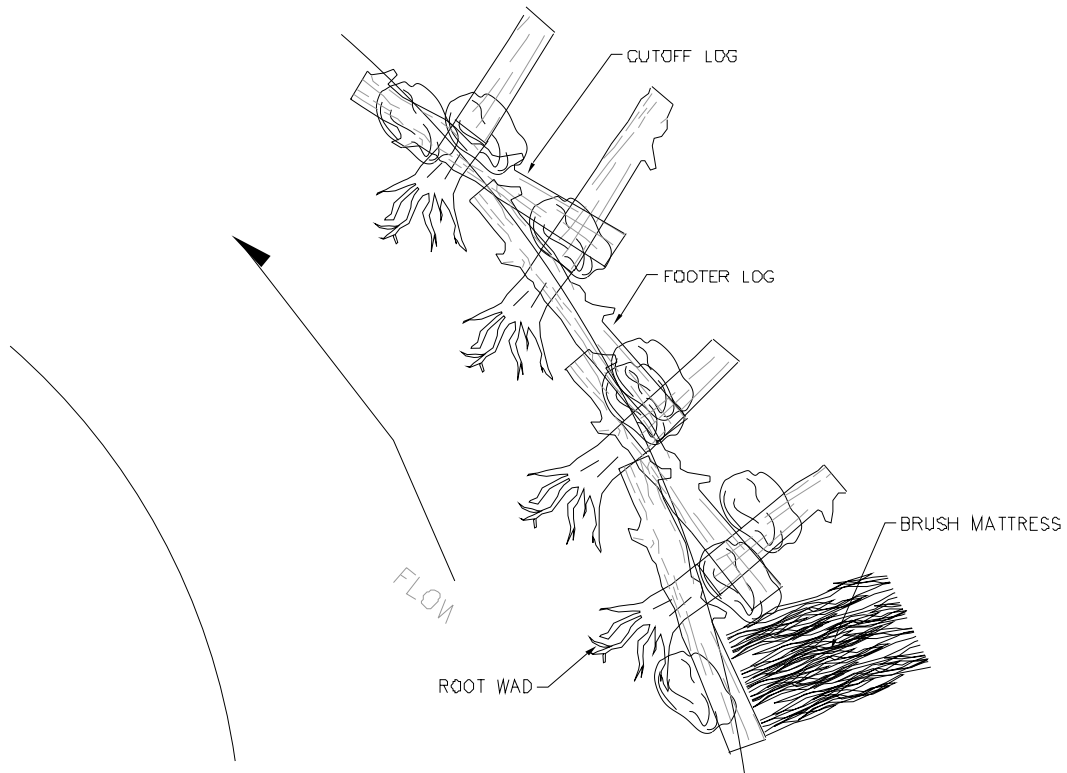


BMP: LARGE WOODY MATERIAL (continued)

TYPICAL CROSS SECTION – NATURAL MATERIAL REVETMENT



TYPICAL PLAN VIEW – NATURAL MATERIAL REVETMENT





DESCRIPTION

Live stake planting involves the insertion of live, vegetative cuttings into the ground in a manner that allows the cutting (stake) to take root and grow. This BMP is used to reduce potential for soil becoming water borne, to reduce water velocity/erosive forces after vegetation establishment, and to aid in habitat protection/maintenance.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Using a system of live stakes to create a root mat that stabilizes the soil by reinforcing and binding soil particles together.
- Using it in conjunction with other practices to provide for an increase in site stability.
- Providing habitat and shade when planted along stream and/or watercourse banks.
- Providing habitat for primary production.
- Providing habitat for prey base organisms such as macro-invertebrates.

APPLICATIONS

This BMP may be used to repair small earth slips and slumps. It may be used to reinforce or enhance stream channel banks. Live staking may be used to anchor and enhance the effectiveness of willow wattles (fascines), excelsior filled logs, backslope planting, coir logs/fabric, or other erosion control material.

LIMITATIONS

This BMP should not be used:

- Where vegetation growth will interfere with maintenance and/or facility access.
- Where vegetation growth will interfere with sight distance and/or create safety issues.
- For immediate soil stabilization results.



CONSTRUCTION GUIDELINES

- Live staking must be done in accordance with design and/or permit conditions.
- Harvesting and planting should optimally occur during the dormant season (late fall to early spring).
- Use healthy live wood that is at least one year old.
- Make a clean angular cut at the butt end. Cutting should be a minimum of 24-inches long (for best results, use 36-inch long cutting) and up to 3" in diameter.
- For best results, prior to installation, soak cuttings in water for a minimum of 24 hours.
- Use a pilot bar (or similar device) in firm soils to establish a planting hole.
- Plantings should be inserted into the ground 2/3 the length of the stake. Re-cut any damaged or split ends after installation.
- Tamp soil around stake.

BMP MAINTENANCE

- Periodic inspection, repair and maintenance will be done in accordance with permit requirements. If no permits are required, vegetation will be monitored until the vegetation is established.
- Staked area may need to be watered during summer months.

BMP REMOVAL

- BMP removal is not necessary.



BMP: LIVE STAKING (continued)



Staked streambank to provide vegetative cover once vegetation has established



Using straw and live staking to reduce erosion and provide vegetative cover once vegetation has established



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DESCRIPTION

Mulching is the application of straw, wood chips, or other suitable materials on the soil surface applied manually or by machine. This BMP is used to reduce potential for soil becoming water borne or air borne and to reduce water velocity/erosive forces after vegetation establishment.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing erosion by protecting the soil surface from raindrop impact or wind.
- Decreasing surface water or wind velocity impacts.
- Fostering the growth of vegetation by increasing available moisture and providing insulation against extreme heat and cold.

APPLICATIONS

This BMP can be used in areas to provide protection to the soil surface. Areas that have been seeded can be mulched to provide additional protection. This BMP may be used in combination with plantings of trees, shrubs, certain ground covers or in conjunction with seeding.

LIMITATIONS

This BMP should not be used:

- On slopes steeper than 2 horizontal to 1 vertical.
- In watercourses and streams.
- In ditches where water flow is continuous.

CONSTRUCTION GUIDELINES

- When used near watercourses or streams, this BMP must be used in accordance with permit requirements.
- Mulch should be applied so that the soil is covered sufficiently enough to allow seeds to germinate, but also protects the soil from erosion.
- Nets and matting may be used in combination with mulch.
- Various types and sizes of mulch are available.



BMP: MULCHING (continued)

- If used to stabilize soil from wind forces, the mulch needs to be tilled or incorporated into the soil.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Additional mulch should be applied where erosion or scouring occurs.
- If a tear occurs in the cover netting or matting, repair as necessary.

BMP REMOVAL

- BMP removal is not necessary under normal circumstances.



Using straw to reduce erosion in a slide area prior to a major stabilizing project

BMP

PLASTIC COVERING



DESCRIPTION

Plastic covering is used to cover exposed areas, which need immediate protection from erosion.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Providing immediate temporary erosion protection to slopes, piles and disturbed areas that cannot be covered by mulching.
- Protecting exposed surfaces from water and/or wind erosion.
- Used in winter months as a temporary erosive control device when grass seed will not germinate.

APPLICATIONS

This BMP may be used in disturbed areas, which require immediate erosion protection, areas seeded during winter and spring to aid in germination and for protection from heavy rain. Plastic covering may be used on steep slopes, construction sites and on stockpiles and/or excess materials. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- For long term erosion control.
- Without controlling surface water runoff from the plastic covered area.

CONSTRUCTION GUIDELINES

- Plastic must be secured by staking or using weight (i.e. sandbag or tires) to prevent movement. Rebar must not be used as a staking mechanism.
- Plastic covering must be "keyed" in at the top of the slope.
- Additional BMPs, such as a berm and/or sediment control, must be used to control surface water runoff from plastic.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek.



BMP: PLASTIC COVERING (continued)

Schedule additional inspections during storm events. Make any required repairs.

- Replace damaged sections of plastic.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



Plastic covering used as erosion protection on a slope at construction/repair area. Note additional use of mulch in area



Plastic covering used to protect exposed surface from erosion during construction/repair activities



Plastic covering used as a temporary erosion control on slope at slide area after storm and before repair

BMP

PLYWOOD WORK PLATFORM



DESCRIPTION

A plywood work platform is a temporary work area under bridges or piers consisting of framework, plywood, scaffolding and/or tarps. This BMP is used to reduce the potential for debris and contaminants falling into water.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Providing a safe and efficient working environment.
- Containing fallen debris (concrete, wood chips, sawdust, slag and metal) from entering water during construction, maintenance and repair activities.

APPLICATIONS

This BMP may be used under most small timber bridges, pipelines or piers. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- Where spans exceed 16 feet from bent to bent.

CONSTRUCTION GUIDELINES

- Framework is usually 4 in. x 6 in. joists 16 inches on center which span the stream.
- 3/4 in. x 4 ft. x 8 ft. plywood is placed flat and tight, edge to edge, on joists, and tacked with 6 d nails for easy removal.
- Tarps are placed over the plywood deck and draped vertically approximately 36 in. high at the abutment wall of the deck and over the hand rails at the other edges.
- A truck mounted bridge work platform may be an option, depending on location and scope of work.
- A fire extinguisher shall be on hand at all times for spark and fire suppression.
- Ensure that plywood platform and tarp do not enter the water.



BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Crew must provide frequent clean up of debris during the day.
- Rips or tears in the tarp must be repaired.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed.
- Remove debris on BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate bridge abutment area disturbed by maintenance activities (if applicable).



Plywood work platform providing a safe work environment and containing fallen debris from entering water during construction, maintenance, and repair activities



DESCRIPTION

Rip rap is a long-term, erosion-resistant ground cover. It is composed of large, loose, angular rock which may be used to stabilize embankments and ditches. An optional filter fabric or granular underlining may be used.

PURPOSE

This BMP includes, but is not limited to:

- Protecting the soil from the erosive forces of concentrated runoff.
- Reducing the velocity of runoff while enhancing the potential for infiltration.

APPLICATIONS

This BMP may be used for stabilization of steep slopes with seepage problems and/or unstable soils that need armoring to prevent sloughing, downstream turbidity, and roadway or shoulder failure. This BMP should be used as a last resort in locations where planting or other stabilizing methods are impracticable. Rip rap may also be used to fill minor washouts along ditch lines, at culvert exits and entrances and shoulders. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used in watercourses or streams:

- Without permit review and approval.
- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:
 - Required or allowed by permit conditions.
 - Required by other regulations.

For applications outside of watercourses or streams, there are no limitations, other than design constraints.

CONSTRUCTION GUIDELINES

- In locations where permits are required, rip rap must be placed in accordance with design and/or permit conditions.



BMP: RIP RAP (continued)

- Remove unstable and unusable soil.
- Shape the sub-base to conform to site.
- Install fabric (if applicable).
- Place rip rap.

MAINTENANCE

- Inspect periodically to determine if high flows have caused scour beneath the rip rap or filter fabric.

BMP REMOVAL

- BMP removal may not be necessary. If BMP is removed, it should be done in accordance with design and applicable permits.



Rip rap placed on slope for increased stability



Rip rap used to provide bank stability

BMP

Rock Check Dam



DESCRIPTION

A rock check dam is a small temporary or permanent dam constructed across a swale or drainage ditch. A rock check dam can be used to provide settling of soil particles and reduction in water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing water velocity/erosive forces.
- Trapping soil particles generated from adjacent areas or the drainage ditch.

APPLICATIONS

Rock check dams may be used to aid in sediment trapping from a work site. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:
 - Required or allowed by permit conditions.
 - Required by other regulations.
 - When it affects fish passage.

For applications outside of watercourses or streams, there are no limitations, other than design constraints.

CONSTRUCTION GUIDELINES

- In locations where rock check dams are required, rock check dam must be placed in accordance with design and/or permit conditions.

The maximum height of the dam shall be 3 feet.

- The center of the check dam must be at least 6 inches lower than the outer edges.
- For added stability, the base of the check dam can be keyed into the soil approximately 6 inches.
- Maximum spacing between the dams should be such that the toe of the



upgrade dam is at the same elevation as the top of the downgrade dam.

- Filter fabric may be used under the stone to provide a stable foundation and to facilitate the removal of the rock.
- Use in small open channels.
- Refer to sketches on following pages for details.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Repair damaged BMPs due to end runs or undercutting.
- Sediment should be removed when deposits reach one-half the height of the BMP.
- Inspection on a regular basis should ensure that the center of the dam is lower than the edges. Erosion around the edges of the dam should be corrected.

BMP REMOVAL

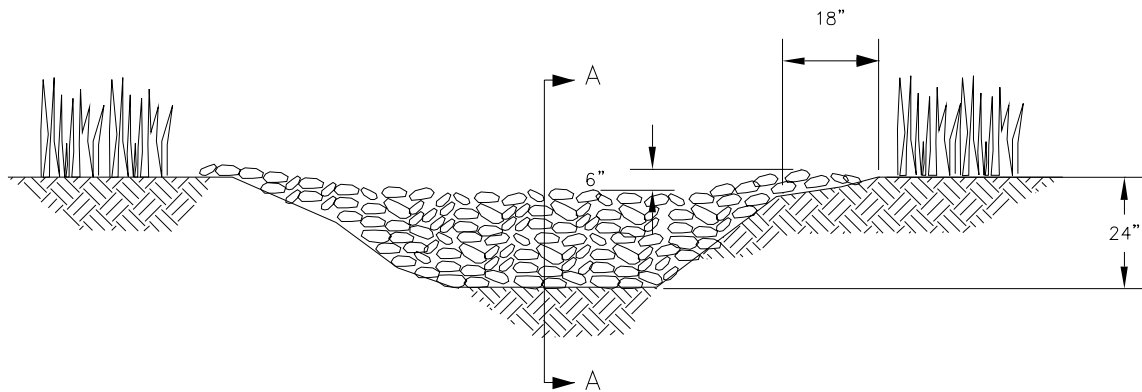
- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP



Rock check dam in ditch to provide reduction in water velocity



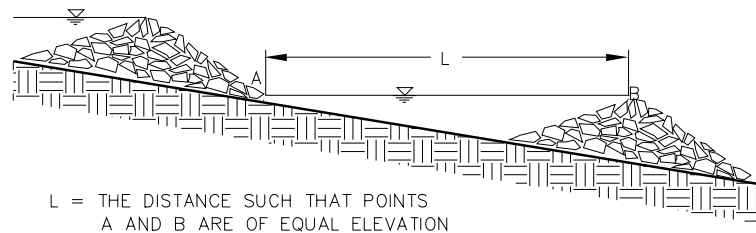
ROCK CHECK DAM



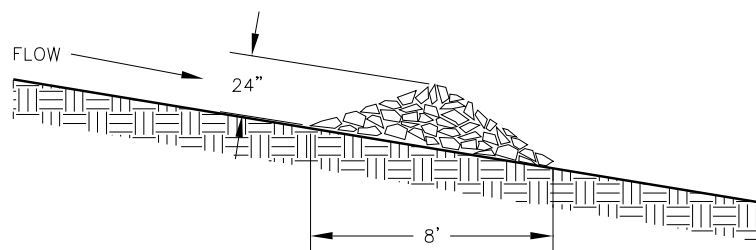
NOTE

KEY STONES INTO CHANNEL BANKS AND EXTEND IT BEYOND THE ABUTMENTS 18" (MIN.) TO PREVENT FLOW AROUND DAM.

SPACING BETWEEN CHECK DAMS



SECTION A-A



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DESCRIPTION

A sandbag is a pre-manufactured cloth or plastic bag (polypropylene) filled with sand or gravel. Sandbags can be used to keep water from the work area, for settling and reduction in water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- A barrier.
- A protective barrier against flooding.
- Using in combination with other methods, to form a cofferdam.
- Using as a sediment filter (when used with clean pea gravel).
- Using as a ballast.
- Other multi-purpose situations.

APPLICATIONS

Sandbags may be used during emergencies to build walls and control the flow and level of water. It may be used in combination with other barriers.

This BMP may be used during construction to form walls in dewatered areas, for example, cofferdams, and for various other impromptu situations.

LIMITATIONS

This BMP should not be used:

- Where permit conditions state otherwise.
- When maintenance activities conducted in locations could reduce actual or potential high flow salmonid refuge functions, this BMP will be used if required by permit conditions.

CONSTRUCTION GUIDELINES

- When used in watercourses or streams, this BMP must be used in accordance with permit requirements.
- Refer to Appendix E for Fish Exclusion Protocols.
- If sandbag filling is to be used as streambed gravel, it must be washed prior to filling bags, appropriately sized according to design and placed in accordance with permit conditions. Wash rock off-site (at a location where washed water can not enter watercourses, streams or wetlands) until water runs clear.
- Secure ends of sandbags to ensure material does not scatter.



- When used as a barrier, stack bags tightly together and in alternating, brick-layer fashion.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Replace damaged sandbags.
- Repair damaged sandbag berm due to end runs or undercutting.
- Sediment should be removed when deposits reach one-half the height of the BMP.
- Check bags often for seepage and replace or add as needed.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).
- Gravel filled bags may be split and the contents left in place, in streams, when so stated in the specific permit conditions (Bags are to be removed from job site).



Sandbags acting as a barrier



BMP: SANDBAG (continued)



A sandbag barrier used to decrease water velocity. Note use of silt mat and hydroseeding to decrease erosion and to increase vegetation in channel



Sandbags holding bypass pipe in place and detaining sediment laden water on site



BMP: SANDBAG (continued)



Sandbags filled with washed rock acting as a filter



Sandbags used in combination with plastic and strawbales serving as a barrier

BMP

SEDIMENTATION SUMP



DESCRIPTION

Sedimentation sumps provide a sump within the flow line of ditches, swales, or channels to allow soil particles to collect and settle.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Collecting soil particles by settlement.

APPLICATIONS

This BMP may be used in areas where water quantity or velocities within steeper sloped ditches, swales, or channels are transporting sediment or material and impacting structures or habitat. It may be used in conjunction with other BMPs.

LIMITATIONS

This BMP should not be used:

- To remove excessive fines.

CONSTRUCTION GUIDELINES

- Place rim of structure at flow line elevation.
- Structures can be sized based on the quantity of soil particles and space availability within the transport facility.
- Structures can be placed with other BMPs such as ditch linings or grass lining.
- Structures can be placed in transport facilities where they collect sediment prior to pipe crossings into streams, wetlands, sensitive areas, or structures that easily plug with sediment.

BMP MAINTENANCE

- Structures should be monitored after rainfall events for determination of cleaning schedule and frequency.
- Structures can be cleaned when necessary utilizing vacuum truck used in cleaning of catch basins.

BMP REMOVAL

- BMP removal is not necessary.



BMP SILT FENCE

DESCRIPTION

A silt fence is a temporary sediment barrier consisting of fabric stretched across and attached to supporting posts and entrenched into the soil. It is generally installed perpendicular to the flow direction to slow or stop water and to allow filter/perimeter protection, settling of soil particles, and/or reduce water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting sheet flow.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to allow for filtering or settling of soil particles.
- Decreasing down slope sheet flow velocity.
- Retain soil particles on site.

APPLICATIONS

This BMP may be used for perimeter protection. It may be used in combination with other BMPs.

This BMP may be used below disturbed areas subject to sheet and rill erosion where drainage area is no greater than .25 acre per 100 lineal feet of barrier and the slope behind the barrier should be no steeper than 2 horizontal feet to 1 vertical foot. On relatively flat slopes, the maximum disturbed slope distance should not exceed 100 feet. The allowable disturbed slope distance decreases as the slope gets steeper.

LIMITATIONS

This BMP should not be used:

- Where rock or hard surfaces prevent the full and uniform anchoring of the barrier.
- Directly in perennial streams or water courses.
- Around drop inlets.
- In front of storm drain inlets.
- As a diversion dam.

CONSTRUCTION GUIDELINES

- The BMP should be placed along contours.
-



- The bottom of the fabric must be continuously and securely anchored for its entire length to reduce undermining.
- The height of the fence shall be adequate to reduce the potential of silt from leaving the job site.
- There must be at least a 3-foot overlap at vertical seams to avoid leakage. Both ends of the overlap must be securely attached to posts.
- Increase the elevation at the ends of the BMP installation to prevent "end runs."

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Replace damaged sections of fabric.
- Repair damaged BMPs due to end runs or undercutting.
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

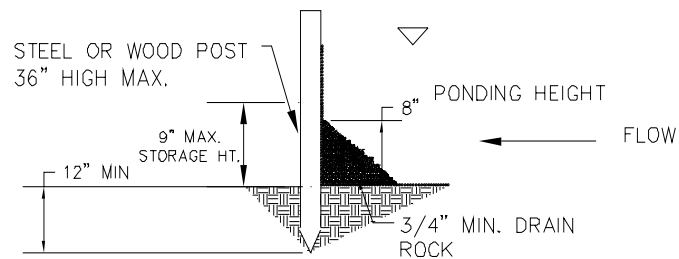
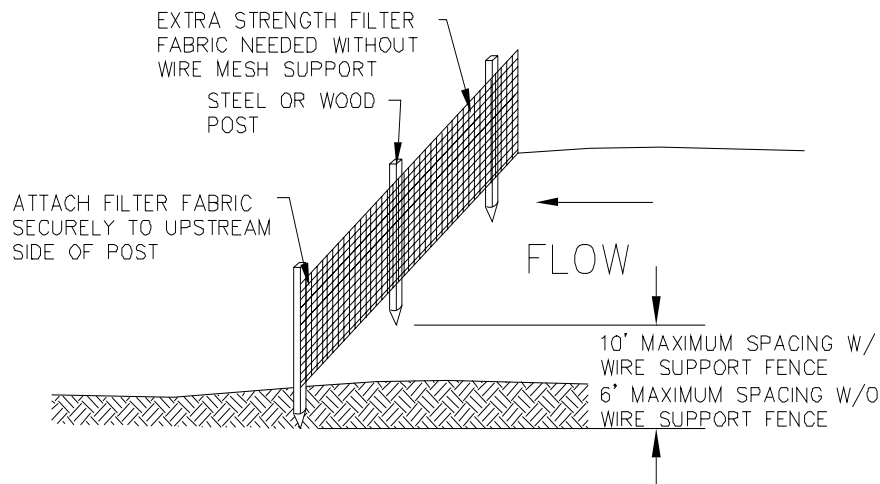
- Evaluate site to determine BMP is no longer needed (the area has stabilized- potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal.



Silt fence being installed on a temporary access road; used as perimeter protection



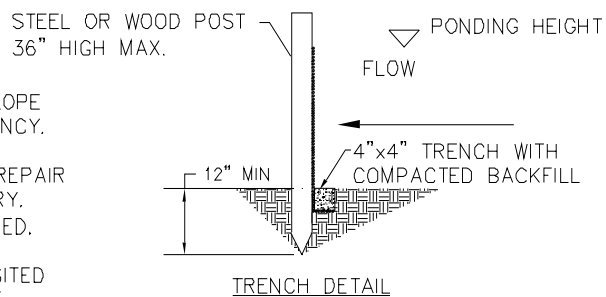
BMP: SILT FENCE (continued)



INSTALLATION WITHOUT TRENCHING

NOTES

1. SILT FENCE SHALL BE PLACED ON SLOPE CONTOURS TO MAXIMIZE PONDING EFFICIENCY.
2. AFTER STORM EVENT, INSPECT AND REPAIR FENCE. REMOVE SEDIMENT AS NECESSARY. 9" MAX. STORAGE HEIGHT IS RECOMMENDED.
3. REMOVED SEDIMENT SHALL BE DEPOSITED TO AN AREA THAT WILL NOT CONTRIBUTE SEDIMENT OFF-SITE AND THAT CAN BE STABILIZED.





DESCRIPTION

A silt mat is a flat pre-manufactured pad made in three layers: jute mesh, excelsior, and burlap. The pads are 4 feet by 10 feet and are biodegradable. Sediment passes through the mat layers and is held by the burlap layer. Silt mats can be used to provide filter/perimeter protection, settling and reduction in water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting and detaining small amounts of soil particles.
- Preventing erosion at discharge points.

APPLICATIONS

It may be used at pump discharges, pipe outlets, and/or downstream of work sites to retain soil particles and provide stabilization. It may also be used in ditch lines. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- As the only BMP when excessive soil particles are present.
- In high flow rates.

CONSTRUCTION GUIDELINES

- This BMP may be used singly or in a group on the streambed immediately downstream of a work site.
- Silt mats should be installed with either staples or stakes.
- There is no need for disposal. Place on adjacent slope or leave in place after use and add seed and mulch to stabilize the slope.
- Joints need to be overlapped according to flow.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.



BMP: SILT MAT (continued)

- Sediment loads should be monitored frequently to ensure the silt mat's capacity load is not exceeded. Replace silt mats before capacity is reached. (Unless used in conjunction with re-vegetation).
- Check periodically for gaps.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove BMP (recycle and/or re-use if applicable).
- Silt mat may be incorporated into permanent stabilization/re-vegetation process.
- Re-vegetate area disturbed by BMP removal (if applicable).



*Silt mat installed in ditch to decrease erosion
and allow settlement of suspended solids*

BMP

SILTATION POND/SETTLING TANK



DESCRIPTION

A siltation pond/settling tank is a temporary containment structure or area for silt laden water to be initially discharged. After sufficient settling, the water may be discharged to sanitary sewer, storm drainage system or other BMP.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Allowing soil particles to settle prior to water being discharged off-site.
- Settling water borne soil particles on site.
- Controlling the flow of water through a settling tank may require a control structure such as a tee fitting, an oil/water separator or an orifice.

APPLICATIONS

This BMP may be used wherever silt laden water must be removed from a construction site. It may be used in combination with other BMPs.

LIMITATIONS

This BMP (Siltation Pond) should not be used:

- In soils that are not compatible for filtration, unless a liner is used.
- If there is inadequate space to process the volume of sediment-laden water.

CONSTRUCTION GUIDELINES

- Silt ponds must be installed according to applicable permit requirements.
- Water discharged from siltation pond/settling tank shall meet permit requirements at the point of discharge.
- If an existing Retention/Detention facility or Settling Pond is near by, it may be utilized.
- Check site to determine if there is adequate space for pond excavation.
- Portable tanks may be used where ponds can not be constructed.
- Siltation pond should be designed according to surface water design standards.



- Stabilize pipe outlet to minimize scour and erosion.
- An optional liner may be used in ponds where soils are incompatible with filtration

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Inspect filtering or control devices frequently. Repair or replace them to ensure that the structure functions as designed.

BMP REMOVAL

- Evaluate site to determine pond/tank is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
 - Follow engineer's recommendations for removal of BMP.
 - Recycle excess construction materials if feasible.
 - When siltation pond is removed it shall be in such a manner as to minimize disturbance. Remaining sediment shall be removed and/or disposed of according to permit conditions.
- Re-vegetate area disturbed by BMP removal according to permit (if applicable).



Large silt pond with turbidity curtain in place



BMP: SILTATION POND/SETTLING TANK (continued)



A settling tank in use to allow onsite containment of water borne soil particles



Settling tank



BMP SOIL STABILIZATION (BLANKETS AND MATTING)

DESCRIPTION

Soil stabilization can be accomplished through the installation of a protective blanket (covering) or a soil stabilization mat on a prepared planting area, a steep slope, channel and/or shoreline.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing erosion.
- Providing a microclimate that protects young vegetation and promotes its establishment.
- "Reinforcing the turf" to resist the forces of erosion during storm events.

APPLICATIONS

This BMP may be used on short, steep slopes where erosion hazard is high and planting is likely to be slow in establishment. It may also be used on stream banks or tidal shorelines where moving water is likely to wash out new plantings. Soil stabilization blankets and matting may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- In watercourses or streams without proper permits.

CONSTRUCTION GUIDELINES

- Installation is site specific.
- See following drawings and specifications.

BMP MAINTENANCE

- If vegetation is incorporated, inspect during the plant establishment period. Re-plant, due to mortality, as necessary.
- Schedule additional inspections during storm events. Check for erosion or undermining; any required repairs shall be made.

BMP REMOVAL

- BMP removal is not necessary.



Stabilizing the soil in a sensitive area using blankets



Lining a ditch with soil stabilization matting to reduce erosion

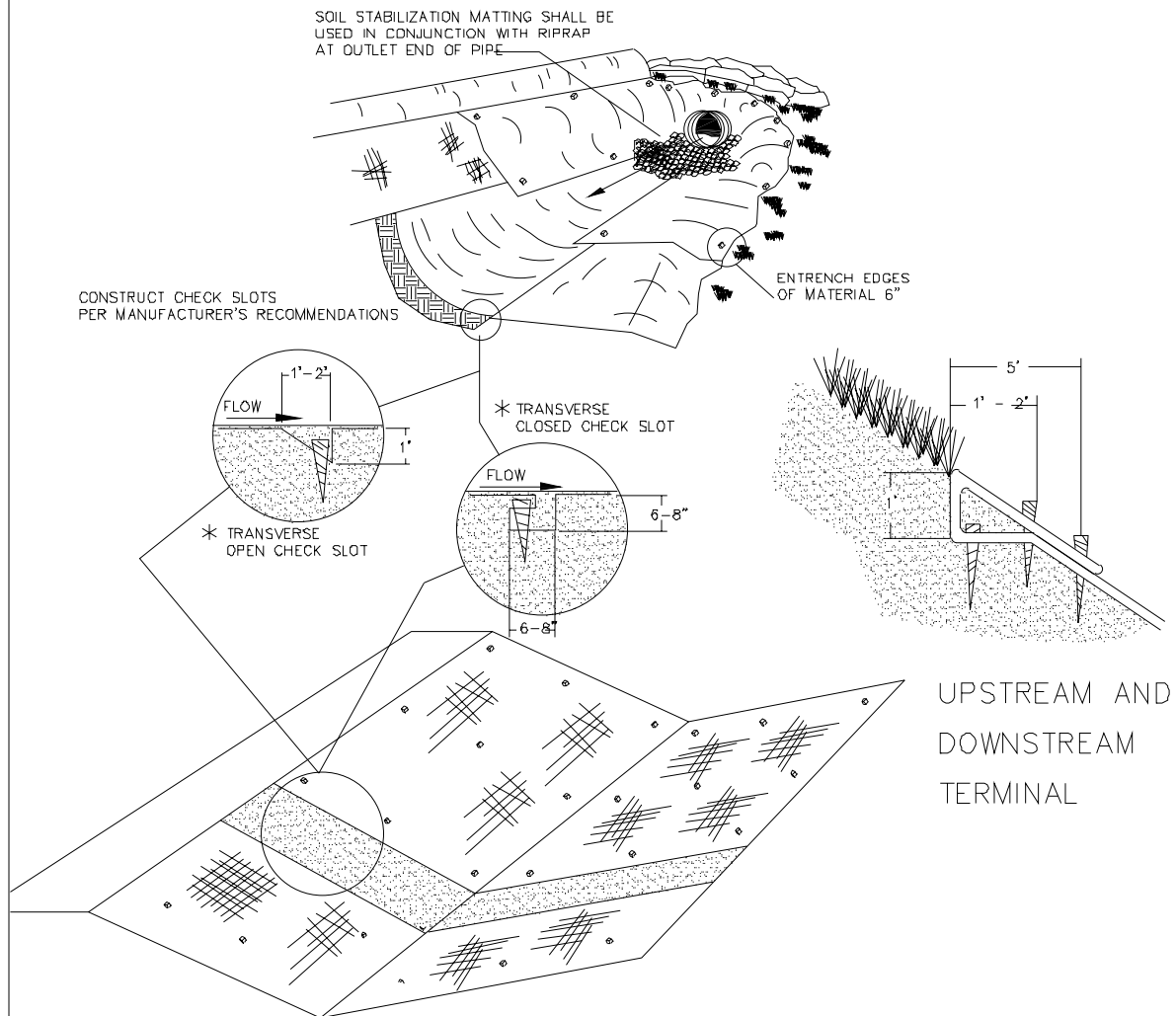


Stabilizing the soil using matting and hydroseeding



BMP: SOIL STABILIZATION (BLANKETS AND MATTING) (continued)

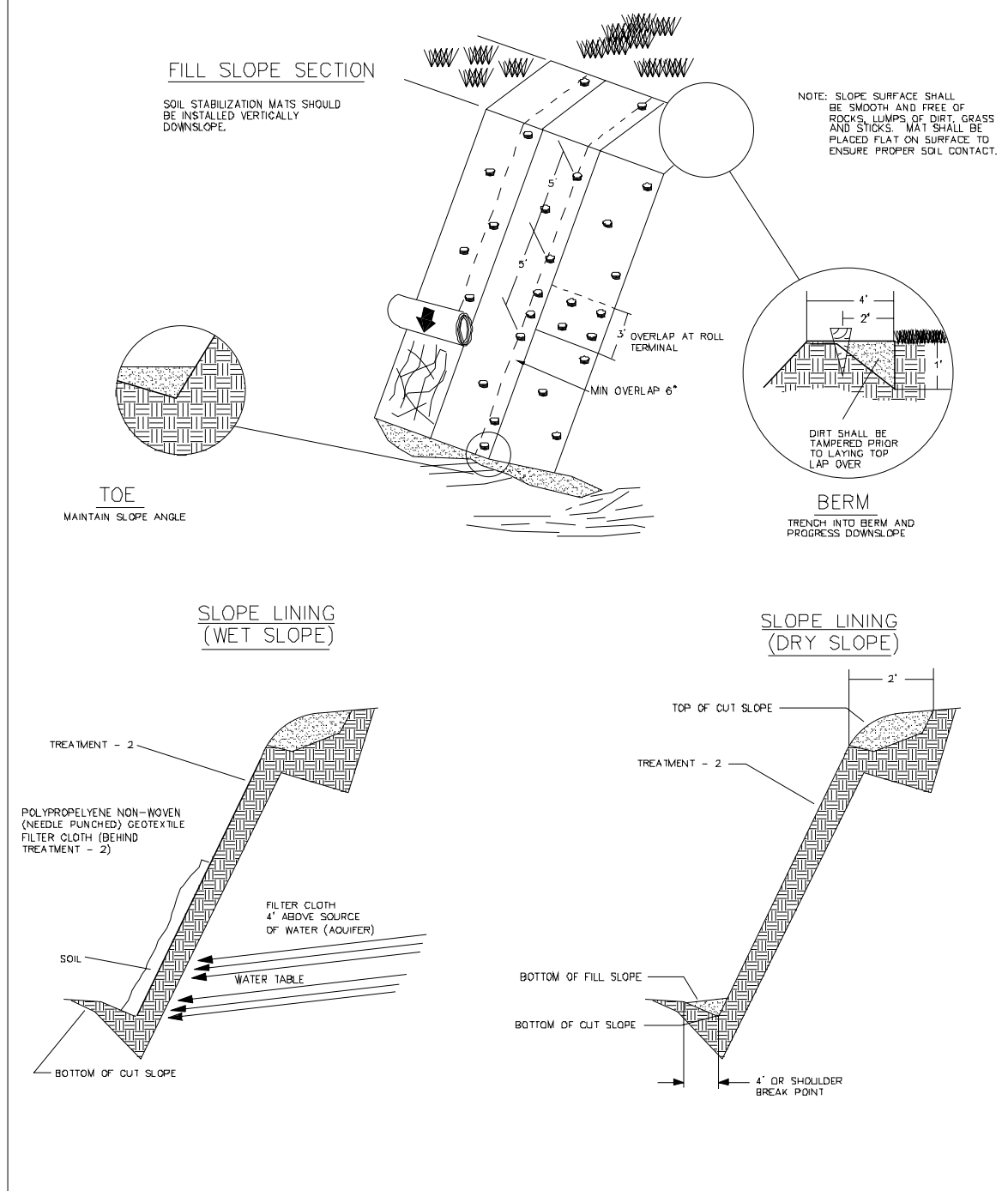
TYPICAL TREATMENT
SOIL STABILIZATION MATTING INSTALLATION





BMP: SOIL STABILIZATION (BLANKETS AND MATTING) (continued)

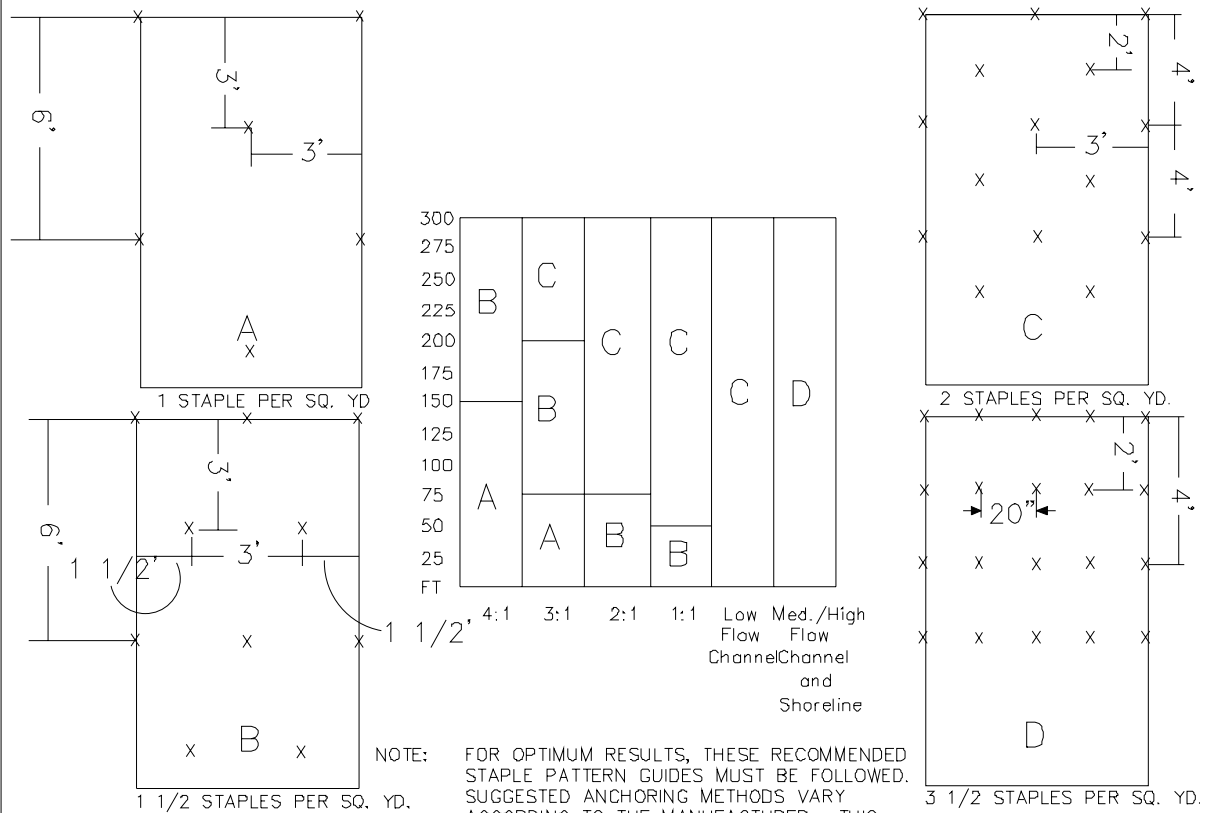
TYPICAL TREATMENT SOIL STABILIZATION MATTING SLOPE INSTALLATION





BMP: SOIL STABILIZATION (BLANKETS AND MATTING) (continued)

GENERAL STAPLE PATTERN GUIDE AND RECOMMENDATIONS AND (SOIL STABILIZATION MATTING)



BMP

STRAW BALE BARRIER (1)



DESCRIPTION

A strawbale barrier (1) is a small temporary barrier constructed across a non-fish bearing swale, gully, or drainageway. It is generally installed perpendicular to the flow direction to slow or stop water and to allow filter/perimeter protection, settling of soil particles, and/or reduce water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting sheet flow.
- Intercepting and detaining small amounts of soil particles from disturbed areas during construction operations in order to allow settling of soil particles.
- Decreasing down slope sheet flow velocity.
- Retaining soil particles on site.

APPLICATIONS

This BMP may be used in areas where permanent stabilization cannot be accomplished immediately. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- Where rock or hard surfaces prevent the full and uniform anchoring of the barrier.
- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:
 - Required or allowed by permit conditions.
 - Required by other regulations.
- Where flow volume or water velocity inhibit BMP function.

CONSTRUCTION GUIDELINES

- Place bales in a single row perpendicular to the flow, with ends tightly abutting one another.



- The bottoms of the end bales should be placed higher in elevation than the top of the middle bale spillway to ensure sediment-laden runoff will flow over the barrier, and not around it.
- Bales shall be installed so that bindings are oriented around the sides rather than on the tops and bottoms, to prevent deterioration.
- Bales shall be entrenched a minimum of 4 inches.
- Gaps between bales shall be sealed by wedging straw in the space to limit escaping water.
- Bales shall be securely anchored by at least two stakes driven into the ground a minimum depth of 18 inches.
- See following pages for construction guidelines and additional detail.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events.
- Any required repairs shall be made. (Repair any damaged BMPs due to end runs or undercutting).
- Sediment should be removed when deposits reach one-half the height of the BMP.

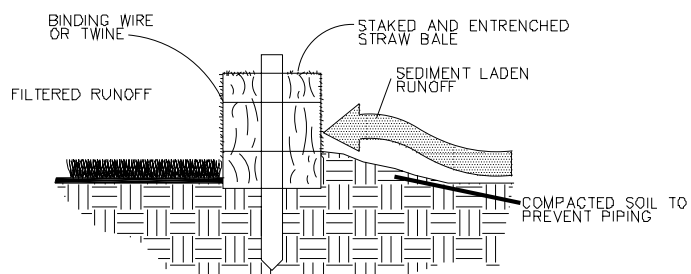
BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP.
- Re-vegetate area disturbed by BMP removal.



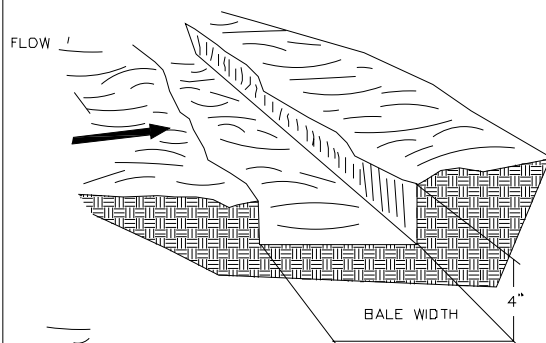
BMP: STRAW BALE BARRIER (1) (continued)

PROPERLY INSTALLED STRAW BALE BARRIER (CROSS SECTION)

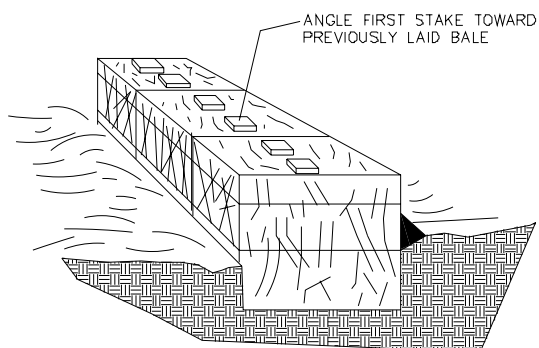


CONSTRUCTION OF STRAW BALE BARRIER

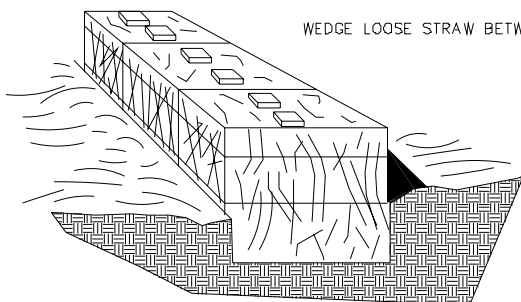
1. EXCAVATE THE TRENCH



2. PLACE AND STAKE STRAW BALES

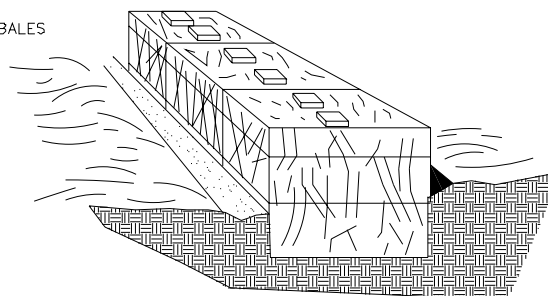


3. WEDGE LOOSE STRAW BETWEEN BALES



3. WEDGE LOOSE STRAW BETWEEN BALES

4. BACKFILL AND COMPACT THE EXCAVATED SOIL





BMP

STRAW BALE BARRIER (2)

DESCRIPTION

A straw bale barrier (2) is a temporary sediment barrier consisting of a row of entrenched and anchored straw bales. It is generally installed perpendicular to the flow direction to slow or stop water and to allow filter/perimeter protection, settling of soil particles, and/or reduce water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting sheet flow.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to allow settling of soil particles.
- Decreasing down slope sheet flow velocity.
- Retaining sediment on site.

APPLICATIONS

This BMP may be used for perimeter sediment control. It may be used in combination with other barriers.

This BMP may be used below disturbed areas subject to sheet and rill erosion where drainage area is no greater than .25 acre per 100 lineal feet of barrier and the slope behind the barrier should be no steeper than 2 horizontal to 1 vertical. On relatively flat slopes the maximum disturbed slope distance should not exceed 100 feet. The allowable disturbed slope distance decreases as the slope gets steeper.

LIMITATIONS

This BMP should not be used:

- Where rock or hard surfaces prevent the full and uniform anchoring of the barrier.
- Directly in watercourses or streams when fish are present.
- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:
 - Required or allowed by permit conditions.



- Required by other regulations.
- Where flow volume or water velocity inhibit BMP function.

CONSTRUCTION GUIDELINES

- Bales shall be placed in a single row, lengthwise on the contour, with ends of adjacent bales tightly abutting one another. (If area does not allow a single row, additional rows need to be installed in a staggered fashion).
- Bales shall be installed so that bindings are oriented around the sides rather than on the tops and bottoms, to prevent deterioration.
- Bales shall be entrenched a minimum of 4 inches.
- Bales shall be securely anchored by at least two stakes driven into the ground a minimum depth of 18 inches.
- Gaps between bales shall be sealed by wedging straw in the space to limit escaping water.
- Loose straw scattered over the area immediately uphill from the bale may increase barrier efficiency.
- See following pages for construction guidelines and additional detail.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events.
- Any required repairs shall be made. (Repair any damaged BMPs due to end runs or undercutting).
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal.



BMP: STRAW BALE BARRIER (2) (continued)

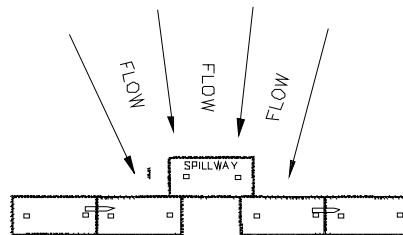


Straw Bale Barrier (2) reducing water velocity and erosive forces. Note other BMPs also being used

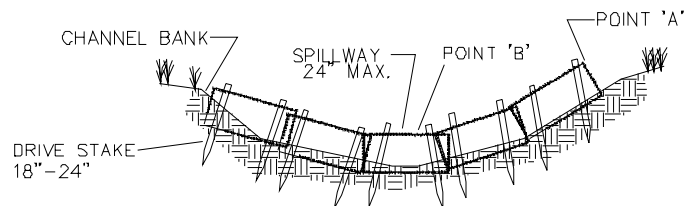


STRAW BALE CHECK DAM

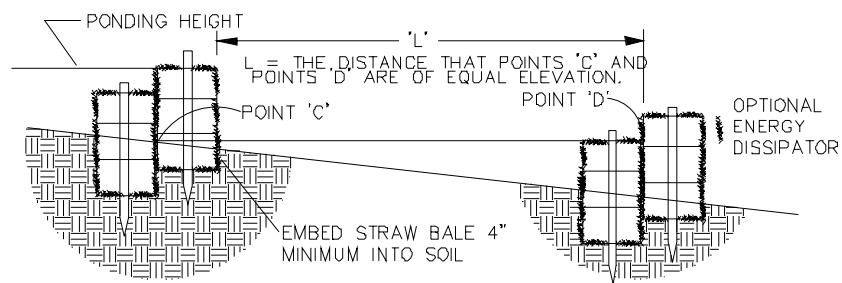
PLAN



VIEW LOOKING UPSTREAM



SECTION A - A
SPACING BETWEEN CHECK DAMS

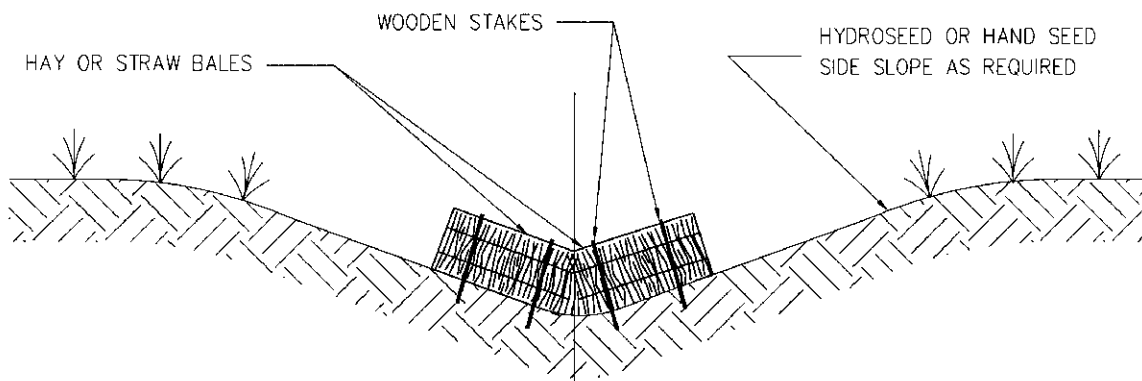
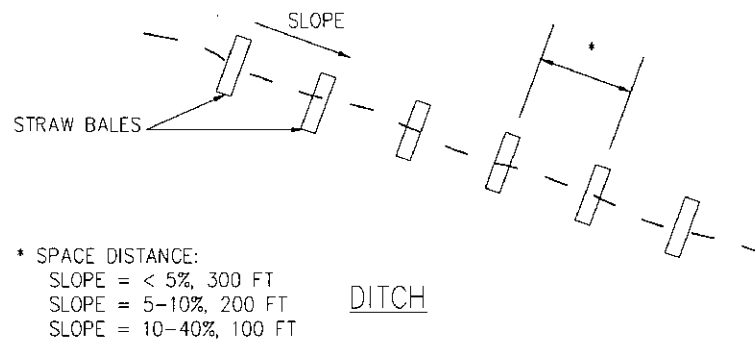
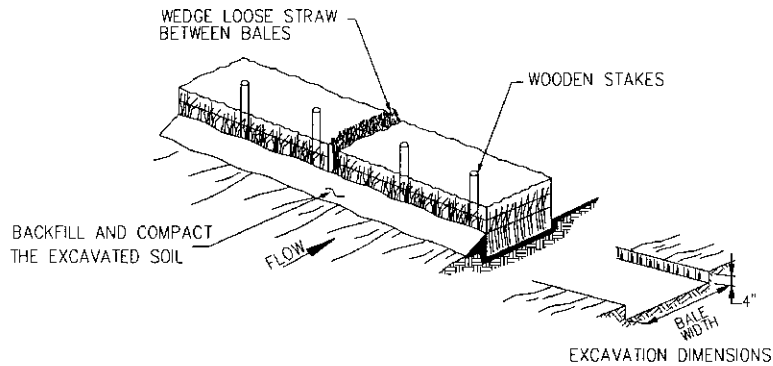


NOTES:

1. EMBED BALES 4" INTO THE SOIL AND 'KEY' BALES INTO THE CHANNEL BANKS.
2. POINT 'A' MUST BE HIGHER THAN POINT 'B' (SPILLWAY HEIGHT).
3. PLACE BALES PERPENDICULAR TO THE FLOW WITH ENDS TIGHTLY ABUTTING
4. SPILLWAY HEIGHT SHALL NOT EXCEED 24".



BMP: STRAW BALE BARRIER (2) (continued)



STRAW BALE BARRIER

N.T.S.

BMP

STRAW BALE BARRIER (3)



DESCRIPTION

A straw barrier (3) is a temporary barrier consisting of straw bales and a rock spillway placed across small drainage areas or gently sloping swales. It is generally installed perpendicular to the flow direction to slow or stop water and to allow filter/perimeter protection, settling of soil particles, and/or reduce water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting sheet flow.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to allow settling of soil particles.
- Allowing runoff to flow through or over the barrier.
- Decreasing runoff velocity.
- Retaining sediment on site.

APPLICATIONS

This BMP may be used in small channel flow situations. The rock size used in the spillway can be enlarged to accommodate larger flows.

LIMITATIONS

This BMP should not be used:

- Where rock or hard surfaces prevent the full and uniform anchoring of the barrier.
- Directly in watercourses or streams when fish are present.
- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:
 - Required or allowed by permit conditions.
 - Required by other regulations.
 - Where flow volume or water velocity inhibit BMP function.

CONSTRUCTION GUIDELINES

- Maximum height of the spillway shall be 2 feet.



- See following pages for construction guidelines and additional detail.
- Bales shall be installed so that bindings are oriented around the sides rather than on the tops and bottoms, to prevent deterioration.
- Bales shall be entrenched a minimum of 4-inches.
- Bales shall be securely anchored by at least two stakes driven into the ground a minimum depth of 18 inches.

BMP MAINTENANCE

- Inspect bales periodically and after each significant rainfall.
- Sediment shall be removed when it reaches one-half the height of the bale.

BMP REMOVAL

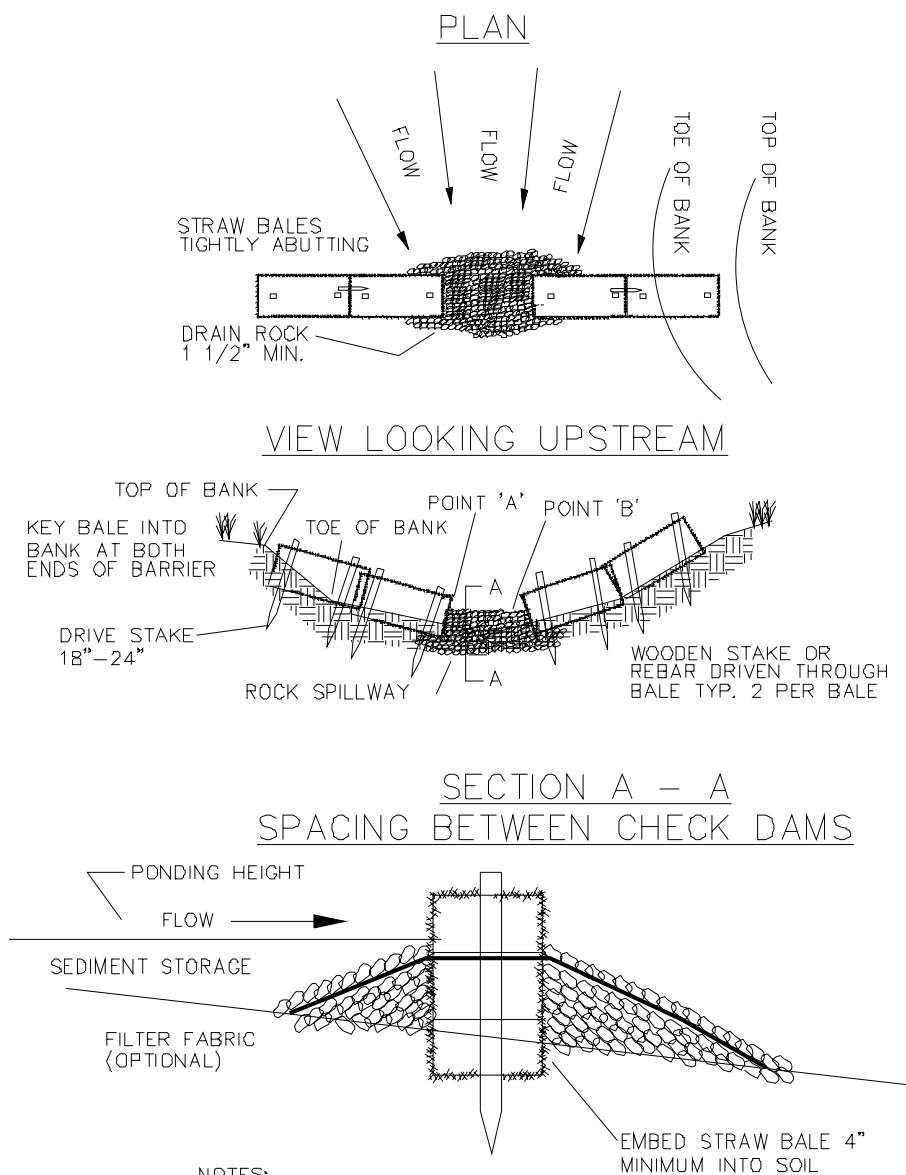
- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal.



Straw Bale Barrier (3) being used with a rock spillway decreasing runoff velocity and retaining sediment onsite



SEMI-PERVIOUS STRAW BALE SEDIMENT BARRIER



NOTES:

1. EMBED BALES 4" INTO THE SOIL AND 'KEY' BALES INTO THE CHANNEL BANKS. PREVENT FLOW AROUND BALES.
2. POINT 'A' MUST BE HIGHER THAN POINT 'B' (SPILLWAY HEIGHT).
3. PLACE BALES PERPENDICULAR TO THE FLOW WITH ENDS TIGHTLY ABUTTING
4. SPILLWAY HEIGHT SHALL NOT EXCEED 24".



BMP STRAW LOG

DESCRIPTION

Straw logs are manufactured from straw (or flax) wrapped in plastic netting. Logs are placed and staked along the contour of newly constructed or disturbed slopes, in shallow trenches. When cut or folded to appropriate length, these logs can be used to provide filter/perimeter protection, settling, reduction in water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing slope length to capture and retain sediment on the slope.
- Temporarily stabilizing slopes by reducing soil creep, sheet and rill erosion until permanent vegetation can be established.
- Trapping topsoil and retaining moisture from rainfall, which aids in growth of seedlings planted along the upslope side of the rolls.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to promote settling of soil particles.
- Filtering soil particles and debris.
- Reducing water velocity and erosive forces.

APPLICATIONS

This BMP may be used in ditches or across culvert ends of any dimension. It may be used instead of excelsior filled logs, coir logs, or straw bale filtering systems. Straw logs may also be used for perimeter sediment control. This BMP is particularly useful in areas where the effects of soil disturbance need to be minimized.

This BMP may be used in gullies and stream channels as check dams; in conjunction with gabions, rip rap, articulated block, or cellular confinement systems. It may be used to anchor and enhance the effectiveness of willow wattles (fascines), turf reinforcement mats, coir mats, continuous berms and other erosion control material. Straw logs may be used to replace silt fences or straw bales on steep slopes. It may be used in combination with other BMPs.



LIMITATIONS

This BMP should not be used:

- Where flow volume or water velocity inhibit BMP function.
- For permanent applications. (Other than vegetation).
- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:
 - Required or allowed by permit conditions.
 - Required by other regulations.

CONSTRUCTION GUIDELINES

- Logs are placed and staked along the contour of newly constructed or disturbed slopes, in 2-3 inch deep trench.
- Spacing depends on soil type and slope steepness.
- Tightly abut any adjacent logs.
- Install to prevent water from going around or under BMP.
- See "Live Staking", "Handseeding" and/or "Hydroseeding" BMP for planting.

BMP MAINTENANCE

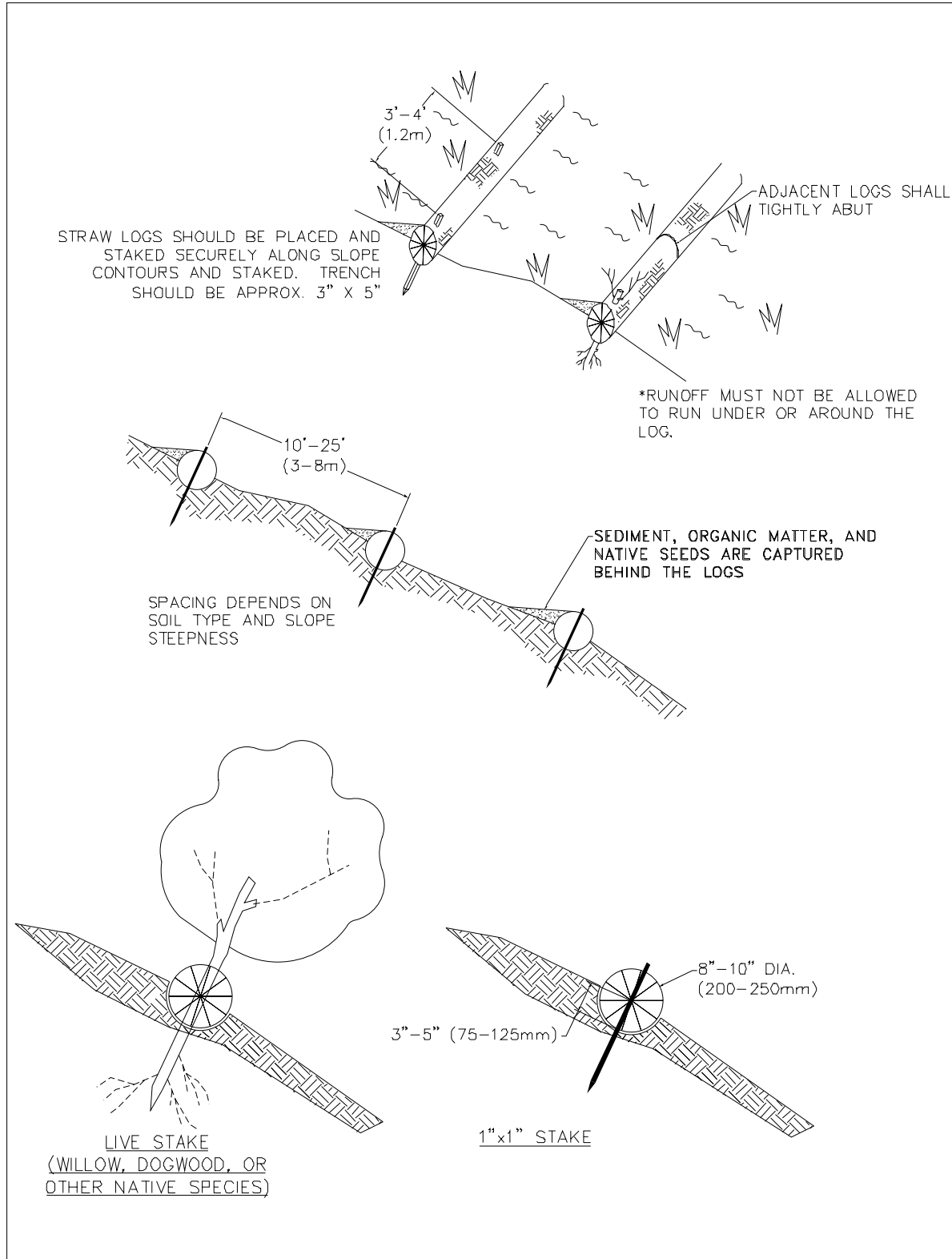
- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Depending upon BMP placement, re-vegetation of site may be necessary.
- BMP removal may not be necessary.



BMP: STRAW LOG (continued)



BMP STREAM BANK STABILIZATION (BIO-ENGINEERING)



DESCRIPTION

This BMP utilizes vegetation as a method of stabilizing stream banks. Use of stream bank stabilization requires design. Use of this BMP will be determined through the permit process for maintenance work, however, this would normally be done as a Capital Improvement Project(CIP).

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Protecting stream banks from the erosive forces of flowing water, thereby, reducing silts and sedimentation.
- Using it in conjunction with other practices to provide for an increase in site stability.
- Providing habitat and shade when planted along stream and/or watercourse banks.
- Providing habitat for primary production.
- Providing habitat for prey base organisms such as macro-invertebrates.



*Stabilizing the stream bank by using coir logs, hydroseeding, and live staking.
Streambed gravel installed to provide a natural spawning substrate*



BMP STREAM BYPASS

DESCRIPTION

A stream bypass is a method of diverting the main flow of a stream to a temporary alternate route during construction. It is used in conjunction with a cofferdam and pumps. A stream bypass may be constructed by various methods or combination of methods such as earthen berms, sand bags, ecology blocks and aqua barriers.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Diverting flowing water away from or around a construction site.
- Minimizing sedimentation.
- In limited cases, it may provide for fish passage.

APPLICATIONS

This BMP may be used at stream crossings during culvert replacement, at bridge repair sites, and other sites where the stream flow cannot be interrupted. It may be used in combination with other barriers.

CONSTRUCTION GUIDELINES

- Stream bypass BMPs must be installed according to applicable permit requirements.
- Refer to Appendix E for Fish Exclusion Protocols.
- Determine best method for specific site.
- Discuss strategy with crew.
- Work quickly to avoid water contamination by sediment.
- Stabilize pipe outlet to minimize scour and erosion.
- Pump and bypass should be designed or reviewed by an engineer to ensure capacity can handle peak flows.
- Ensure that stream bypasses do not entrain salmonids at pipes and pumps.

BMP MAINTENANCE

- Inspect bypass, pump, and dam periodically. Repair any leaks.
- Check for scour at bypass outfall. Repair or move as necessary.



BMP: STREAM BYPASS (continued)

- Have adequate fuel supply and backup pumps in the event of mechanical failure.
- Inspect fish isolation nets to ensure complete exclusion. Remove any accumulated debris from isolation net.

BMP REMOVAL

- Remove BMP when in-water work is complete.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



*A stream bypass used to divert water
around a construction site*



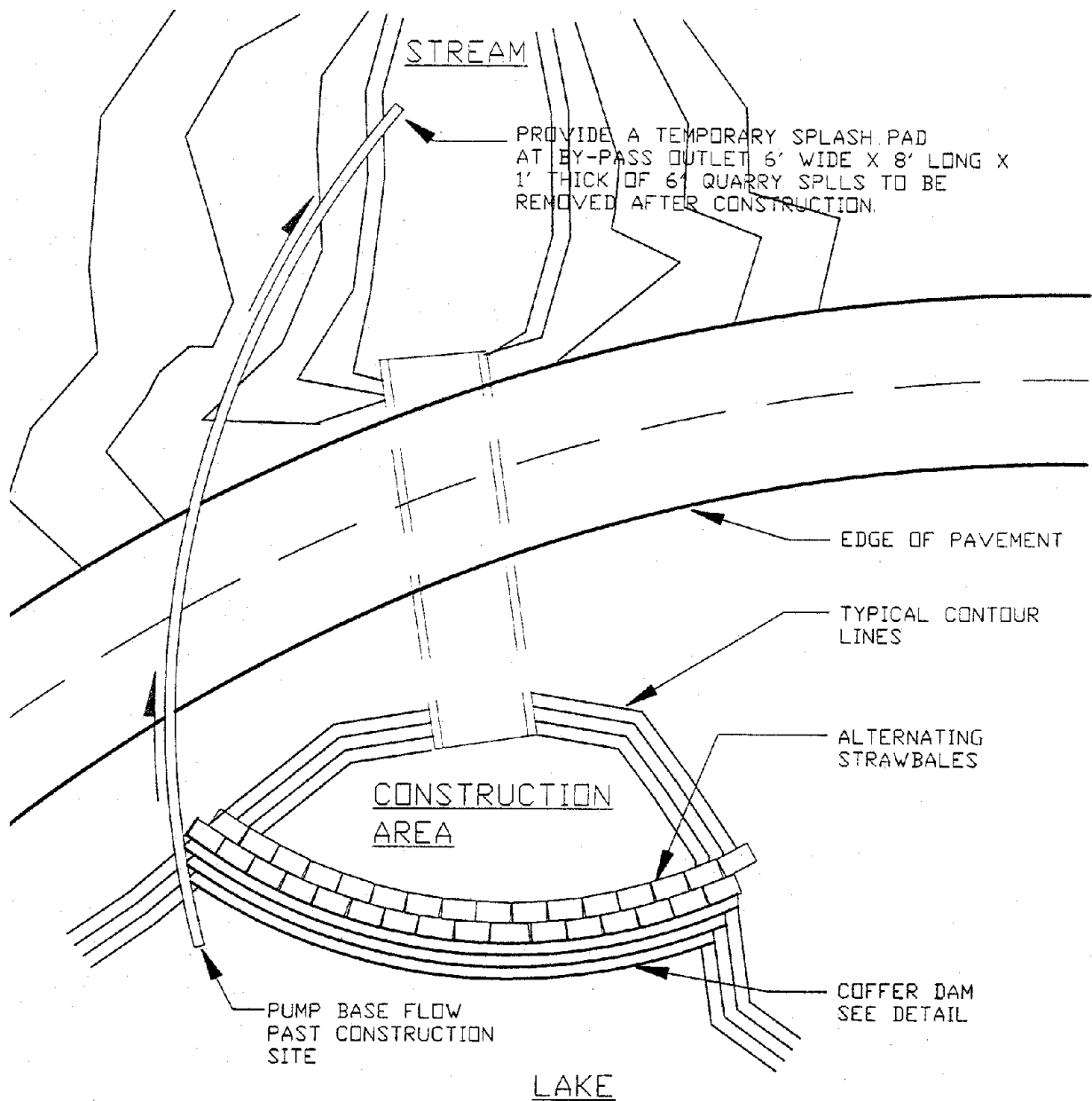
BMP: STREAM BYPASS (continued)



A stream bypass used to divert water around a construction site



STREAM BYPASS DETAILS





BMP **STREAMBED GRAVEL**

DESCRIPTION

Streambed gravel is, non-angular gravel of variable sizes used for habitat protection/maintenance, bridge maintenance or culvert replacements (which may be watercourses or streams).

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Providing a natural substrate.
- Minimizing siltation in ditches and/or stormwater facilities.

APPLICATIONS

This BMP may be used to provide fish habitat in sensitive areas, culverts or ditches used by fish. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- If the gravel does not meet design specifications.

CONSTRUCTION GUIDELINES

- Streambed gravel must be placed in accordance with applicable design and/or permit conditions.
- Check gravel gradation to ensure it meets design specifications.
- If gravel does not meet specifications because of excessive fines, wash rock off-site (at a location where washed water can not enter watercourses, streams or wetlands) until water runs clear.
- Haul material in clean truck bed.
- Dump streambed gravel onto tarped area on-site.
- Place a cover or berm around streambed gravel stockpiles.

BMP MAINTENANCE

- Inspect piles of streambed gravel periodically.

BMP REMOVAL

- BMP removal is not applicable.



Placing streambed gravel inside a newly installed cross culvert to provide a natural substrate for fish



BMP SURFACE ROUGHENING

DESCRIPTION

Surface roughening is roughening a bare, sloped soil surface with horizontal grooves running across the slope. Grooves can be large-scale, such as grooving with disks, tiller, or other machinery, or with heavy track machinery which should be reserved for sandy, noncompressible soils. Roughening aids the establishment of vegetative cover, improves water infiltration, and decreases runoff velocity. This BMP is intended to keep soil from becoming water borne and reduces water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Reducing runoff velocity and increasing infiltration.
- Reducing erosion and providing for sediment trapping.
- Aiding in establishment of vegetative cover with seed.
- Reducing wind velocity at the soil surface.

APPLICATIONS

This BMP should be used as a temporary technique. It may be used in areas to reduce surface runoff or wind velocity until other BMPs can be installed. This BMP may be used on steeper slopes where revegetation is establishing. This BMP may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- On slopes with a rock surface.
- On excessively roughened slopes where mowing is planned.
- In sensitive areas with hydric soils, due to heavy compaction.
- On steep slopes without simultaneous revegetation.

CONSTRUCTION GUIDELINES

- Surface roughening shall be done by operating tracked equipment up and down the slope to leave traverse depressions in the soil.
- As few passes as possible should be made to minimize soil compaction.



BMP: SURFACE ROUGHENING (continued)

- The surface should be roughened to a depth of 2 to 4 inches.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Check for erosion, scour and sloughing, make any required repairs.

BMP REMOVAL

- BMP removal is not applicable.

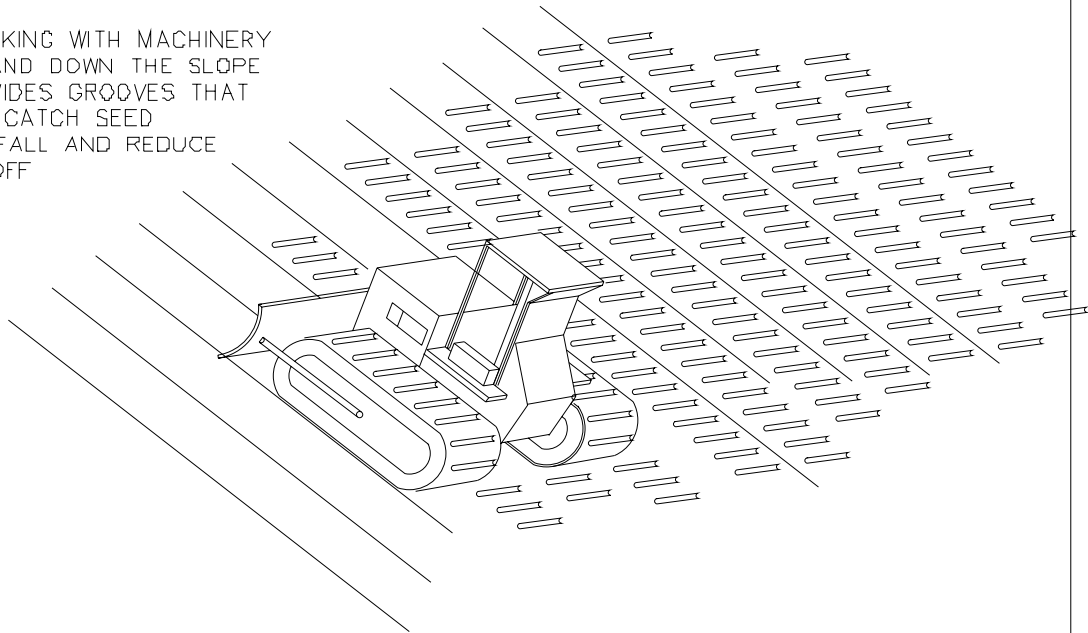


BMP: SURFACE ROUGHENING (continued)

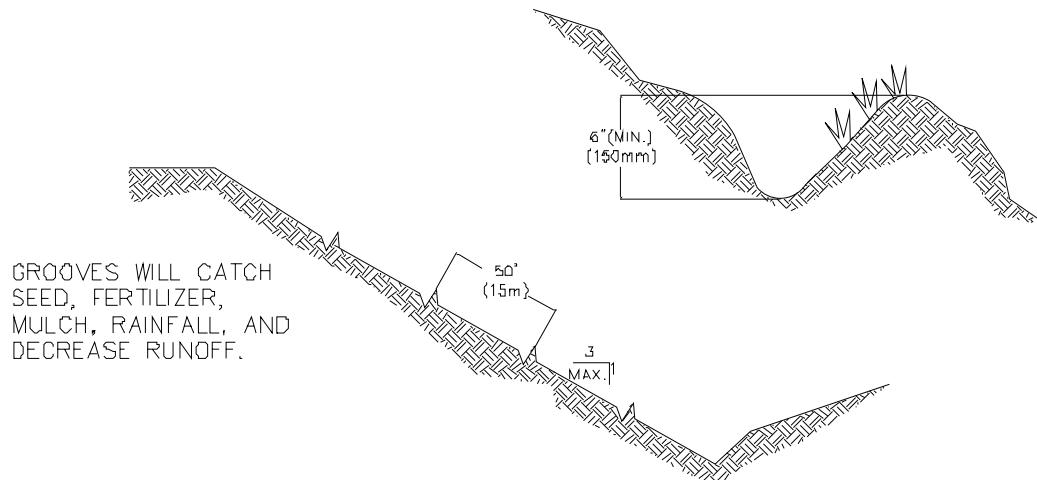
SURFACE ROUGHENING

TRACKING

TRACKING WITH MACHINERY
UP AND DOWN THE SLOPE
PROVIDES GROOVES THAT
WILL CATCH SEED
RAINFALL AND REDUCE
RUNOFF



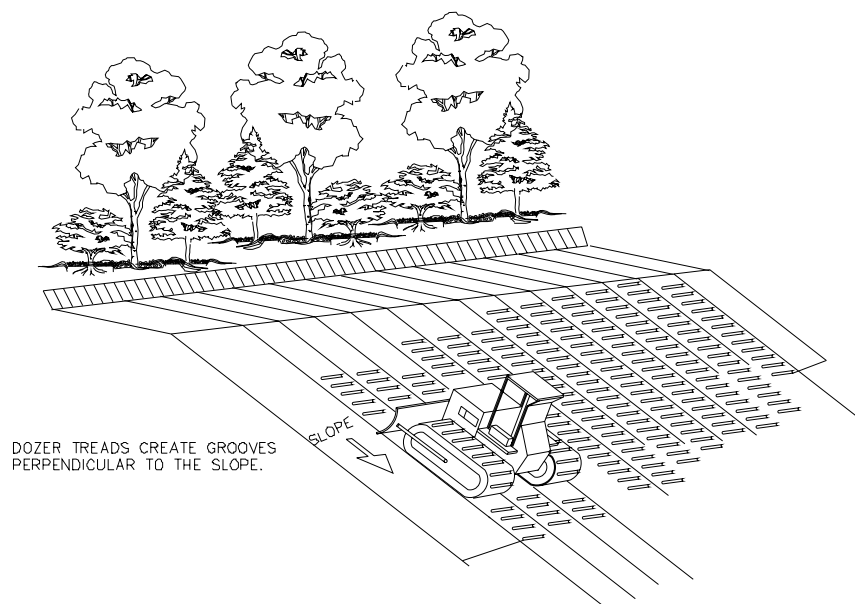
CONTOUR FURROWS





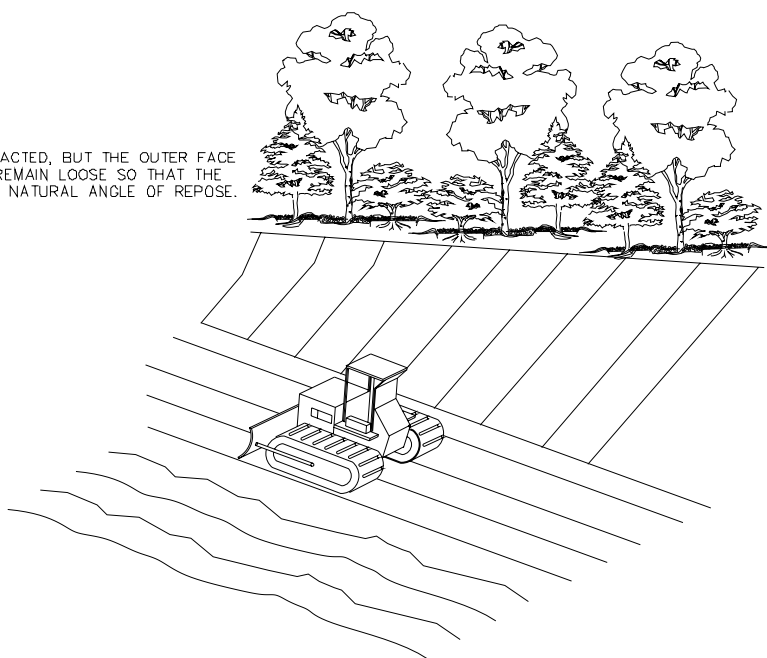
BMP: SURFACE ROUGHENING (continued)

TRACKING



FILL SLOPE TREATMENT

EACH LIFT OF THE FILL IS COMPACTED, BUT THE OUTER FACE OF THE SLOPE IS ALLOWED TO REMAIN LOOSE SO THAT THE ROCKS, CLODS, ETC. REACH THE NATURAL ANGLE OF REPOSE.





BMP SWEEPING

DESCRIPTION

Sweeping is done by hand or mechanical means. A sweeper is a vehicle with brushes and/or a vacuum system and a water spray system used on the roadways to remove debris and soil particles.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Removing soil particles and debris before entering drainage systems, streams or watercourses.
- Suppressing dust on roadways and at construction sites.
- Removal of snow sand after snow and ice control operations.

APPLICATIONS

This BMP may be used to remove soil particles, debris and/or snow sand from paved surfaces. It may be used in combination with other BMPs.

LIMITATIONS

- All street sweeping is a benefit. There are no limitations.

CONSTRUCTION GUIDELINES

- Use pickup brooms in sensitive areas.
- Use water with mechanical brooms.
- Schedule snow sand removal as part of the snow and ice emergency response.
- Dispose of collected material.

BMP MAINTENANCE

- BMP maintenance is not applicable.

BMP REMOVAL

- BMP removal is not applicable.



A sweeper picking up debris and soil particles on a paved access road

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BMP

TEMPORARY SEDIMENT TRAP



DESCRIPTION

A temporary sediment trap is a small ponding area formed by constructing an earthen embankment with a rock outlet to allow for soil particle settling.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to allow settling of soil particles.
- Retaining sediment on site.

APPLICATIONS

This BMP may be used below disturbed areas where the total contributing drainage area is less than 3 acres. Drainage areas larger than 3 acres may use other BMPs such as siltation ponds or settling tanks, as defined in applicable permit conditions. It may also be used where the sediment trap will be used no longer than 18 months. This BMP may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- In areas where the total contributing drainage area is more than 3 acres.

CONSTRUCTION GUIDELINES

- The area under the embankment shall be cleared and stripped of any vegetation and root mat.
- Fill material shall be free of roots or other woody vegetation, organic material and other unsuitable material.
- All embankment slopes shall be not steeper than 2 horizontal to 1 vertical.
- The embankment shall be seeded.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek.



BMP: TEMPORARY SEDIMENT TRAP (continued)

Schedule additional inspections during storm events. Make any required repairs.

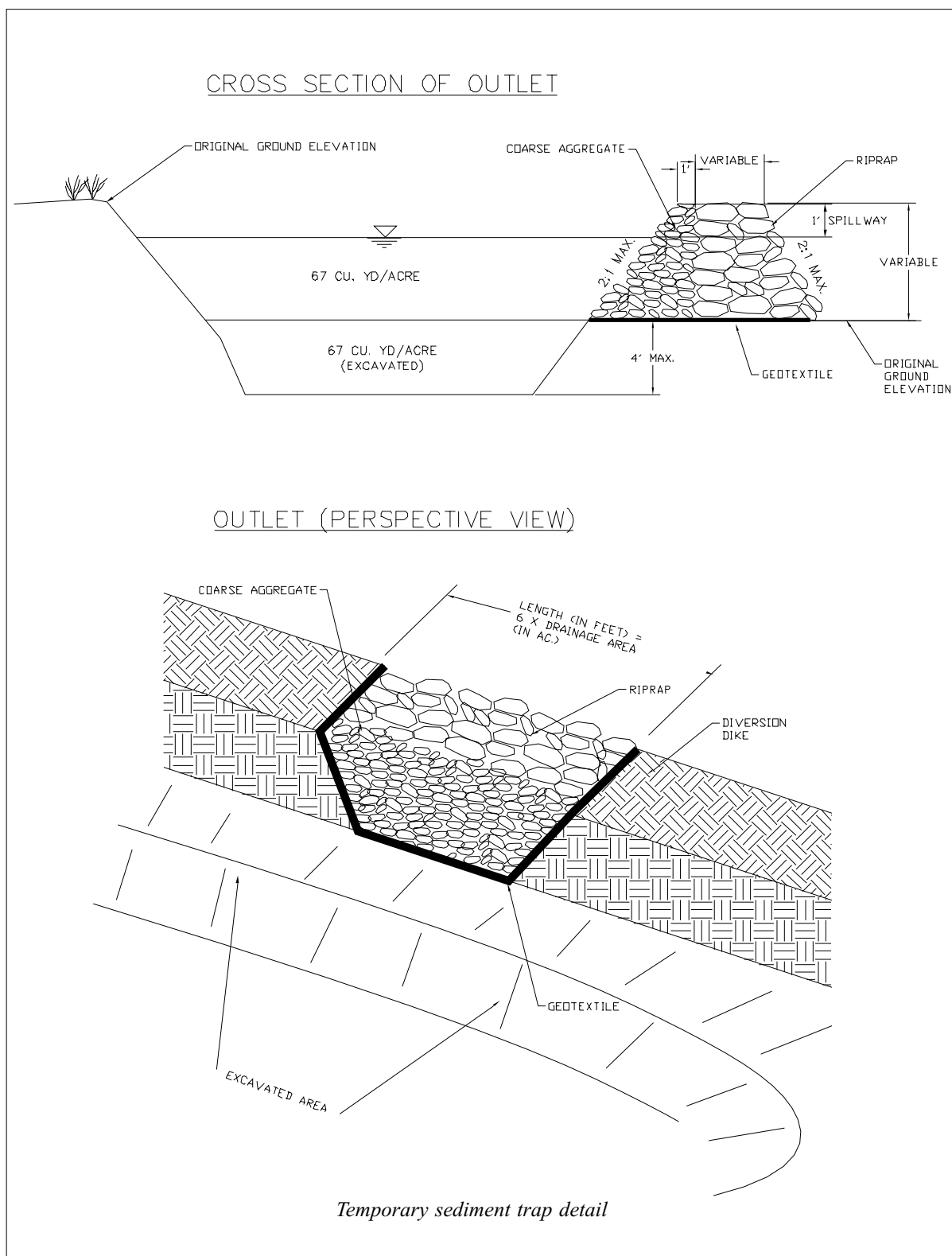
- Sediment shall be removed when it has accumulated to one-half the original dimension.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup from BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Re-vegetate area disturbed by BMP removal (if applicable).



BMP: TEMPORARY SEDIMENT TRAP (continued)





BMP

TRIANGULAR SILT DIKE

DESCRIPTION

A triangular silt dike is a sediment control device made of foam sewn into a woven geo-synthetic fabric. It is triangular in shape, 10 in. to 14 in. high in the center, with a 20 in. to 28 in. base. An apron extends beyond both sides of the triangle along its standard section of 7 ft. A sleeve at one end allows attachment of additional sections as needed. This BMP can be used to provide settling and/or reduction in water velocity/erosive forces.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Intercepting sheet flow.
- Intercepting and detaining small amounts of water from disturbed areas during construction operations in order to allow settling of soil particles.
- Decreasing down slope sheet flow velocity.
- Retaining soil particles on site.

APPLICATIONS

This BMP may be used for temporary check dams in ditches of any dimension. This BMP may be used for perimeter protection. It may be used in combination with other barriers.

This BMP may be used below disturbed areas subject to sheet and rill erosion where drainage area is no greater than .25 acre per 100 lineal feet of barrier and the slope behind the barrier should be no steeper than 2 horizontal to 1 vertical. On relatively flat slopes the maximum disturbed slope distance should not exceed 100 feet. The allowable disturbed slope distance decreases as the slope gets steeper.

LIMITATIONS

This BMP should not be used:

- Where flow volume or velocity inhibit BMP function.
- As a filter.
- When maintenance activities could reduce actual or potential high flow salmonid refuge functions, this BMP will only be used if:



- Required or allowed by permit conditions.
- Required by other regulations.

CONSTRUCTION GUIDELINES

- Install with the long flap upstream.
- Install to prevent water from going around or under BMP.
- BMP should be placed along contours.
- BMP must be anchored with adhesive on asphalt or other hard surfaces or staples or stakes on soil or soft surfaces.

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Sediment should be removed when deposits reach one-half the height of the BMP.

BMP REMOVAL

- Evaluate site to determine BMP is no longer needed (the area has stabilized—potential of sediment laden water exiting the area has passed).
- Remove sediment buildup in front of BMP.
- Remove BMP (recycle and/or re-use if applicable).
- Use sweeper or hand broom to clean road surface.
- Depending upon BMP placement, re-vegetation of site may be necessary.



BMP: TRIANGULAR SILT DIKE (continued)



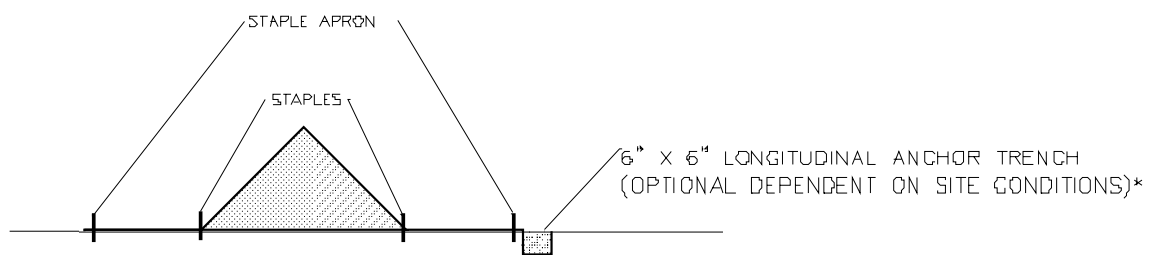
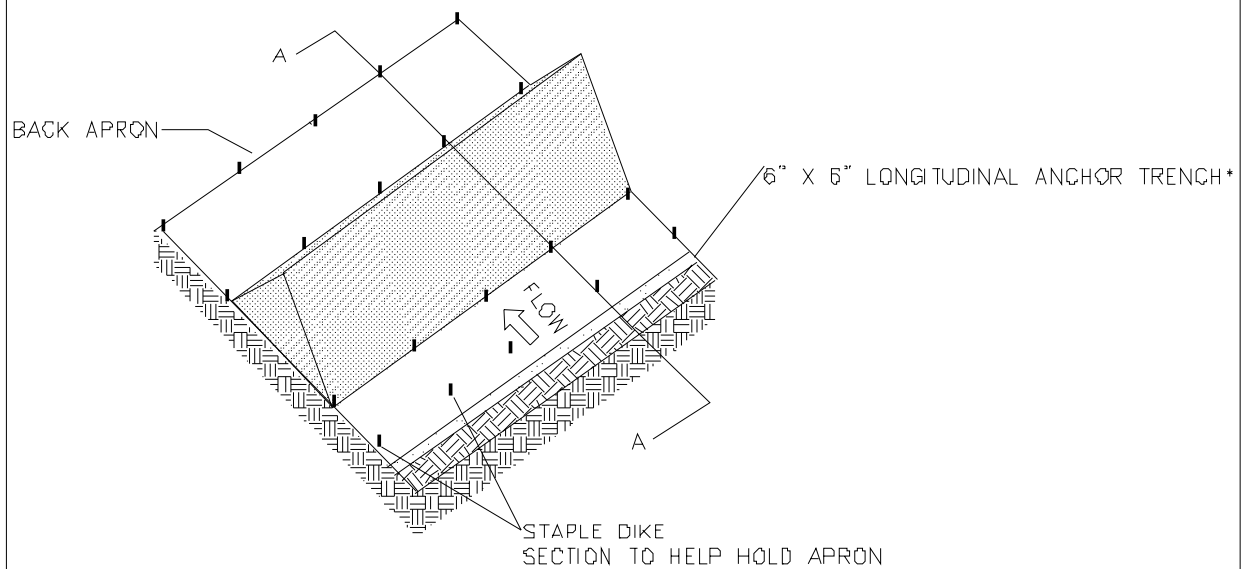
A triangular silt dike detaining water and allowing soil particles to settle



A triangular silt dike in place with accumulated sediment being retained on site, prior to cleaning



TRIANGULAR SILT DIKE DETAIL



* TRENCH APRON DEPENDING ON SITE
CONDITIONS AND MANUFACTURER'S
SUGGESTED USE.



BMP **TURBIDITY CURTAIN**

DESCRIPTION

A turbidity curtain is a pre-manufactured floating geotextile structure which minimizes turbidity transport from a disturbed area adjacent to or within a body of water. This device allows for settling of suspended solids and/or reducing water velocity.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Minimizing the mixing of turbid water with the adjacent clean water.
- Containing soil particles during construction and/or repair activities.

APPLICATIONS

This BMP may be used in water including open drainage systems, non-tidal and tidal watercourses where construction activities create turbidity.

LIMITATIONS

This BMP should not be used:

- Across the entire flow of the watercourse or stream.
- To cross more than 2/3 of the main flow of any salmonids bearing water at the time of the year when any life history stage of salmonids are expected to be present.
- Where flow volume or water velocity inhibit BMP function.

CONSTRUCTION GUIDELINES

- Turbidity curtains must be installed according to applicable permit requirements.
- Follow manufacturer recommendations and guidelines for installation and safety measures.
- Turbidity curtains are available in various heights. The units are preassembled in 50-foot lengths and are used by connecting the number of units required.
- Add a suitable weight or anchoring system to the bottom of the curtain.
- See drawings on following pages.



- The turbidity curtain can be deployed in standing and/or in flowing water (see limitations).

BMP MAINTENANCE

- During construction, inspect BMPs daily during the workweek. Schedule additional inspections during storm events. Make any required repairs.
- Inspect daily.
- If repairs are required, follow directions in repair kit instructions.

BMP REMOVAL

- Remove BMP (recycle and/or reuse if applicable).
- Follow manufacturer recommendations for removal.
- When curtain is removed it shall be in such a manner as to minimize turbidity. Remaining soil particles shall be sufficiently settled before removing the curtain.
- Water discharged from turbidity curtain shall meet permit requirements at the point of discharge.

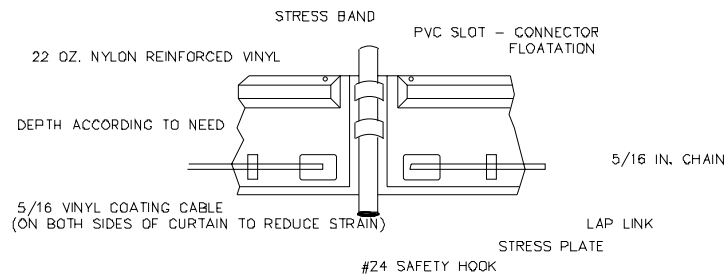


A river repair project in progress using a turbidity curtain to contain turbid water



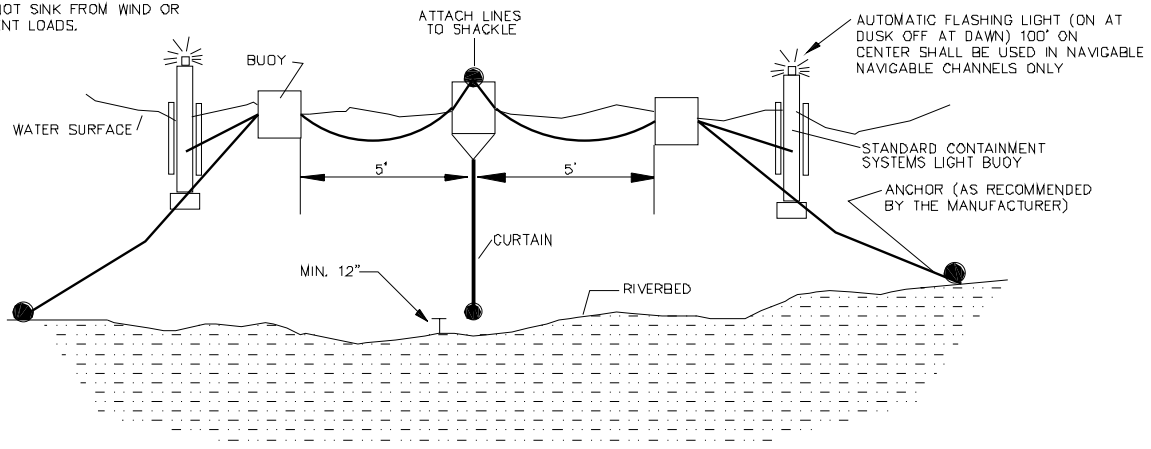
BMP: TURBIDITY CURTAIN (continued)

TURBIDITY CURTAIN TYPE III



ORIENTATION WHEN INSTALLED (TIDAL SITUATION - TYPE III)

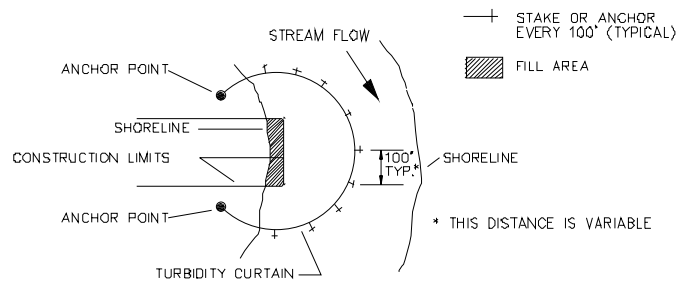
NOTE: ANCHORING WITH BUOYS, AS SHOWN, REMOVES ALL VERTICAL FORCES FROM THE CURTAIN. HENCE, THE CURTAIN WILL NOT SINK FROM WIND OR CURRENT LOADS.



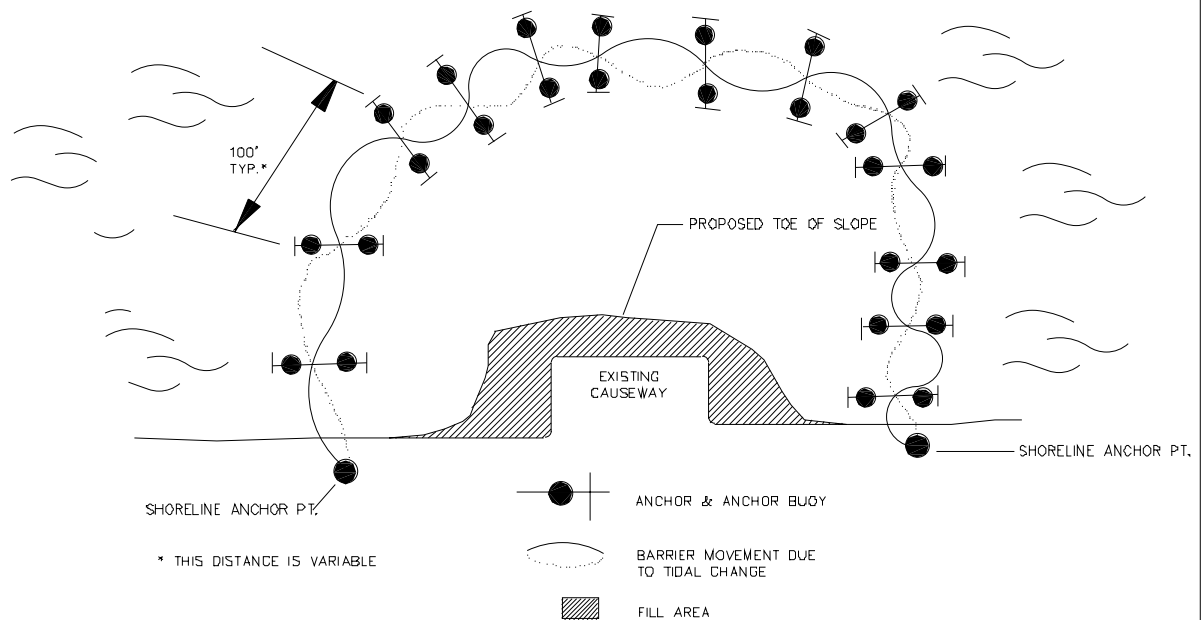


TURBIDITY CURTAIN

TYPICAL LAYOUTS;
STREAMS, PONDS, AND LAKES (PROTECTED AND NON-TIDAL)



TIDAL WATERS AND/OR HEAVY WIND AND WAVE ACTION





BMP VACTORING

DESCRIPTION

Vactoring is the use of a truck mounted drainage system cleaning device. The cleaning device operates on the principle of large volume, high-speed air movement to lift water, soil particles/sediment, contaminants and debris. A large tube conveys the collected materials into a tank mounted on the truck. The cleaning device also includes a freshwater supply and high-pressure pump system to flush and clean pipes and structures. Collected material is transported in the truck to approved disposal sites.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Cleaning drainage systems.
- Dewatering the work area.

APPLICATIONS

This BMP may be used to clean and/or dewater enclosed drainage systems, open drainage systems, excavations and settling ponds. It may be used in conjunction with other BMPs.

LIMITATIONS

This BMP should not be used:

- Where the flow exceeds the capacity of the cleaning device.
- To remove large debris.

CONSTRUCTION GUIDELINES

- When used in a watercourse or stream, vactoring should be done according to applicable permit requirements.
- Reduce potential for sediment and debris from re-entering water.
- If entering a confined space use appropriate air testing and entry procedures.
- Prepare work sequence to address backup equipment or project phasing when tank is full.



BMP MAINTENANCE

- Follow manufacturer's operation and service guidelines.

BMP REMOVAL

- BMP removal is not applicable.



Vactor truck removing sediment from catch basin



BMP VEGETATIVE BUFFER

DESCRIPTION

A vegetative buffer is a strip of vegetation (grasses and small forbes) adjacent to shoulders, ditches, pavement, and/or gravel roads. This BMP reduces soil from becoming water borne and reduces water velocity/erosive forces.

PURPOSE

The purpose of the BMP includes, but is not limited to:

- Providing bio-filtration.
- Reducing soil particles, snow sand and debris from entering ditches or the drainage system.
- Providing habitat and shade when planted along stream and/or watercourse banks.
- Providing habitat for prey base organisms such as macro-invertebrates.
- Allowing plants to grow over the ditch or channel.
- Providing shade as long as it does not become a public safety hazard.

APPLICATIONS

This BMP may be used adjacent to ditches and/or sensitive areas, parallel to roadways, parking lots or at road crossings and must comply with back of slope BMPs along ditch lines. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- If it creates a potential public safety hazard according to federal, state, or city safety standards.
- If it prohibits infiltration or prevents sheet flows.

CONSTRUCTION GUIDELINES

- To the greatest extent possible, preserve existing vegetation as a buffer.
- See other BMPs such as, handseeding, hydroseeding and/or live staking for construction guidelines.



BMP MAINTENANCE

- Mow or trim the vegetative buffer in accordance with applicable standards.
- Re-vegetate as necessary.

BMP REMOVAL

- BMP removal is not necessary.

*Using a ditchmaster
to leave a vegetative
buffer*



Roadside ditch with a vegetative buffer



BMP WASHED ROCK

DESCRIPTION

Washed rock is sediment free non-angular gravel.

PURPOSE

The purpose of this BMP includes, but is not limited to:

- Minimizing siltation in ditches and/or stormwater facilities.
- Reducing velocity and erosive forces.
- Filtering soil particles from water.
- Stabilizing disturbed areas.

APPLICATIONS

This BMP may be used wherever gravel will be placed in ditches and/or stormwater facilities which are watercourses or streams. It may be used in combination with other BMPs.

LIMITATIONS

This BMP should not be used:

- In locations where design and/or permit conditions prescribe other streambed material.
- On steep slopes.
- On road shoulders.

CONSTRUCTION GUIDELINES

- Wash rock off-site (at a location where washed water can not enter watercourses, streams or wetlands) until water runs clear.
- Haul material in clean truck bed.
- Dump cleaned rock onto tarped area on-site.
- Place cover and berms around clean rock that will not be used immediately.

BMP MAINTENANCE

- Inspect stockpiles of cleaned rock periodically. If rock becomes contaminated rewash rock prior to use.

BMP REMOVAL

- BMP removal is not applicable.

PART 3

4(D) APPLICATION FOR INDIVIDUAL AGENCY



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PART 3

4(d) APPLICATION FOR INDIVIDUAL AGENCY



OVERVIEW

The Regional Road Maintenance Endangered Species Act Program (“Regional Program”) consists of the following three parts:

- Part 1: Regional Program Elements.
- Part 2: Best Management Practices.
- Part 3: 4(d) Application for Individual Agency.

Part 1 of the Regional Program describes the ten program elements along with the goals and outcomes of the program.

Part 2 of the Regional Program contains Best Management Practices (BMPs) that require more detailed, site-specific information than routine BMPs, which are presented in Part 1.

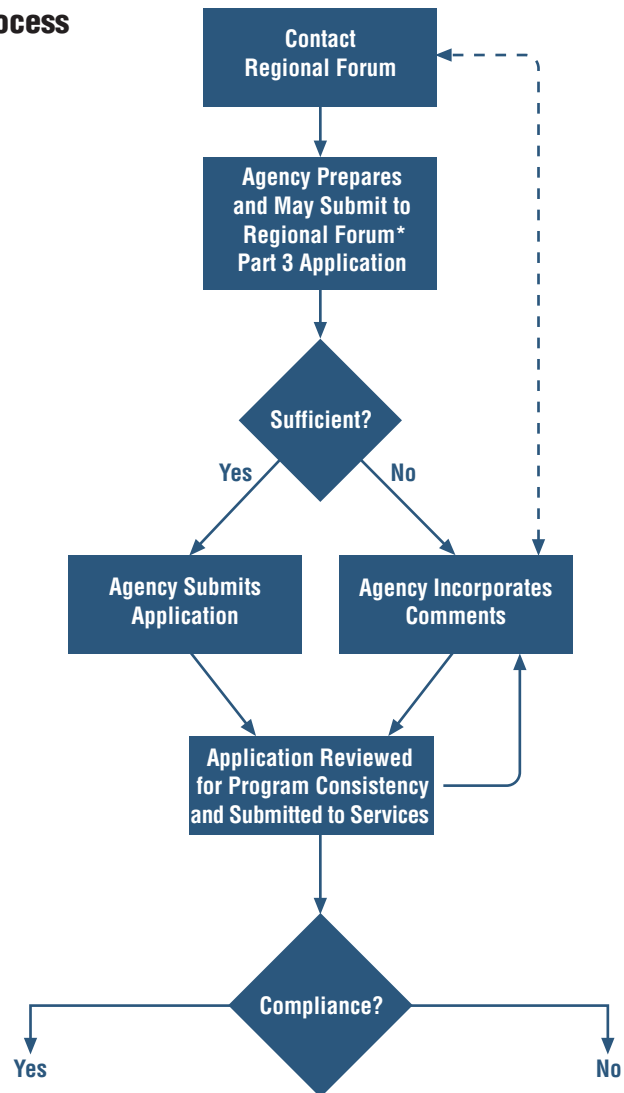
Part 3 of the Regional Program is an *Application for Individual Agencies*. Under the Regional Program, each agency must prepare a Part 3 Application. The Part 3 Application is presented in a “plug-and-play” format that allows applicants to “plug” into Parts 1 and 2 of the program to receive a take limit under the NMFS Salmon and Steelhead 4(d) Rule, special 4(d) Rule and/or Section 7 take exemption (provided through the incidental take statement of biological opinion) through the USFWS.

National Marine Fisheries Service/United States Fish and Wildlife Services (the Services) will review and approve each agency’s Part 3 Application. Before submittal to the Services, the Washington State Department of Transportation (WSDOT) Highways and Local Programs (H&LP) or the Regional Program will screen Part 3 Applications for compliance with the Regional Program. Each agency will submit a Part 3 Application to receive a take limit under the NMFS Salmon and Steelhead 4(d) Rule, special 4(d) Rule and/or Section 7 take exemption (provided through the incidental take statement of biological opinion) through the USFWS. For more information on the Part 3 Application review see Element 2, Program Review and Approval, in Part 1 of the Regional Road Maintenance ESA Program *Guidelines* (*Guidelines*). The Part 3 Application Process is shown on the following pages.



Part 3 Application Process

Figure 8

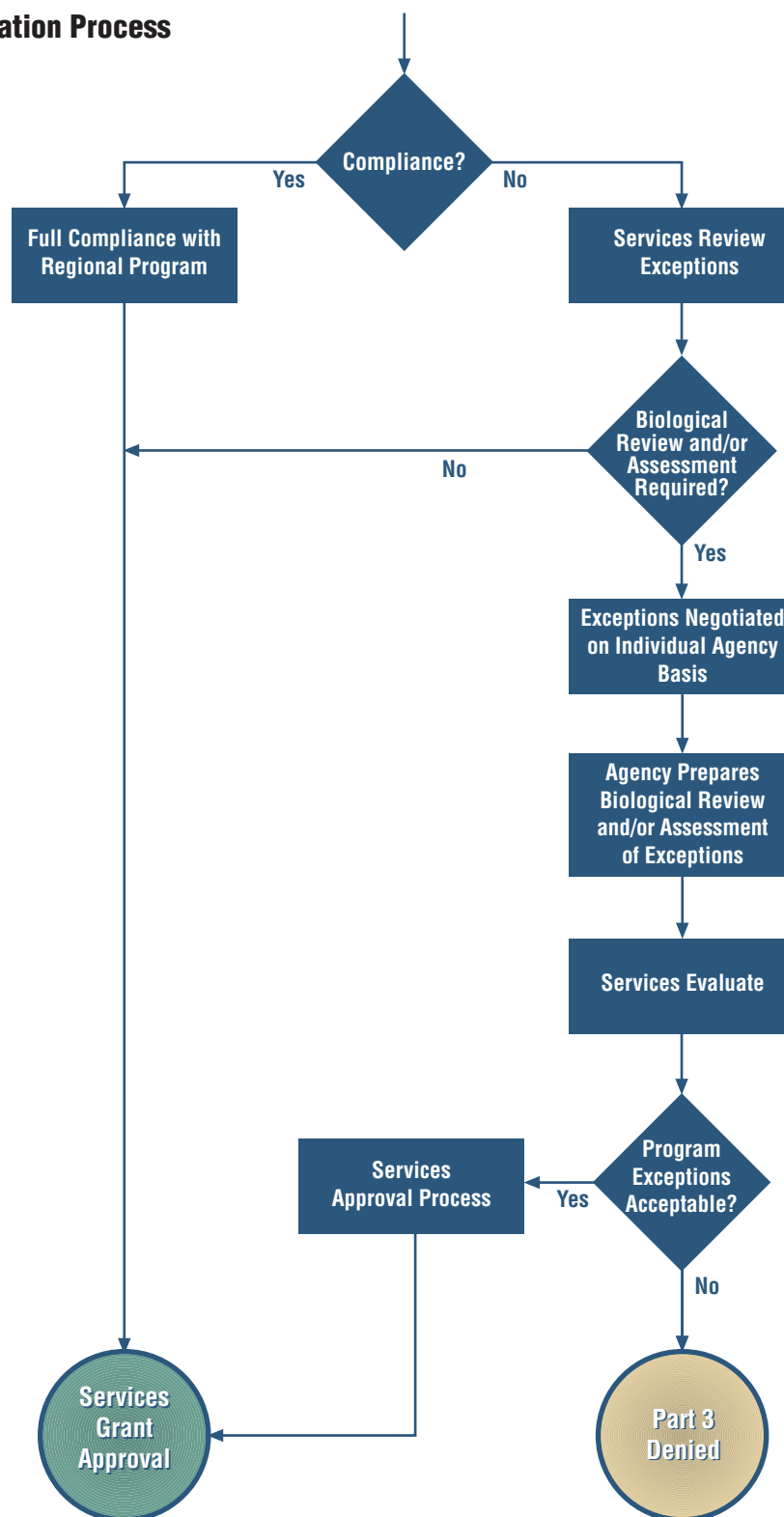


Continued on Next Page



Part 3 Application Process

Figure 8 continued





HOW TO USE PART 3 OF THE *GUIDELINES*

This part of the *Guidelines* is a model for filling out your application. It allows applicants to agree to meet Parts 1 and 2 of the program—effectively creating a plug-and-play into Regional Program—by completing the examples provided in each section. If desired, your agency can also use the application to propose and explain procedural exceptions from the Regional Program.

The Part 3 Application has the following four sections.

- **Section 1: Letter of Commitment.** This section is a letter of commitment requesting the Services to approve plug-and-play for an agency to use Parts 1 and 2 of the Regional Program to receive a take limit under the NMFS Salmon and Steelhead 4(d) Rule, special 4(d) Rule and/or Section 7 take exemption (provided through the incidental take statement of biological opinion) through the USFWS.
- **Section 2: Compliance with Part 1 and Part 2.** This section contains the ten program elements in the Regional Program. Agencies must commit to complying with all Regional Program elements at both the regional and local levels to obtain a take limit under the NMFS Salmon and Steelhead 4(d) Rule, special 4(d) Rule and/or Section 7 take exemption (provided through the incidental take statement of biological opinion) through the USFWS.
- **Section 3: General Procedures.** This section contains the general procedures of an agency. It outlines organizational structure and processes for maintenance selection, BMP selection and implementation, checklists, and adaptive management.
- **Section 4: Exceptions from the Regional Program.** This section contains any exceptions from the Regional Program including the following:
 - Any agency programs not included in the Regional Program.
 - Any deviations.
 - Any additional maintenance categories not listed in Part 1 of the *Guidelines*.
 - Checklist process(es) if they differ from those in the *Guidelines*.
 - Any additions or changes outside of the *Guidelines*.



To adopt the Regional Road Maintenance ESA Program *Guidelines* **without changes**, any agency can use the examples in each of the four sections to develop their submittal. By inserting the agency's name in place of "(Agency)", applicants can directly create a Part 3 Application submittal. Each section in the Part 3 Application gives instructions for filling in the information.

Or if your agency wishes to add to the Regional Program or to use a maintenance category other than those in the *Guidelines*, those exceptions from the program must be included and highlighted in Section 4 of your Part 3 Application.

Agencies that are unfamiliar with the Regional Road Maintenance ESA Program *Guidelines* or the Part 3 Application process should attend a Regional Forum meeting. The Regional Forum can help applicants better understand the Regional Program and the Part 3 Application process.



PART 3 APPLICATION

The Part 3 Application components are outlined below. Each of the four sections of the application gives italicized instructions and clearly marked boldface areas for you to insert the name of your agency. Inserting your agency's name and submitting the Part 3 Application means you agree to the Regional Program without changes.

If your agency wishes to develop their own Part 3, you must highlight those areas you wish to include or exclude from the Regional Program.

PART 3 APPLICATIONS HAVE FOUR SECTIONS

The following is a detailed listing of what you must provide in each of the four sections of the Part 3 Application. Instructions and examples are on the following pages:

Section 1: Letter of Commitment to Implement the Regional Program

1. Complete Letter of Commitment to NMFS
2. Complete Letter of Commitment to USFWS

Section 2: Commitment to Part 1 and Part 2 of the Regional Program

1. Commit to regional action
2. Commit to local action

Section 3: General Procedures

Provide the following information:

1. Organizational structure.
2. Maintenance activity or project selection process.
3. BMP selection and implementation process.
4. Checklist process.
5. Internal adaptive management process.

Section 4: Exceptions from the Regional Program

1. Describe any elements not included in the Regional Program.
2. Describe any deviations from the Regional Program.
3. Describe additional maintenance categories not listed in Parts 1 or 2 of *Guidelines*.
4. Provide an Agency-specific checklist.
5. Provide other additions or changes.

SECTION 1

(AGENCY) LETTER OF COMMITMENT TO IMPLEMENT THE REGIONAL PROGRAM



(Example of letter to National Marine Fisheries Service)

Instructions:

- This is a formal letter request to commit your agency to implement the Regional Program.
- Fill in both letters.
- Submit letter to each of the Services.

Date

Agency Official (*Contact Regional Forum for Current Name)
National Marine Fisheries Service - NW Region, Regional Administrator
7600 Sandpoint Way NE
Seattle, WA 98115

Subject: **(Agency)** Commitment to Implement the Regional Road
Maintenance ESA Program

Dear Agency Official (*Contact Regional Forum for Current Contact Name):

This letter serves as a letter of commitment from the **(Agency)** to the National Marine Fisheries Service that the **(Agency)** will implement the measures, and abide by the commitment made in this Part 3 Application. In addition, we will work closely with National Marine Fisheries Service as we evaluate and adjust the routine Road Maintenance ESA Program through adaptive management.

The **(Agency)** is committed to being a partner in the Regional Road Maintenance ESA Program. Part of this commitment is identifying and implementing best management practices (BMPs) to minimize potential environmental impacts associated with Road Maintenance activities. The accompanying Part 3 Application represents the minimization and avoidance measures identified for routine road maintenance activities.

The **(Agency)** will participate as an active member of the Regional Forum. The **(Agency)** will implement the program outlined in this Part 3 Application.

If you need additional information, or have any questions, please feel free to contact **(Agency Official)** at *** ***,

Sincerely,
(Title Block)
Enclosure



(Example of letter to United States Fish & Wildlife Service)

Date

Agency Official (*Contact Regional Forum for Current Name)
United States Fish & Wildlife Service
510 Desmond Drive; Suite 102
Lacey WA 98503

Subject: **(Agency)** Commitment to Implement the Regional Road
Maintenance ESA Program

Dear Agency Official

(*Contact Regional Forum for Current Contact Name):

This letter serves as a letter of commitment from the **(Agency)** to the United States Fish & Wildlife Service that the **(Agency)** will implement the measures, and abide by the commitment made in this Part 3 Application. In addition, we will work closely with the United States Fish and Wildlife Service as we evaluate and adjust the routine Road Maintenance ESA Program through adaptive management.

The **(Agency)** is committed to being a partner in the Regional Road Maintenance ESA Program. Part of this commitment is identifying and implementing best management practices (BMPs) to minimize potential environmental impacts associated with Road Maintenance activities. The accompanying Part 3 Application represents the minimization and avoidance measures identified for routine road maintenance activities.

The **(Agency)** will participate as an active member of the Regional Forum. The **(Agency)** will implement the program outlined in this Part 3 Application .

If you need additional information, or have any questions, please feel free to contact **(Agency Official)** at *** ***.

Sincerely,

(Title Block)

Enclosure

SECTION 2

(AGENCY) COMMITMENT TO PART 1 AND PART 2 OF THE REGIONAL PROGRAM



Instructions:

- This is a commitment to Part 1 and Part 2 of the Regional Program. There are ten program elements in the Regional Road Maintenance ESA Program. Agencies must comply with each of the ten program elements to obtain a take limit under the NMFS Salmon and Steelhead 4(d) Rule, special 4(d) Rule and/or Section 7 take exemption (provided through the incidental take statement of biological opinion) through the USFWS. Each element has a *regional* action and a *Local* action component.
- If your agency wishes to comply with the elements in Section 2 without changes, insert the agency's name in place of the boldface and italics "***(Agency)***". These paragraphs meet the minimum requirements as stated in the Regional Program.
- If your agency proposes exceptions to the Regional Program, these exceptions will need to be defined for both the Regional level and your Local level in section 4 for of the Part 3 Application.

The following are the ten elements of the Regional Program (see *Guidelines*)

Element 1. Regional Forum: A Regional Forum has been created from participating agencies. The Regional Forum provides a regional meeting for program discussion, coordination, and adaptive management.

Regional Action

The ***(Agency)*** Director or designee will be appointed as the Regional Forum member, representing the department. The appointed member shall have the knowledge, authority, and maintenance technical expertise in the field, to discuss, coordinate, and participate in adaptive management of the Regional Road Maintenance ESA Program. The member will have the maintenance knowledge and technical expertise to review the Regional Program, review adaptive management results, recommend program changes, request funding, and brief policy makers for their review and approval of the program. The ***(Agency)*** will participate in the Regional Forum, committee discussions, and activities as they pertain to the Regional Program.

Local Action

The ***(Agency)*** will develop a ***(Agency)*** ESA team that meets regularly. The team will consist of assigned maintenance and operation supervisors and maintenance environmental personnel. The ***(Agency)*** team will



implement the Regional Program, develop and update the (*Agency*) Part 3 application for (*Agency*) manager's review and approval. The team will also coordinate development and implementation of the (*Agency*) Part 3, which includes review, discussion, coordination, and adaptive management. The team will recommend program changes that evolve from adaptive management to improve the regional program and the (*Agency*) program. The team will prepare a quarterly Adaptive Management report for the Regional Forum meetings. This report will provide an overview of the implementation of the program. The Adaptive Management report will also recommend potential revisions to the Regional Program based on new information.

Element 2. Program Review and Approval: The program review and approval process will require that each agency participating in the Regional Program comply with the ten program elements. Each agency's Part 3 Application will be reviewed by the Washington State Department of Transportation (WSDOT) Highways and Local Program (H&LP) or the Regional Forum, to ensure that all ten program elements are included in the Part 3 Application. The Services will issue final approval for each agency.

Regional Action:

The Regional Forum has developed, in cooperation with the Washington State Department of Transportation (WSDOT) H&LP, and with the approval of the Services, a process for road maintenance Part 3 Application review. This review and approval process serves as an agency's commitment to comply with the approved program (Part 1 and Part 2). The (*Agency*), as part of the Regional Forum, will work with WSDOT H&LP or the Regional Forum and the Services in the evaluation of the process for reviewing local agency Part 3 Applications as they relate to the Regional Program.

Local Action:

The (*Agency*) team will work to develop the (*Agency*)'s Part 3 Application, and implement the Regional Program. The team will review the following documents: letter of commitment, commitment to the ten program elements, organization structure, activity selection process, selecting/implementing the BMP process, the checklist process, and any local program exceptions from the regional program. The team will review the Part 3 application to ensure it meets the requirements of the Regional Program.



Element 3. Training: Courses will include the topics of basic ESA, design, biological review, permit, maintenance BMPs, and monitoring work activities. The WSDOT Technology Transfer (T2) Center, and University of Washington or WSDOT Operations & Maintenance Program, in conjunction with the Regional Forum, will develop a curriculum for training of road maintenance employees in the implementation of the Regional Program. The curriculum may be taught by T2 instructors, WSDOT Trainers, or other trainers that have passed the train-the-trainer course.

Regional Action:

The Regional Forum has, in cooperation with the WSDOT T2 Center, University of Washington, or WSDOT Operations & Maintenance Program, developed a program for formal training of road maintenance employees in the implementation of the regional program. The (*Agency*) will participate in the Regional Forum discussions as they pertain to Program Element 3 training activities.

The (*Agency*) may participate in the training committee, working with WSDOT (T2), the University of Washington (*TRANSPEED*) or WSDOT to develop and implement training curriculum as outlined in the *Regional Road Maintenance ESA Program Guidelines*. The (*Agency*) will support an adaptive management approach to training by reviewing course curriculum and proposing changes to incorporate new information into the program.

Local Action

The (*Agency*) will require maintenance employees to attend training courses relevant to their position within the organization as courses are developed and become available. New maintenance employees will be trained on relevant Regional Program courses within a reasonable amount of time.

The (*Agency*) team will review and recommend updates to the Regional Program training through adaptive management activities by reviewing course curriculum and implementation of the training program.

Element 4. Compliance Monitoring: Compliance monitoring will take place at a number of levels: local agency supervisory staff and local, state and federal agency permitting authorities evaluating BMPs for use and implementation. Each local jurisdiction will establish a formal compliance monitoring program for monitoring BMP implementation and monitoring that takes place as part of various research projects.



Regional Action:

The (*Agency*) will participate in the Regional Forum to review the compliance monitoring activities as they pertain to the *Regional Road Maintenance ESA Program Guidelines*. The Regional Forum process includes program implementation, adaptive management, planning process, performance assessments process, outcome assessments process and coordination with resource agencies.

Local Action

The (*Agency*) team will review implementation of the (*Agency*)'s program and through adaptive management recommend changes to the program if needed. The team will conduct planning meetings with environmental staff to identify maintenance activities, permits, BMPs, and in-water work requirements. The team will conduct performance assessments on selected BMPs. Performance assessment will involve site visits with environmental staff, supervisors, or resource agencies through the permit process.

Monitoring will be done on a routine basis by crew leads, supervisors, maintenance inspectors, or environmental staff. Monitoring may include adequacy of BMPs, development or implementation of checklists, review of implemented BMPs, and their effectiveness. The team will evaluate BMP implementation and, through adaptive management, evaluate performance. The team will then review new information on BMPs and develop recommendations for incorporation in the Regional Program.

Element 5. Scientific Research: Case studies in the field, as well as literature review done by others, are included in this program element. The scientific research element will serve to verify effectiveness of BMPs and to recommend changes to BMPs based on the latest technologies.

Regional Action:

The Regional Forum is a meeting for cooperative research, professional maintenance interaction, information sharing and adaptive management. The research to be performed by the Regional Forum will be specific to road maintenance activities to verify the effectiveness of the BMPs used within the road maintenance right-of-way. Case studies and literature review may be performed both locally and regionally. The information gained may be shared through the Regional Forum. The (*Agency*) will participate in the Regional Forum discussions as they pertain to scientific research activities and shared experiences.



Local Action

The (*Agency*) Team will analyze specific road maintenance BMPs and jointly work with or support development of a research committee.

Element 6. Adaptive Management: The adaptive management philosophy will apply to all elements of the Regional Road Maintenance ESA Program. The training, research, biological data collection, and program monitoring elements are the basis for adaptive management.

Regional Action:

The Regional Forum provides a forum for adaptive management of the Regional Program. Adaptive management will apply to all elements of the Regional Program. Compliance monitoring, BMP effectiveness monitoring, review of the Regional Program, and scientific research shall provide some of the basis for adaptive management. Information gained from these elements, will be shared at the Regional Forum to provide the basis for adaptive management decisions. Adaptive management will allow new information and science based technology to be incorporated into recommended changes to the *Regional Road Maintenance ESA Program Guidelines*. The (*Agency*) will participate in the Regional Forum discussions as they pertain to adaptive management.

Local Action:

The (*Agency*) team will implement the program elements of the *Regional Road Maintenance ESA Program Guidelines* and apply adaptive management to the ten program elements. The team will implement a compliance monitoring effort to evaluate the effectiveness of selected BMPs used within program activities. The team will discuss BMPs as part of their routine meetings and make recommendations on incorporating new information, and changes to the Regional Forum.

Element 7. Emergency Response: This element provides a framework under which road maintenance agencies can operate during emergencies.

Regional Action:

Regional Program includes guidance on emergency response for road maintenance agencies. Emergency response is defined as actions undertaken to avoid imminent threat to public health and safety, public or private property, or prevent an imminent threat of serious environmental degradation.



The (*Agency*) will participate in Regional Forum discussions as they pertain to emergency response activities.

Local Action

The (*Agency*) will respond to emergency road maintenance situations and stabilize the situation. Sites will be reviewed with regulatory agencies (as required), and appropriate permits applied for following site stabilization. The (*Agency*) will develop a phone tree for resource contacts to be called during an emergency response. Where possible the emergency maintenance activities will employ the same BMPs as routine maintenance activities.

Element 8. Biological Data Collection: This element includes habitat location information within the right-of-way and development of a process to train and alert staff where these guidelines need to be utilized.

Regional Action:

The (*Agency*) will participate in the Regional Forum discussions as they pertain to the biological data collection process and share experiences or actions encountered.

Local Action:

The (*Agency*) team will work to identify aquatic habitat locations to make BMP decisions within the road maintenance right-of-way. The team will develop a process and train staff when and where to apply the BMPs.

Element 9. Biennial Reports: The Regional Forum will provide biennial (every two years) reports to the Services. Biennial reports will include a review of the ten program elements, updates on research, recommended BMP changes, and recommended updates to the program elements.

Regional Action:

As a member of the Regional Forum, the (*Agency*) will participate in providing the Services biennial reports on the progress of the ten program elements of the *Regional Road Maintenance ESA Program Guidelines*. This report will include a status report and updates on each program element, review of the training program, review of scientific research, review program implementation, and implementation of adaptive management, including recommended changes. The Services will be provided a copy of the quarterly newsletter. The biennial report will be provided to others upon request.



Local Action:

The (*Agency*) will provide quarterly and biennial report to the Regional Forum for use in compiling its biennial report on implementation of the Regional Program. This report will address implementation and progress of the (*Agency*)’s Part 3 Application and activities as they relate to the implementation of the ten program elements of the *Regional Road Maintenance ESA Program Guidelines*.

Element 10. Best Management Practices (BMPs) and

Conservation Outcomes: BMPs and desired conservation outcomes have been developed for road maintenance activities. The Regional Forum will annually review and update the BMPs. Local agencies and the Services will review whatever changes the Regional Forum recommends for adoption.

Regional Action:

The Regional Forum will provide a forum for review and update of the BMPs, and the development of a training program outlined in Program Element 3. The Regional Forum will evaluate the training program and through adaptive management recommend changes to incorporate new information as needed. The (*Agency*) may participate in the Regional Forum discussions and activities as they pertain to the Regional Program.

Local Action:

The (*Agency*) team will implement the Regional Program. As the training program is developed and made available, the training program will be implemented. The team will develop a decision process to identify when environmental staff is to be consulted. The implementation of Program Element 10, BMPs and Conservation Outcomes, will be reviewed and updated annually.



SECTION 3

(AGENCY) GENERAL PROCEDURES

Instructions:

- Complete this section by providing the following materials on your agency's general procedures: Instructions for each subsection will guide you through this section.

GENERAL PROCEDURES MATERIALS

3a Organizational Structure

3b Maintenance Activity/Project Selection Process

- Classification responsible for making decisions
- Biological oversight/support

3c Selecting/Implementing the BMP Process

3d Checklist Process

3e Internal Process for Adaptive Management

3a (Agency) Organizational structure

Instructions:

- This is a commitment to identify staff participating in the Regional Program
- Complete this section by including your organizational structure for road maintenance activities. The organizational structure will help your agency define who is covered under the Regional Program.

3b (Agency) Maintenance Activity/Project Selection and Authorization Process

Instructions:

- This is a commitment to a maintenance activity/project selection and authorization process. As you develop your process you may use this framework as a guide.
 - The boldface items are the key components your need to define for your process.
-



Input for Activity or Project may include, but are not limited to, the following:

- Management Team
- Customer Request
- Inspection
- Environmental Planner/Permit Coordinator

Selection for Activity or Project may include, but are not limited to, the following:

- Directors
- Superintendent
- M & O
- Supervisors

Conceptual Planning for Activity or Project may include, but are not limited to, the following:

- Design Engineers/Consultant
- Superintendent
- M & O
- Supervisors

Budget for Activity or Project may include, but are not limited to the following:

- Director
- Superintendent

Schedule for Activity or Project may include, but are not limited to, the following:

- Superintendent
- Supervisor



Environmental Support for Activity or Project may include, but are not limited to, the following:

- Environmental Planner/Permit Coordinator
- In House
- USFWS
- NMFS
- WDFW
- Consultants

3c (Agency's) BMP Selection and Implementation Process

Instructions:

- This is your agency's commitment to a BMP Selection and Implementation Process.
- If you are planning to use the *Guidelines* without changes, the following sample checklist matches that of the Regional Program.
- If you develop a different process, it must be outlined in Section 4 of this Part 3 Application.

Regional Program BMP Selection and Implementation Process

- Use checklists in Appendix D of the *Guidelines* or develop and use your own checklists as defined in Section 4 of your Part 3 Application.
- Become familiar with the *Guidelines*.
- Identify the "Maintenance Category (ies)" to be performed and BMP categories.
- Define the activity, scope and limits.
- Conduct a site visit.
- Review the BMP options.
- List those BMPs (both part 1 and Part2) applicable to the Maintenance Category or Categories.
- Select the BMP(s) that will meet the desired outcome.
- Secure permits.
- Prepare a maintenance sequence and/or schedule.
- Conduct a pre-maintenance/pre-construction meeting to go over the



activity, roles and responsibilities, and BMP(s) installation, monitoring/maintenance, and removal.

- Gather the necessary crew(s), equipment and material.
- Implement the BMP(s) by following the *Guidelines'* instructions, permits or plans.
- Ask for help (if required).

3d Checklist Process

Instructions:

- This is a commitment to use a checklist process in your agency.
- If you are planning to use the *Guidelines* without changes, use the following sample checklists from the Regional Program.
- If you develop a different process, it must be outlined in this section under a heading “Your Checklist Process” and in section 4 of this Part 3 Application.

3d (1) Activity or BMP Planning and Selection Checklist

1. Make site visit before starting work.
2. Define activity, scope and limits.
3. Identify sensitive areas and drainage features.
4. Is Environmental staff required to review plans or provide crew support?
5. Are fish present (or likely to be present) in the work area or activity impact area? (If yes, contact environmental support staff or WDFW.)
6. Will fish exclusion be required? (If yes, coordinate with designated staff or agency.)
7. Review Maintenance Category BMP options related to site-specific conditions.
8. Select applicable BMP(s) from Part 1 & 2 of the *Guidelines*.
9. Secure permits.
10. Read and understand permit conditions. Resolve permit conditions before moving forward.
11. Prepare construction or maintenance sequence (including installation, monitoring, maintaining and removing BMP(s)).



12. Schedule a pre-maintenance or a pre-construction meeting as necessary.
13. Review activity as possible model for training and/or adaptive management discussions.

3d (2) Pre-Construction or Pre-Maintenance Meeting Checklist

1. Invite appropriate personnel and/or agencies.
2. Prepare agenda and attendance/sign in form.
3. Outline construction/maintenance, schedule, and/or sequence (including installation, monitoring, maintaining and removing BMP(s)).
4. Identify sensitive areas and drainage features.
5. If fish exclusion required, follow Fish Exclusion Protocol in Appendix E.
6. Clarify roles and responsibilities of personnel and agencies related to aspects of the activity.
7. Discuss permits, approvals and their conditions.
8. If environmental staff is required to be onsite during work activities: introduce personnel and their role(s).

3d (3) Activity or BMP Installation, Monitoring, Maintaining and Removal Checklist

1. Identify/mark work area and location of BMP(s).
2. Arrange for delivery of BMP(s) products.
3. Environmental staff support as appropriate.
4. Make sure BMP(s) are installed in accordance with *Guidelines*, permit conditions and/or specifications.
5. Monitor/check BMP(s) routinely to make sure BMP outcomes are achieved, and make repairs, adjustments, and/or additions as necessary.
6. Remove BMP(s) and re-vegetate in accordance with the *Guidelines*.



3e Internal Process for Adaptive Management

Instructions:

- This is a commitment to use an adaptive management process in your agency.
- If you are planning to plug into the *Guidelines* without changes, use the following adaptive management framework. (See the *Guidelines*).
- If you develop a different adaptive management process, it must be outlined in this section and listed in section 4 of this Part 3 Application.

(*Agency*) staff will participate in the Regional Forum, described in Part 1 of the Regional Program *Guidelines*.

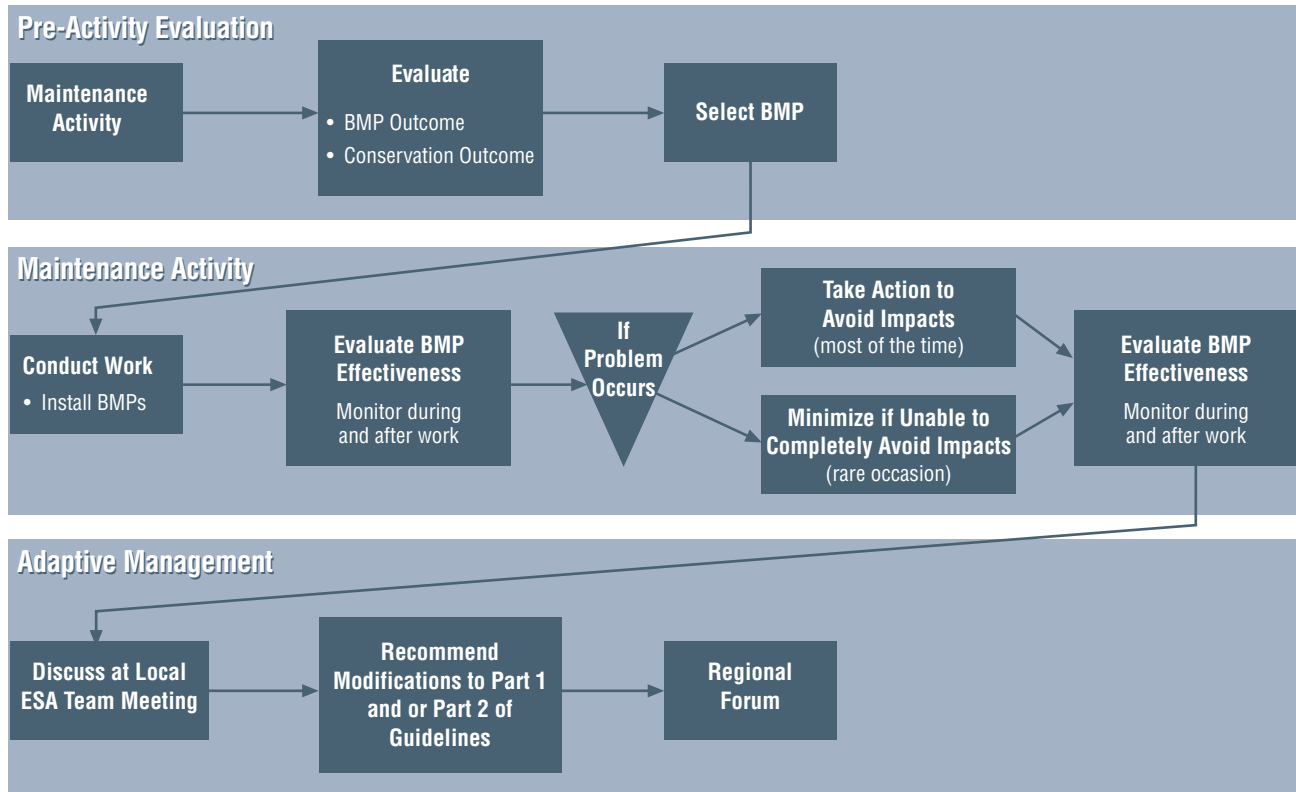
(*Agency*) will develop a team in which information and experiences can be shared and reviewed to improve the implementation of the Regional Program. The team will do the following:

- Share information.
- Review and evaluate the implementation progress of each Regional Program element.
- Gather and analyze information in order to develop and implement alternatives to correct unproductive BMP(s).
- Review and evaluate new information for possible incorporation into the Program.
- Any Program modifications will be reviewed/approved by (*Agency*) policy makers.

The figure on the next page shows the local agency adaptive management process:



Agency Adaptive Management



SECTION 4

EXCEPTIONS FROM REGIONAL PROGRAM



Instructions:

- Any exceptions to the Regional Program may require a full program review and negotiation. The Services will determine the level of review. This review could include any or all of the following:
 - Biological review.
 - Negotiations with the Services.
 - Public notice.
 - Comment period.
- Highlight any changes or additions to the Regional Program under the proper headings below:
 - If agency has no exceptions indicate so under 4E.

GENERAL PROCEDURES

- 4a** Describe any local program elements not included in the Regional Program.
- 4b** Describe any deviations from the Regional Program.
- 4c** Additional Maintenance Categories/Activities, not listed in Parts 1 and 2 of the *Guidelines*.
- 4d** Agency-specific checklists, if different from those in Part 1 of the *Guidelines*.
- 4e** Other additions or changes.



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developed by:
Regional Road Maintenance
Technical Working Group



The Guidelines are available at: <http://www.metrokc.gov/roadcon/bmp/pdfguide.htm>