

6.0 Impact Avoidance and Minimization Measures

Contents

| | | |
|-------|---|------|
| 6.0 | Impact Avoidance and Minimization Measures | 6.1 |
| 6.1 | Impact Minimization Measures and Best Management Practices | 6.3 |
| 6.2 | Where to Include Minimization Measures and Best Management Practices within a BA | 6.5 |
| 6.3 | Developing Appropriate Impact Minimization Measures for Specific Construction Activities | 6.5 |
| 6.3.1 | Overview of Common Construction Activities | 6.5 |
| 6.3.2 | General Considerations for Minimizing Activity-Specific Impacts | 6.6 |
| 6.4 | Developing Appropriate Impact Minimization Measures for Sensitive Species and Habitats | 6.32 |
| 6.4.1 | Impact Minimization Measures for Sensitive Species | 6.32 |
| 6.4.2 | Impact Minimization Measures for Habitats Associated with Sensitive Species | 6.33 |

6.0 Impact Avoidance and Minimization Measures

Chapter Summary

- Performance standards are observable or measurable benchmarks for a particular performance objective against which a project can be compared. If the standards are met the related performance objectives are considered to have been fully achieved. Performance measures must be something quantifiable; measures, not actions that are: 1) achievable and 2) capable of being monitored. Performance standards may only be applied on some projects.
- Performance standards are often established for projects lacking detailed designs (i.e., projects undertaking consultation early in design). Examples of Performance standards are provided below:
 - Performance Measure or Goal #1. Minimize harm and harassment to listed salmonid species due to degradation of water quality during in-water work activities.
 - Performance Standard #1.1. Water quality in the Puyallup River will meet the State's Water Quality Standard at a point 300 feet downstream during in water work as determined by a monitoring program. If an activity results in non-compliance with this standard, work causing the effect will be immediately stopped and corrective actions taken.
- Conservation measures are activities or measures that help recover listed species. Conservation measures may only be identified or recommended for some projects.
 - An example of a conservation measure would include implementing research or surveys of unsurveyed habitat in other portions of a watershed or other areas in a species' range to determine occupancy, life history information, etc. or contribution of funds toward habitat enhancement projects intended to improve baseline conditions for a particular species.
- Minimization measures (MMs) are measures that reduce the impact of a project on listed species or habitats. Minimization measures can be precautionary measures implemented by the federal action agency to minimize or eliminate project effects on listed and sensitive species and habitat, or they can include avoidance and preservation measures such as timing restrictions or buffers around sensitive habitat types and habitat

features that are important to sensitive species. Minimization measures apply to all projects.

- Best management practices (BMPs) are methods, facilities, built elements, and techniques implemented or installed during project construction to reduce short- and long-term project impacts on listed and sensitive species and habitat. BMPs are applied for all projects.
- Minimization measures and BMPs are measures that are part of the proposed action that will be implemented. They are not recommendations or suggestions.
- MMs and BMPs can be defined to minimize impacts associated with specific project activities or techniques.
 - Examples of activity-specific measures include erosion control features for earthwork activities (BMP), replanting of areas where vegetation removal or grading has occurred (MM), infiltration features for stormwater runoff in projects adding new impervious surface area (BMP), and mitigation plans for wetland impacts (MM).
- MMs and BMPs can be defined to minimize potential impacts on species and habitat.
 - Examples of habitat- or species-specific measures include timing restrictions (MM), exclusion of listed species from the work area (MM), noise shields (BMP), and avoiding riparian vegetation removal (MM).
- MMs and BMPs should be compiled into the Impact Avoidance and Minimization section of the BA. This section should include MMs and BMPs addressing specific construction elements, as well as impact minimization measures for particular species and critical or suitable habitats.
- MMs and BMPs that are consistent with WSDOT standard specifications can be easily incorporated into project contract documents.
- MMs and BMPs that are not consistent with WSDOT standard specifications must be incorporated as special provisions into contract documents. The project biologist should coordinate with project designers and engineers to ensure that these additional provisions are feasible. The project biologist should work with project designers to ensure that special provisions are incorporated into contract documents.

This chapter defines and explains minimization measures and best management practices and explains where to discuss them within a BA. The chapter provides an overview of common construction activities for which impact minimization measures may be required, general considerations for developing appropriate impact minimization measures for construction activities, guidance for developing impact minimization measures for sensitive species and habitats, and examples of appropriate enforceable wording for MMs and BMPs extracted from BAs.

The chapter is organized as follows:

- The first section of the chapter defines MMs and BMPs and discusses the differences between them.
- The second section explains where a project biologist should include discussions of MMs or BMPs within a BA, as well as two preferred options for compiling these impact minimization measures to facilitate federal review of the BA and also to facilitate incorporation of the required measures into the contracts administered for a project.
- The third section provides an overview of construction activities that may require impact minimization measures, and examples of MMs and BMPs that address construction-related impacts.
- The fourth section discusses the importance of considering additional species- and habitat-specific impact minimization measures. Examples of specific MMs and BMPs are provided for sensitive aquatic and terrestrial habitats.

6.1 Impact Minimization Measures and Best Management Practices

MMs and BMPs are precautionary measures intended to minimize environmental impacts associated with proposed project activities or elements. These measures can target impacts associated with specific project activities or techniques, as well as potential impacts on species and habitat. MMs and BMPs are not merely recommendations; they are measures included in the proposed action, to be implemented throughout project planning, design, and construction in order to minimize environmental impacts. The Services cannot consult on recommendations, only known project elements or measures that will be implemented.

MMs are most frequently avoidance or preservation measures of some kind, for example, timing restrictions or buffers around sensitive habitat types and habitat features that are important to sensitive species. BMPs are methods, facilities, built elements, and techniques implemented or installed during project construction to reduce short- and long-term project impacts. The nature

of MMs and BMPs vary according to physical and environmental conditions of the project site, different phases of the project, and the activities for which they are intended. MMs and BMPs are developed for implementation during the permitting, design, and construction phases of projects.

Typically, the BA is developed concurrently with the design of a new project. During this process, it is critical for the biologist writing the BA and engineers designing the project to stay in close communication throughout preliminary and final design. The project biologist relies on the design engineers for accurate project description detail (e.g., project areas and construction techniques). Based on this information, it is the biologist's responsibility to identify MMs and BMPs for the project in conjunction with the design and project engineers. The project engineer must approve all of the MMs and BMPs to ensure that the MMs and BMPs can be implemented and are included in the contract.

MMs and BMPs are effective only if they are clearly communicated to the contractor responsible for construction of the project. To construct a project, the contractor relies entirely on the construction plan sheets, WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT 2018), and supplemental special provisions. Some MMs and BMPs are partially or wholly covered in the standard specifications, but many are not and need to be incorporated by the design engineers into the construction plan sheets and the special provisions. WSDOT has been working to incorporate the MMs into the standard specifications and special provisions. The exact wording of those MMs has been provided in this chapter and shall be copied exactly into any WSDOT BA. Some MMs are conditions attached to permits, such as a Clean Water Act Section 404 permit, a Section 401 water quality certification, or a hydraulic project approval. All permits must be attached to the construction plans and referred to in the special provisions so that the contractor is familiar with them. To the extent possible, these permit conditions should be specified in the special provisions.

After the BA receives concurrence from the Services, all MMs and BMPs need to be finalized in the construction plans and special provisions. After final design, the construction plans and special provisions are advertised so that contractors can bid on the project. The contractor selected for the project is responsible to carry out only what is specified in construction plans, standard specifications, and special provisions. For this reason, it is critical that all necessary MMs and BMPs are clearly described in the BA. If they are missing or unclear, there is a risk that the contractor may perform activities that harass threatened or endangered species, damage critical habitat, or damage suitable habitat for listed species.

The following sections of this chapter contain many examples of MMs and BMPs that have been used on projects in the past and are currently used for projects that comply with the *Programmatic Biological Assessment for the Washington State Department of Transportation* (WSDOT 2017), and the *Programmatic Biological Assessment Working Document for NOAA Fisheries Listed Species* (WSDOT 2012).

6.2 Where to Include Minimization Measures and Best Management Practices within a BA

MMs and BMPs should be compiled into a single section of the BA that includes measures addressing specific construction elements as well as impact minimization measures for particular species and critical or suitable habitats. Activity-specific measures are usually defined first in the BA development process, and then species- or habitat-specific measures are defined later.

If the general term *BMPs* is used in a BA, the specific impact-minimization activities intended by the project biologist in using this term should be described in the report, so that the Services understand the exact measures that will be taken to reduce potential project impacts. For example, if a BA states, “during construction, BMPs will be implemented to ensure that impacts on the adjacent stream are minimized,” the project biologist should describe these practices in detail (e.g., all disturbed areas will be replanted or reseeded within 30 days).

Because impact minimization measures can be included in two distinct sections of a BA, it is important to compile all of these measures in a single location, for two reasons: 1) to facilitate review of the final effect determinations and their rationale, and 2) to ensure that all measures identified in a BA are clearly specified in documents conveyed to the contractor implementing the project. A compilation of impact minimization measures can be effectively provided in a list of all impact minimization measures identified in the report (activity-specific, as well as species- or habitat-specific), to be included in the Impact Avoidance and Minimization Measures section of the BA.

6.3 Developing Appropriate Impact Minimization Measures for Specific Construction Activities

6.3.1 Overview of Common Construction Activities

Some of the most common activities associated with construction and operation of transportation projects include the following:

- Stormwater quality and quantity
- Aquatic area buffers
- Vegetation removal
- In-water work
- Revegetation and slope stability
- General construction
- Pollutant protection

- Concrete work
- Access roads and bridges
- Restrictions in rainy weather
- Bridge work
- Bridge painting
- Sub-surface sampling
- Emergency actions
- Bank protection
- Work area isolation and fish handling
- Culvert work
- Cutting and filling
- Pile installation and removal
- Herbicide use
- Lighting
- Geotechnical investigations
- Wildlife

6.3.2 General Considerations for Minimizing Activity-Specific Impacts

The transportation-related construction activities listed above are discussed below in more detail. These examples illustrate types of impacts and general impact minimization approaches a project biologist might consider in selecting specific MMs and BMPs for the proposed project.

6.3.2.1 Stormwater Quality and Quantity

Primary effects to listed species from construction activities may include changes in the quality and quantity of stormwater moving from the site. Effects are minimized to the extent possible by implementing stormwater management measures.

MM-1. All projects (except exempt activities as listed in section 3-2.2 of the Highway Runoff Manual (2016), are subject to minimum stormwater management requirements as outlined in Section 3-3 of the Highway Runoff Manual. Non-exempt projects must address erosion control if $\geq 7,000$ ft² of soil will be disturbed or if there is ≥ 2000 ft² of new, replaced, or new + replaced impervious surface. Erosion control requirements

include: 1) a Temporary Erosion and Sediment Control (TESC) Plan (see TESC Manual), and a project specific Spill Prevention, Control and Countermeasures (SPCC) Plan as required in Standard Specification 1.07-15(1).

The intent of this MM is to prevent pollutants from entering natural water bodies.

The standard specifications require that an SPCC plan be developed,¹ approved, and implemented throughout the duration of the project. The SPCC plan can be developed by the engineer for the contractor to adopt during construction, although normally the contractor is responsible for developing and implementing the plan.

The standard specifications have provisions for a TESC plan but do not make it mandatory.² The designer has two options to ensure that a TESC plan is developed and implemented for the project: 1) the designer may develop a TESC plan in the special provisions and drawings, in which case the contractor is required by the standard specifications to either adopt or prepare an appropriate TESC plan, or 2) the designer may replace the first sentence in 8-01.3(1)A “Submittals” with the following: “The contractor shall prepare and submit a TESC plan for the engineer’s approval.”

MM-2. WSDOT will ensure that projects within 200 feet of surface water will install and maintain Best Management Practices (BMPs) as stated in the Contract to ensure that no foreign material, such as pavement slurry from asphalt grinding equipment, is sidecast, and to control and prevent sediments from entering aquatic systems.

The intent of this MM is to prevent construction waste materials from entering sensitive areas.

BMPs chosen by the engineer during the design phase should be incorporated into the TESC plan and special provisions, in accordance with Section 8-01.3(1)A of the standard specifications. Additionally, all

1. Section 1-07.15(1) of the standard specifications – *Spill Prevention, Control, and Countermeasures Plan: The Contractor shall prepare a Type 2 Working Drawing consisting of a project specific spill prevention, control, and countermeasures plan (SPCC Plan), and shall implement the for the duration of the project. The SPCC Plan shall address all fuels, petroleum products, hazardous materials, and other materials defined in Chapter 447 of the WSDOT Environmental Manual M 31-11, and their relationship to drainage pathways, waterways, and other sensitive areas. The plan shall identify spill prevention and containment methods to be used at each of these locations.*

2. Section 8-01.3(1)A of the standard specifications – *Submittals – Erosion Control and Water Pollution Control: When a TESC plan is included in the project plans, the contractor shall either adopt or modify the existing TESC plan. The contractor shall obtain the engineer’s approval on the TESC plan and schedule before any work begins.*

sensitive areas to be protected must be clearly identified on the contract drawings.

- MM-3. The Contractor shall comply with Washington Department of Ecology's State Water Quality Standards (WAC 173-201) or permit modifications. Permit modifications are limited to an extended temporary area of mixing granted by Ecology in a 401 Water Quality Certification.
- MM-4. Projects that drain to waters that may be used by listed fish species and create more than 5000 ft² of new pollution generating impervious surface in any TDA will use the most current WSDOT stormwater effects analysis guidance to evaluate the potential effects of each proposed project. The supplemented documents must include the following information at a minimum: 1) Sufficient information to assess pre-project and post-project stormwater pollutant loadings and end of pipe concentrations. 2) Identify the receiving waterbodies for the stormwater runoff associated with the new pollution and post-project stormwater pollutant loadings and end of pipe concentrations. 2) Identify the receiving waterbodies for the stormwater runoff associated with the new pollution generating impervious surface. 3) Identify any proposed new (or modified) stormwater outfalls/structures. 4) A qualitative or quantitative description of pre-and post-project mixing zones or dilution analysis, consistent with WSDOT stormwater effects analysis guidance. If exposure to listed fish species in the dilution zone cannot be discounted, a quantitative description is recommended. 5) Describe potential effects to hydrology (i.e., peak flows, base flows, flow durations, etc.) and instream conditions (i.e., bed and bank scour or erosion, channel stability, etc.) due to the proposed project.
- MM-5. The project will not cause or contribute to bed or bank scour or erosion (channel instability), and will not measurably affect base, peak, or flow durations in any Threshold Discharge Area (TDA) or receiving waterbody.
- MM-6. Stormwater will be infiltrated and/or dispersed when possible.

6.3.2.2 Aquatic Area Buffers

- MM-7. No contractor staging areas will be allowed within 200 feet of potentially suitable wetland, stream, estuarine, river or marine drainage as identified by the project biologist, unless site specific review completed by the project biologist indicates that no impacts to the sensitive resource areas will occur due to topography or other factors.

The intent of this MM is to prevent materials from leaving the staging area and entering sensitive areas. For example, erosion of soil piles in staging areas could cause sediment-laden runoff to drain into sensitive areas. The distance specified may be project-specific.

- MM-8. Temporary material storage piles consisting of erosive materials will be placed outside the 100-year floodplain during the rainy season (October 1 through June 1) except for

emergency projects, or unless site specific review completed by the project biologist indicates that topography or other factors preclude runoff from entering waterbodies containing listed fish species or their prey. Such temporary storage piles will be stabilized with plastic sheeting, straw bales, or other BMPs, to prevent sediment delivery to these waterbodies. Material to be used within 12 hours of deposition will not be considered a temporary material storage pile.

The intent of this MM is to prevent temporary material stock piles from being flooded by streams or rivers and washed into natural water bodies.

The standard specifications do not specify the locations where material stockpiles can be placed.

If possible, the designer should identify the 100-year floodplain in relation to the project site.

If the required quantity of plastic covering is significant, the special provisions should include it as a bid item.

MM-9. All excavated materials will be removed to an upland location where they cannot enter the water body.

The intent of this MM is to prevent pollutants such as sediments or contaminated sediments from entering water bodies and affecting fish or habitat.

The standard specifications have a few requirements that may meet the intent of this MM,³ although the specific location of upland disposal is not covered. Specific details related to this MM should be incorporated into construction plans and special provisions.

6.3.2.3 Vegetation Removal

To adequately address vegetation removal or clearing activities, the BA should quantify the extent of vegetation removal and clearing activities proposed for each phase of the project, or for the project as a whole. The trees to be removed as part of a project also should be quantified in

3. Section 1-07.5(2) of the standard specifications – *State Department of Fish and Wildlife: The contractor shall dispose of any project debris by removal, burning, or placement above high-water flows.*

Section 1-07.5(3) – *State Department of Ecology: In doing the work, the contractor shall ... Perform Work in such a manner that all materials and substances not specifically identified in the Contract documents to be placed in the water do not enter waters of the State, including wetlands. These include, but are not limited to, petroleum products, hydraulic fluid, fresh concrete, concrete wastewater, process wastewater, slurry materials and waste from shaft drilling, sediments, sediment-laden water, chemicals, paint, solvents, or other toxic or deleterious materials.*

Section 2-09.3(3)A – *Preservation of Channel: When foundations or substructures are to be built in or next to running streams, the contractor shall ... remove any excavation material that may have been deposited in or near the stream so that the watercourse is free from obstruction.*

terms of acreage or number of trees, and described by species and diameter-at-breast-height (dbh) class, if possible. If riparian vegetation is removed as part of the proposed action, the amount and type of riparian vegetation to be removed should be measured, and its stream shading, bank stabilization, and food web contribution functions should be assessed. For wetland vegetation to be removed, the area should be quantified, and the ecological functions (as they relate to listed species) lost as a result should be considered in the assessment of project impacts.

The general impacts associated with vegetation removal or clearing activities include but are not limited to the following:

- Removal of trees (indicate whether they are suitable or unsuitable habitat)
- Removal of riparian vegetation
- Wetland impacts
- Introduction of noxious weeds or exotic species
- Ground or soil disturbance or compaction
- Increased bank or soil erosion
- Sedimentation
- Noise impacts
- Human presence or activity impacts
- Impacts on prey species.

Some general approaches that the project biologist might consider to minimize impacts associated with these activities include the following:

- Where riparian vegetation has been removed from aquatic resources, isolate disturbed areas using erosion control features (such as silt fencing or hay bales) until disturbed areas are stabilized or revegetated
- Replant areas with native vegetation, or hydroseed disturbed sites, to prevent soil erosion
- Cut vegetation at the ground surface rather than grubbing, which removes the roots.

The following are MMs developed for projects requiring vegetation removal:

MM-10. To facilitate compliance with the Northwest Forest Plan Standards and Guidelines, WSDOT will coordinate with the appropriate Forest Service ranger district if tree removal, including dying, dead, or downed wood is proposed on lands identified in the plan.

MM-11. WSDOT Designers will minimize removal of riparian vegetation and contractors shall replant riparian vegetation. Replanting may not be possible in permanent impact areas, the roadway clear zone, or adjacent to or under bridges. However, potential replanting of riparian vegetation near the site should be evaluated. The PBA Determination Form will provide the justification for the removal of riparian vegetation and will include the proposed planting plans, if applicable.

The intent of this MM is to minimize impacts on riparian areas.

This MM is addressed in the previously noted sections of the standard specifications, but without specific reference to riparian habitat. Although the standards list WDFW requirements for replanting stream bank or shoreline plants that are disturbed,⁴ the requirement to minimize impacts on riparian areas is not specifically addressed in the standard specifications.

This MM should be incorporated into the construction plans and special provisions by clearly designating where vegetation will be preserved in riparian areas. In addition, this MM should be incorporated into the planting plans by designating the locations and species of native plants to be planted in riparian areas.

MM-12. Vegetation will only be grubbed from areas undergoing permanent alteration. No grubbing will occur in areas slated for temporary impacts.

The intent of this MM is to minimize disturbance and to allow vegetation to grow back in temporary impact areas.

MM-13. Disturbance to riparian vegetation from the operation of heavy equipment will be minimized as practicable by straddling it with heavy equipment or by pruning it without damaging the roots. Existing riparian vegetation outside of the work area will not be removed or disturbed.

The intent of this MM is to minimize disturbance and to allow vegetation to grow back in temporary impact areas.

4. Section 1-07.5(2) of the standard specifications – *State Department of Fish and Wildlife: The contractor shall replant any stream bank or shoreline area if the project disturbs vegetative cover. Replanted trees, brush, or grasses shall resemble the type and density of surrounding growth, unless the Special Provisions permit otherwise.*

6.3.2.4 *In-water Work*

In-water work activities include but are not limited to pile installation, bank stabilization, pile removal, bridgework, stream or ditch realignment work, and culvert replacement. The construction methods or techniques employed in each of these activities have impacts that are unique to their application. Common impacts include sedimentation, impacts on substrate (spawning beds and cover), and direct mortality of fish.

In-water work methods and their impacts should be carefully researched and described by the project biologist. A BA should document the specific construction techniques, materials, and impacts of the proposed action in relation to the listed species and habitats occurring in the project action area. To minimize these impacts, MMs tailored to the construction methods must be developed and included in the BA. This topic is discussed more completely in PART 2, IN-WATER WORK.

General approaches that should be considered by the project biologist to minimize impacts of in-water activities include but are not limited to the following:

- Avoid in-water work if feasible, or conduct it only during approved in-water work windows.
- Divert streamflow during in-water work to minimize turbidity.
- Use bioengineered solutions where feasible.
- Perform work during low flow or dry conditions, or during dry weather.
- Isolate the area of in-water work from the water body to minimize sediment impacts (using cofferdams, silt fencing, hay bales, or water sausages), and pump sediment-laden waters to an infiltration or treatment site.
- Isolate the work area to avoid impacts on listed fish species, and remove fish from the area if necessary (using seining, netting, and as a last resort, electrofishing). WSDOT has a fish handling protocol that has been approved by the Services. The Fish Exclusion Standards and Protocol is available online at <http://www.wsdot.wa.gov/environment/technical/disciplines/fish-wildlife>.
- Dispose of debris or sediments outside the floodplain.
- Clean the activity site after construction to prevent an influx of sediments to streams after the first large storm event.

- Minimize impacts on stream banks and riparian vegetation.

The following MMs and BMPs were developed for projects requiring in-water work:

MM-14. Seasonal restrictions applied to work conducted within or below the OHWM or MHHW, will follow requirements within the HPA issued by the Washington Department of Fish and Wildlife, and Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC). In-water work duration will be minimized as practicable.

The intent of this MM is to avoid impacts on fish when they are most likely to be present in a natural water body where work is proposed.

This particular MM is covered in a very general way by the standard specifications.⁵

Seasonal restrictions on work in water bodies are rules that WDFW adds as conditions in HPAs. These seasonal restrictions need to be incorporated into the special provisions.

MM-15. No temporary floating work platform will place its anchors or allow grounding in fish spawning areas in freshwater or in eelgrass, kelp, macro algae, or intertidal wetlands. Anchoring above beds or eelgrass, kelp, or macro algae will be kept to a minimum.

The intent of this MM is to prevent damage to eelgrass and kelp beds as a result of shading or disturbance by anchors or drilling equipment.

Because the intent of this MM is not covered by the standard specifications, this measure should be incorporated into the special provisions. All known locations of eelgrass and kelp beds should be delineated on the drawings with a reference note incorporating this MM.

MM-16. Construction equipment will not enter any water body without authorization from the Washington Department of Fish and Wildlife, USFWS, and the NMFS. Equipment will be operated as far from the water's edge as possible.

The intent of this MM is to minimize impacts (e.g., sedimentation) in natural water bodies by doing as much work as possible from beyond the water's edge.

5. Section 1-07.5(1) of the standard specifications – General – Fish and Wildlife and Ecology Regulations: Throughout the work, the contractor shall comply with all current rules of the resource agencies having jurisdiction over the affected areas (state Departments of Fish and Wildlife, and Ecology).

MM-17. Anthropogenic debris from bridge demolition will be directed toward storage areas on land or barges. Bridge demolition will include sectioning the structure to the extent possible to provide for safer disposal and to minimize debris falling into surface waters.

The intent of this MM is to prevent treated wood debris from entering natural water bodies and contaminating them.

This is not addressed in the standard specifications and should be incorporated into the special provisions and contract drawings by the designer

6.3.2.5 Revegetation and Slope Stability

MM-18. Erodible earth not being worked, whether at final grade or not, shall be covered within the specified time periods below, using an approved soil covering practice: Western Washington (west of the Cascade Mountain Crest) 1) from October 1 through April 30 erodible earth may be exposed without cover for a 2 day maximum, 2) from May 1 to September 30 for 7 days maximum. Eastern Washington (east of the Cascade Mountain Crest) 1) from October 1 through June 30 erodible earth may be exposed without cover for a 5 day maximum, 2) from July 1 to September 30 for 10 days maximum.

The intent of this MM is to minimize erosion of exposed soils and transport of sediment-laden water to sensitive areas.

The standard specifications cover this requirement with regard to the length of time allowed for exposed soils before stabilization is required.⁶

MM-19. Temporarily disturbed areas will be restored to pre-work conditions to the extent possible, including protecting existing root systems and allowing re-sprouting of herbaceous and woody plants. Native trees and shrubs will be used that are endemic to the project vicinity or region of the State where the activity is occurring.

The intent of this MM is to ensure that areas temporarily disturbed are adequately restored.

For areas that are designated to not be disturbed, their restoration is covered in the standard specifications.⁷ These areas should be specifically delineated on the drawings (see above comments). However, for areas disturbed in the course of the work, this MM is not specifically addressed in the standard specifications. The construction drawings and special

6. Section 8-01.3(1) of the standard specifications – *General – Erosion Control and Water Pollution Control: In western Washington, erodible soil not being worked, whether at final grade or not, shall be covered within the following time period, using an approved soil covering practice, unless authorized otherwise by the engineer: from October 1 through April 30, 2 days maximum; and from May 1 to September 30, 7 days maximum.*

7. Section 1-07.16(1), 4th paragraph: *If the contractor (or agents/employees of the contractor) damage, destroy, or interfere with the use of such property, the contractor shall restore it to original condition.*

provisions should incorporate appropriate restoration requirements for each disturbed area. This may include a planting plan that identifies each location and native plant species to be planted in disturbed or temporary impact areas.

To ensure that plants successfully mature, a monitoring and maintenance plan should be implemented after construction. The standard specifications have a requirement for plant establishment.⁸ However, if desired, the designer should incorporate any critical or special procedures, as required by permit conditions, for monitoring after construction, submitting monitoring reports to permitting agencies, and implementing maintenance measures, as necessary.

MM-20. All exposed areas will be mulched and seeded with an approved native or noninvasive herbaceous seed mix following construction and/or planted with native woody vegetation and trees (if appropriate) during the first available planting season.

6.3.2.6 General Construction

MM-21. Construction impacts will be confined to the minimum area necessary to complete the project.

The intent of this MM is to minimize impacts on the natural environment, including sensitive areas.

The standard specifications do not address this MM in the general manner stated above. This MM should be incorporated into construction plans and special provisions by clearly showing areas where no impacts are allowed.

MM-22. WSDOT Construction will clearly flag the boundaries of clearing limits to prevent disturbance outside of the limits. The contractor shall install high visibility fencing in accordance with WSDOT Standard Specifications.

The intent of this MM is to confine work activities to nonsensitive areas, or minimize the amount of disturbance in sensitive areas.

There is language within the standard specifications that covers this in general.⁹ However, the drawings still must clearly depict the areas to be

8. Section 8-02.3(13) – *Plant Establishment: Plant establishment shall consist of caring for all plants planted on the project and caring for the planting areas within the project limits.* This section also requires that the contractor prepare and submit a *first year plant establishment plan* for approval.

9. Section 1-07.16 of the standard specifications – *Protection and Restoration of Property: The contractor shall protect private or public property on or in the vicinity of the work site. The contractor shall ensure that it is not removed, damaged, destroyed, or prevented from being used unless the contract so specifies. . . . If the engineer orders, or if otherwise necessary, the contractor shall install protection, acceptable to the engineer, for property (land, utilities, trees, landscaping, ... and other property of all description whether shown on the plans or not).*

protected. If it is critical, the drawings and special provisions should include a requirement for the contractor to delineate these areas using temporary high-visibility fencing.

To ensure that unintended disturbance does not occur in sensitive areas, the design should incorporate language similar to the following within the site work sections of the special provisions: “Contractor will install temporary high-visibility fencing to demarcate and protect sensitive areas. No work, including placement or stockpiling of fill materials, will be performed within these areas. When it is no longer needed, or at the engineer’s direction, contractor will completely remove and dispose of temporary high-visibility fencing.”

The sensitive areas should also be delineated on the drawings, along with a note containing a similar statement regarding installation of high-visibility fencing and the need to protect these areas.

Because the standard specifications do not include installation or material requirements for temporary high-visibility fencing, the designer should include provisions for temporary high-visibility fencing installation and materials.

6.3.2.7 Pollutant Protection

MM-23. The contractor will use BMPs, as stated in their Spill Prevention Control and Countermeasures Plan, to ensure that no foreign material such as oil or fuel from construction equipment will enter any wetlands, flowing or standing water.

The intent of this MM is to prevent spills from construction equipment or sediments from entering marine waters.

While prevention of water pollution is a requirement in the standard specifications, this MM is not specifically addressed. BMPs chosen by the designer during the design phase should be incorporated into the SPCC plan, TESC plan, and special provisions, in accordance with Section 1-07.15(1) of the standard specifications.

Section 1-07.16(2) – *Vegetation Protection and Restoration: Existing vegetation, where shown in the plans or designated by the engineer, shall be saved and protected through the life of the contract. The engineer will designate the vegetation to be saved and protected by a site preservation line, high visibility fencing, or selected individual flagging.*

In Section 2-01.1, the areas to be cleared and grubbed are limited by the following statement: *The contractor shall clear, grub, and clean up those areas staked or described in the special provisions. This work includes protecting from harm all trees, bushes, shrubs, and other objects selected to remain.*

Section 2-01.3(1) – *Clearing: The contractor shall protect, by fencing if necessary, all trees or native growth from any damage caused by construction operations.*

MM-24. All equipment will be fueled and maintained more than 200 feet from the nearest wetland, ditches, flowing or standing water, unless site specific review completed by the project biologist indicates that no impacts to the resource areas will result due to topography or other factors. Exceptions to this requirement are allowed for large cranes, pile drivers, and drill rigs if they cannot be easily moved.

The intent of this MM is to prevent fuel and maintenance equipment spills from entering sensitive areas.

MM-25. Equipment will be checked daily for leaks and will be well maintained to prevent lubricants and any other deleterious materials from entering waters of the State. Prior to entering the water or below the OHWM, all equipment will be free of any external petroleum products, hydraulic fluid, coolants, and other deleterious materials. Wash water will not be discharged to any water body without pre-treatment.

The intent of this MM is to prevent pollutants from entering natural water bodies and affecting fish or habitat.

The standard specifications provide general requirements to prevent pollutants from entering state waters,¹⁰ along with two specific requirements for keeping equipment out of state waters¹¹ and preventing the discharge of equipment washwater into state waters.¹²

However, if in-water work is to be conducted, the special provisions should be augmented to require that the contractor inspect equipment for leaks and faulty parts (especially hydraulic lines, fittings, and cylinders) and clean the equipment each day or shift that the equipment is to enter the water. Additionally, the designer should add language to the special provisions to require that all equipment operating in state waters contain biodegradable, nontoxic, vegetable-based hydraulic oil rather than petroleum-based hydraulic oil.

MM-26. All equipment entering waters that may be used by listed fish species and/or if the waters are critical habitat, will use vegetable oil or other biodegradable acceptable hydraulic fluid substitute, unless the project is an emergency action.

10. Section 1-07.5(2) of the standard specifications – *State Department of Fish and Wildlife: The contractor shall not degrade water in a way that would harm fish. (Criteria: Washington State Water Quality Regulations.)*

11. Section 1-07.5(2)7: *Keep all equipment out of any flowing stream or other body of water, except as may be permitted by the special provisions.*

12. Section 1-07.5(3) – *State Department of Ecology: In doing the work, the contractor shall ... Perform Work in such a manner that all materials and substances not specifically identified in the Contract documents to be placed in the water do not enter waters of the State, including wetlands. These include, but are not limited to, petroleum products, hydraulic fluid, fresh concrete, concrete wastewater, process wastewater, slurry materials and waste from shaft drilling, sediments, sediment-laden water, chemicals, paint, solvents, or other toxic or deleterious materials.*

The intent of this MM is to prevent hydraulic fluid spilling into and polluting natural water bodies in the event of an accidental release due to equipment leakage or hydraulic component failure.

6.3.2.8 Concrete Work

MM-27. For projects involving concrete, concrete truck chute cleanout areas will be established to properly contain wet concrete and wash water and prevent it from entering wetlands and other waterbodies.

The intent of this MM is to ensure that concrete construction activities occur in designated areas away from sensitive areas.

Designated areas for concrete construction activities should be included in the SPCC plan.

MM-28. The contractor will protect all inlets and catchments from stormwater runoff from fresh concrete, tackifier, paving, or paint striping if inclement weather unexpectedly occurs.

The intent of this MM is to prevent contaminated construction materials from entering inlets and catchments and being conveyed to natural water bodies or other sensitive areas.

The standard specifications cover this in general. However, it should be required on the TESC or SPCC plans.

MM-29. All concrete will be poured in the dry, or within confined waters not being dewatered to surface waters, and will be allowed to cure a minimum of 7 days before contact with surface water.

The intent of this MM is to prevent concrete from increasing the pH of natural water bodies by allowing concrete to fully cure prior to contact with water.

The standard specifications cover placement and curing of concrete from a quality control standpoint rather than an environmental protection standpoint.¹³ However, there is a provision that prohibits discharge to the environment of water used for curing.¹⁴

13. Section 6-02.3(6) – *Placing Concrete: When a foundation excavation contains water, the contractor shall pump it dry before placing concrete. If this is impossible, an underwater concrete seal shall be placed that complies with Section 6-02.3(6) B.*

14. Section 6-02.3(11) – *Curing Concrete: Concrete shall cure for a minimum of 3 days and as long as 10 days depending on the type of concrete and curing method. During the continuous wet cure, the Contractor shall keep all exposed concrete surfaces saturated with water. Formed concrete surfaces shall be kept in a continuous wet cure by leaving the forms in place. If forms are removed during the continuous wet cure period, the Contractor shall treat*

The standard specifications do not indicate the minimum time necessary before concrete can contact surface water. This information should be added to the special provisions. For additional protection, the designer should consider requirements for rinsing the freshly cured concrete prior to allowing it come into contact with surface waters.

6.3.2.9 Access Roads and Bridges

MM-30. The establishment and use of temporary access roads will meet the following conditions: 1) Existing roadways or travel paths will be used whenever they provide the needed access. 2) Where stream crossings are essential, the crossing design will accommodate reasonably foreseeable risks (such as flooding and associated bedload and debris) to prevent diversion of stream flow out of the channel and down the road in the event of a crossing failure. 3) Vehicles and machinery must cross riparian areas and streams perpendicular to the main channel unless site specific conditions require an alternate approach. 4) Vehicles and machinery will not cross within a wetted stream, unless necessary as part of an emergency action. 5) Temporary roads within 300 feet of streams will avoid, minimize, and mitigate soil disturbance and compaction by clearing vegetation. 6) Vehicles and machinery operating below the OHWM (except if operating in the dry or during emergency actions) will use biodegradable hydraulic fluids and lubricants to reduce the potential impacts associated a potential oil spill or leak. 7) The number of stream crossings will be minimized.

The intent of this MM is to minimize impacts associated with access roads through sensitive areas, including streams and riparian areas.

This MM is not addressed in the standard specifications. The engineer should consider this MM during the design phase and designate the location of access roads on construction plans. Information pertaining to proper materials and methods of building the access roads should be stated in the special provisions.

MM-31. New stream crossing structures, including channel-spanning bridges, will not reduce the existing stream width.

The intent of this MM is to avoid loss of existing habitat area within streams where crossings are proposed.

This MM is not addressed in the standard specifications. Maintaining existing stream width should be addressed during the design phase and shown in the construction plans.

the concrete as an exposed concrete surface. Runoff water shall be collected and disposed of in accordance with all applicable regulations. In no case shall runoff water be allowed to enter any lakes, streams, or other surface waters.

6.3.2.10 Restrictions in Rainy Weather

MM-32. No paving, chip sealing, or stripe painting will be initiated in rainy weather.

The intent of this MM is to prevent paving and painting materials from running off the construction site in stormwater and entering sensitive areas.

The standard specifications provide criteria to determine whether site conditions are adequate to ensure quality installation of paving and striping.¹⁵ However, depending on the sensitive nature of the site, the designer may wish to include stronger weather protection requirements in the special provisions for paving and striping projects.

6.3.2.11 Bridge Work

MM-17. Anthropogenic debris from bridge demolition will be directed toward storage areas on land or barges. Bridge demolition will include sectioning the structure to the extent possible to provide for safer disposal and to minimize debris falling into surface waters.

The intent of this MM is to prevent treated wood debris from entering natural water bodies and contaminating them.

This is not addressed in the standard specifications and should be incorporated into the special provisions and contract drawings by the designer

MM-33. Bridge construction will take place from the adjacent streambanks, existing bridges, barges, or temporary work bridges. Some work may be allowed within a dewatered channel or on a dry gravel bar with WDFW, NMFS and USFWS approval, but no equipment or vehicle staging will be allowed in these areas.

The intent of this MM is to minimize impacts (e.g., sedimentation) in natural water bodies by doing as much work as possible from beyond the water's edge.

MM-34. Concentrated accumulations of bird feces, road grit, sand, and loose paint chips will be removed from bridges before dismantling unless such activities would result in a higher risk of materials entering the water. This material will be scraped, swept or vacuumed from the bridge structure and collected and disposed of at permitted and approved upland

15. Section 5-04.3(1) of the standard specifications – *Weather Limitations – Hot Mix Asphalt (HMA): Do not place HMA for wearing course on any Traveled Way beginning October 1st through March 31st of the following year, without written concurrence from the Engineer. Do not place HMA on any wet surface, or when the average surface temperatures are less than those specified in Table 5 (of the Standard Specification), or when weather conditions otherwise prevent the proper handling or finishing of the HMA.*

Section 5-02.3(10) – *Unfavorable Weather – Bituminous Surface Treatment: Emulsified asphalt shall not be applied to a wet Roadway.*

location. A 5.25 percent sodium hypochlorite solution may be used directly on residual accumulations of guano or fungus after prior dry cleaning and washing. Wash water from the sodium hypochlorite solution shall be full contained and not allowed to enter state waters.

The intent of this MM is to prevent debris from entering and contaminating natural water bodies.

This MM is not specifically addressed in the standard specifications. Removal, containment, and handling of these items should be incorporated into the special provisions.

6.3.2.12 Bridge Painting

MM-35. For brush and/or roller paint applications, painters will work from pails containing a maximum of 2 gallons of paint to minimize the impact of accidental spillage, except for sealed containers that are part of a spray system.

The intent of this MM is to minimize the amount of accidental paint spills potentially entering natural water bodies and other sensitive areas.

This MM is covered by the standard specifications for painting steel surfaces.¹⁶ The designer should confirm that the requirements apply to the site and should augment the special provisions as necessary.

MM-36. Cleaning of paint materials and maintenance equipment will not be done in or over waters of the State nor will resultant cleaning runoff be allowed to enter State waters.

The intent of this MM is to prevent paint materials from entering natural water bodies or other sensitive areas.

This MM is covered by the standard specifications for painting steel surfaces.¹⁷ The designer should confirm that the requirements apply to the site and should augment the special provisions as necessary.

MM-37. Drip pans or other protective devices will be required for all paint mixing and solvent transfer operations.

The intent of this MM is to prevent paint materials from entering natural water bodies or other sensitive areas.

16. Section 6-07.3(10)N – *Field Coating Application Methods: Painters using brushes shall work from pails containing a maximum of 2 gallons of paint. This is intended to minimize the impact of any spill.*

17. Section 6-07.3(10)Q – *Cleanup: Cleaning of equipment shall not be done in State waters nor shall resultant cleaning runoff be allowed to enter State waters.*

The standard specifications provide for containment beneath painting activities, but the designer should add language in the special provisions specifying requirements for paint mixing and solvent transfer operations to be conducted in designated areas that are fully protected by spill containment controls.

MM-38. Drip tarps will be suspended below paint platforms to prevent spilled paint, buckets, brushes, etc. from entering State waters.

The intent of this MM is to prevent paint materials from entering natural water bodies or other sensitive areas.

MM-39. Residual grease will be removed by hand from bridges and roadways with a degreaser on absorbent-material to prevent cleaning agents and grease from entering waters of the State.

The intent of this MM is to minimize contaminants entering natural water bodies and having adverse effects on fish.

MM-40. Bridges will first be cleaned using dry methods and equipment. Debris accumulations on the bridge, road surface, and within the bridge drains will be collected or swept up and properly disposed of prior to fresh water flushing. Debris disposal will occur in approved locations above the limits of flood water or extreme high tide. Debris will not be placed in road drainages, wetlands, riparian areas, or on adjacent land where it may be transported into state waters. Flushing will involve the use of clean water only, to prevent detergents or other cleaning agents from entering waters of the State.

The intent of this MM is to prevent debris on bridges from entering and contaminating natural water bodies.

The standard specifications provide general requirements for control and containment of debris, along with specific measures to be implemented if debris is generated during preparation for painting.

MM-41. Preparatory painting pressure washing of structures will be done using appropriate filter fabric to control and contain paint particles generated by the activity. Wash water will be fully contained when it would otherwise discharge to waters with listed fish species.

The intent of this MM is to minimize contaminants entering natural water bodies and having adverse effects on fish.

MM-42. During abrasive blasting of a steel bridge prior to painting, a containment system appropriate for the type and location of the bridge will be in place and maintained to prevent spent blast media from reaching State Waters. Spent blast media will be collected, sampled, designated for its hazardous waste content, and disposed of as appropriate for its waste designation at an approved and permitted site.

The intent of this MM is to minimize contaminants entering natural water bodies and having adverse effects on fish.

The standard specifications generally provide for requirements in keeping with this MM.¹⁸ The designer may find it useful, however, to augment the specification language and include it in the special provisions as well.

6.3.2.13 Sub-surface Sampling

MM-43. During subsurface sampling within 200 feet of waters containing listed fish, all materials removed from the test hole will be removed from the site until sub-sampling is completed. Uncontaminated material may be returned to the test hole. All subsurface sampling sites within waterbodies will be refilled with clean, silt-free material if the holes create a potential stranding hazard.

The intent of this MM is to prevent foreign material from entering natural water bodies.

MM-44. Oil absorbent pads will be placed under the drill rig to catch and control spills during subsurface sampling when within 200 feet of waters containing listed fish species.

The intent of this MM is to prevent drill rig oil spills from entering natural water bodies.

MM-45. For subsurface sampling within 200 feet of waters containing listed species, the team lead will have a minimum of 4 hours erosion control, spill control and containment training.

The intent of this MM is to prevent spills and sediments from entering natural water bodies.

MM-46. For subsurface sampling all existing large woody debris will be left on or adjacent to the site if feasible.

The intent of this MM is to prevent loss of habitat by keeping large woody debris onsite.

18. Section 6.07.3(10)A – *Containment: The containment system shall be in accordance with SSPC Technology Guide No. 6, Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations Class 2. The Contractor shall protect the surrounding environment from all debris or damage resulting from the Contractor's operations.*

Section 6-07.3(10)F of the standard specifications – *Collecting, Testing, and Disposal of Containment Waste: The contractor shall have spent blast media collected, sampled, designated for its hazardous material content, and disposed of as appropriate for its waste designation.*

MM-47. For subsurface sampling, no geared mechanisms (e.g., tires, tracks) will enter the wetted perimeter of a waterbody. Truck mounted and tracked drilling equipment will work from a location outside of the wetted perimeter unless working off of a temporary floating work platform or barge. The temporary floating work platforms will not ground on the bed of State waters.

6.3.2.14 Emergency Actions

MM-48. Report emergency actions to the NMFS/USFWS within one workday where listed fish species or other federally listed species are potentially present. Emergency activities should be limited to only those actions that are necessary to address the immediate emergency.

6.3.2.15 Bank Protection

MM-49. If site-specific conditions allow, improve fish habitat by incorporating LWD into bank protection projects.

The intent of this MM is to take advantage of existing large woody debris and boulders that can be incorporated into the design.

This MM is not addressed in the standard specifications. The special provisions should specify that existing large woody debris and boulder material may be used if approved for use by the engineer.

MM-50. Installation of riprap and other materials will occur from the banks or outside the wetted perimeter as much as possible.

The intent of this MM is to minimize disturbance to fish and habitat within natural water bodies.

MM-51. Project areas with existing riprap will be allowed to increase the lineal distance of the riprapped area below the OHWM by an additional 5 percent. If the project footprint needs to be increased beyond this, riprap placement will demonstrate consistency with the Integrated Streambank Protection techniques that are defined for WSDOT projects.

MM-52. All materials, such as riprap or gravel, placed within the water will be free of rock fines, silt, soil, or other extraneous material. An exception to the presence of fines is permitted if they are required as part of channel bed reconstruction.

The intent of this MM is to prevent pollutants from entering natural water bodies and affecting fish or habitat.

This MM is not addressed in the standard specifications and should be incorporated into construction plans and special provisions.

6.3.2.16 Work Area Isolation and Fish Handling

MM-53. Listed fish species, including their forage fish, will be removed from the work area prior to any in-water work activities, unless removal would affect the individuals more than leaving them on-site. Fish exclusion activities will follow the most recent WSDOT protocol that has been approved by the NMFS and USFWS.

The intent of this MM is to avoid stranding and potential mortality of fish within construction sites.

This MM should be incorporated into construction plans and special provisions.

MM-54. Water pumped out of the isolated project area will be discharged to a temporary storage and treatment site or to upland areas and filtered through vegetation prior to reentering the stream channel.

The intent of this MM is to protect streams from turbidity impacts associated with sediment-laden runoff.

The standard specifications generally prevent the discharge into state waters of any material that contains sediment.¹⁹ Additional specific requirements for water pollution control are found in Section 8-01 Erosion Control and Water Pollution Control.²⁰ Ground water encountered within excavations shall be treated before being discharged.²¹

19. Section 1-07.5(3)4 of the standard specifications: *Perform Work in such a manner that all materials and substances not specifically identified in the Contract documents to be placed in the water do not enter waters of the State, including wetlands. These include, but are not limited to, petroleum products, hydraulic fluid, fresh concrete, concrete wastewater, process wastewater, slurry materials and waste from shaft drilling, sediments, sediment-laden water, chemicals, paint, solvents, or other toxic or deleterious materials.*

20. Section 8-01.3(1): *Controlling pollution, erosion, runoff, and related damage requires the contractor to perform temporary work items including but not limited to 1) providing ditches, berms, culverts, and other measures to control surface water; 2) building dams, settling basins, energy dissipaters, and other measures, to control downstream flows; 3) controlling underground water found during construction; or 4) covering or otherwise protecting slopes until permanent erosion-control measures are working.*

21. Section 8-01.3(1) C: *Disposal of Dewatering Water: When uncontaminated groundwater with a pH range of 6.5 – 8.5 is encountered in an excavation on a project covered by a NPDES Construction Stormwater General Permit, it may be disposed of as follows:*

1. When the turbidity of the groundwater is 25 NTU or less, it may bypass detention and treatment facilities and be discharged into the stormwater conveyance system at a rate that will not cause erosion or flooding in the receiving surface water body.

2. When the turbidity of the groundwater is not more than 25 NTU above or 125 percent of the turbidity of the site stormwater runoff, whichever is greater, the same detention and treatment facilities as used to treat the site runoff may be used.

Otherwise, this MM is not specifically addressed in the standard specifications. If a project site has a viable upland area for treatment or infiltration, this MM should be incorporated into the special provisions and design drawings as an option. The designer should also pay attention to the physical nature of the sediment/turbidity to determine the feasibility of settlement as a treatment method. The contractor also may prefer to use other treatment methods.

MM-55. All intake pumps within fish bearing streams will have a fish screen installed, operated and maintained. Screening techniques must utilize the specifications in the HPA and be in compliance with RCW 77.55.010, RCW 77.57.040 and RCW 77.57.070 or the specifications in the NMFS Anadromous Salmonid Passage Facility Design manual (2011) and NMFS Fish Screening Criteria for Anadromous Salmonids (1997), whichever is more restrictive.

MM-56. Temporary diversion structures will be non-erosive (e.g., sand bags filled with clean gravel and covered with plastic sheeting, portable bladder dam).

The intent of this MM is to avoid or minimize turbidity impacts on fish and habitat downstream of the construction area.

MM-57. Temporary bypass systems will utilize non-erosive techniques, such as pipe or a plastic-lined channel that will accommodate the predicted peak flow rate during construction.

The intent of this MM is to avoid or minimize turbidity impacts on fish and habitat downstream of the construction area.

MM-58. Temporary bypass structures will have energy dissipaters at the outflow to prevent erosion.

The intent of this MM is to avoid or minimize turbidity impacts on fish and habitat downstream of the construction area.

MM-59. WSDOT Biologists will follow the WSDOT Fish Exclusion Protocols and Standards to conduct work area isolation, fish capture and removal, and dewatering/rewatering. Implementing these factors depends to some degree on local conditions and the professional judgment of the biologist. If block nets are in use, they will be checked 3 times daily. Flows shall be gradually reintroduced to the isolated work area, to prevent channel bed or bank instability, excessive scour, or turbidity and sedimentation. The directing biologist shall inspect the work area downstream reach to ensure no fish are stranded or in distress during reintroduction of flows.

3. When the turbidity of the groundwater is more than 25 NTU above or 125 percent of the turbidity of the site stormwater runoff, whichever is greater, the groundwater shall be treated separately from the site stormwater.

The intent of this MM is to avoid or minimize turbidity impacts on fish and habitat downstream of the construction area.

The standard specifications have provisions that cover the intent of this MM.²² The designer should review these requirements and augment as necessary within the special provisions.

MM-60. Upon completion of all in-water work, all stream diversion devices, equipment, pipe, and conduits will be removed and disturbed soil will be restored after diversions are removed. Streambank plantings may occur at a later date during the planting season.

MM-61. Projects will not inhibit passage of any listed fish species life stage following completion. When feasible, a bypass system will be installed during construction to permit both upstream and downstream passage of listed fish and their prey.

The intent of this MM is to avoid interfering with the migration and rearing activities of salmonids.

Because the standard specifications do not allow for blocked fish passage, an HPA permit is necessary to override this specification. Conditions of the HPA should be referenced in the special provisions.

6.3.2.17 Culvert Work

MM-62. Culvert cleaning, repair, and maintenance will occur during the dry or when listed fish are least likely to be present.

The intent of this MM is to avoid disturbance to fish in the vicinity of culverts during cleaning and repair activities.

22. Section 1-07.5(2) of the standard specifications – *State Department of Fish and Wildlife: The contractor shall never block stream flow or fish passage.*

Section 2-09.3(3)A – *Preservation of Channel: When foundations or substructures are built in or next to running streams, the contractor shall:*

- 1. Excavate inside cofferdams, caissons, or sheet piling unless dredging or open pit excavation is permitted.*
- 2. Backfill foundations placed inside cofferdams and behind sheet piling prior to removing cofferdams or sheet piling. This backfill shall be level with the original streambed and shall prevent scouring.*
- 3. Remove any excavation material that may have been deposited in or near the stream so that the watercourse is free from obstruction. Page 2-32 2016 Standard Specifications M 41-10 Amended April 3, 2017 2-09 Structure Excavation*
- 4. Maintain water depth and horizontal clearances required for traffic to pass on navigable streams, furnishing any channel signals or lights required during construction.*
- 5. Place riprap around the outside of cofferdams, as specified, to repair local scour.*

MM-63. For waters that may be used by listed fish species and include critical habitat, culvert cleaning will occur either by hand or from the top of the bank when flow is in the channel or when the stream is either dry or a flow bypass is installed.

The intent of this MM is to avoid disturbance to fish in the vicinity of culverts during cleaning and repair activities.

MM-64. All culverts conveying fish bearing streams will be designed and constructed in accordance with WDFW’s Water Crossing Design Guidelines (Barnard et al. 2013) or most current document and related Washington Administrative Code criteria. Culverts must be designed to either meet the “no slope” or the “stream simulation” model design, whichever is most appropriate.

The intent of this MM is to provide culverts that are fish-passable during all seasons of the year.

Typically, culvert design is performed by the designer and fully incorporated into the contract drawings and special provisions, in which case this MM does not pertain to the contractor. In the case of temporary culverts installed for diversions or other purposes, the design may or may not be performed by the contractor. If the contractor performs culvert design, this MM should be incorporated into construction plans and special provisions and approved by WDFW in the HPA permit.

MM-65. Repair or extension of culverts that are partial or complete fish passage barriers will incorporate measures to improve fish passage for all life stages. The retrofit of an existing culvert to provide fish passage will require approval of the project design from the WDFW’s Area Habitat Biologist and WDFW’s Area Engineer.

6.3.2.18 Cutting and Filling

To adequately address earthwork activities (grading, cutting, and filling) in a BA, the extent of these activities should be quantified. Specific details should be provided regarding the size and type of fill to be placed, the location of fill in relation to nearby water resources, the methods and locations of soil removal and disposal, and methods of soil stabilization after grading or filling is complete. The placement of fill or the disturbance soils within areas containing salmon-bearing streams can have several impacts, including but not limited to the following:

- Introduction of additional impervious or semi-impervious surface area to the riparian system
- Introduction of additional potentially erodable materials to the system
- Alteration of hydrodynamics within the system
- Suspension of sediments in nearby water bodies.

Some examples of general approaches that might be considered to minimize impacts associated with projects requiring cutting and filling activities include but are not limited to the following:

- Placement of a no-construction buffer around wetlands and sensitive riparian habitats
- Avoidance of grading or placement of fill adjacent to fish-bearing streams or wetlands
- Straw placement, hydroseeding, or planting of newly disturbed sites to minimize erosion
- Placement of erosion control features (e.g., hay bales or silt fences) surrounding newly disturbed or filled sites.

The following examples of MMs developed for projects requiring cutting and filling illustrate how to word MMs appropriately:

MM-66. Fill material will only be placed in specified and permitted locations. Fill placement may be permanent or temporary and will be located in a way that minimizes impacts to sensitive areas.

The intent of this MM is to minimize impacts on sensitive fish habitat within streams and rivers associated with placement of rock for filling scour holes or making barbs. To ensure that rock is carefully placed in streams and rivers, the design should incorporate language similar to the following within the site work sections of the special provisions: Contractor will place rock by hand or employ machine placement in areas designated in the drawings.

MM-67. Temporary fills must be entirely removed and the site restored to pre-existing contours.

The intent of this MM is to ensure that temporary fills are removed and the site is restored so that potential impacts on sensitive areas (such as erosion and sedimentation, changes in drainage paths, compaction, settlement, etc.) are not permanent.

This MM is not specifically addressed in the standard specifications and should be incorporated into construction plans and special provisions. For example, if a temporary access road is placed in a wetland, instructions should be provided for the contractor to remove all road materials and restore the area (i.e., restore soils and native vegetation).

If soil compaction is an issue, the contractor could be required to decompact affected areas by ripping to a depth of at least 12 inches, regrading, and recompacting to a specified maximum density. This is most important where the work includes plantings, because root growth is inhibited by densely compacted soils. To define acceptable levels of density and compaction limits, it is prudent to

obtain a sample of the site soils and perform laboratory testing to determine the moisture-density relationship. Otherwise, a conservative specification for the compaction limit is 85 percent of the soil's maximum dry density as determined by test method ASTM D698.

6.3.2.19 Pile Installation and Removal

MM-68. Installation of steel piles with an impact hammer in-water requires the use of a bubble curtain or other approved sound attenuation method(s) to minimize impacts within waterbodies that may be used by listed species, including marine mammals.

Bubble curtains typically are not required in water depths less than three feet.

MM-69. No creosote-treated wood will be used below the OHWM.

MM-70. Any removed piling or other materials, including their waste water, will be fully contained and disposed of at a location with regulatory approval.

The standard specifications require that debris and construction wastes be disposed of in accordance with all local, state, and federal laws. The designer should consider including a note or special provision to reference the standards.

MM-71. For pile removal, direct pulling, vibratory removal, or cutting the piles below ground level will be prioritized to minimize localized turbidity. If use of a clamshell bucket is necessary due to pile breakage, turbidity curtains will be employed if site specific conditions support their use. Limiting factors for silt curtain use include tidal influence and currents.

MM-72. In tidally influenced areas, piles will be driven during slack tides whenever practicable.

MM-73. All treated wood will be contained during and after removal to preclude sediments and any contaminated materials from re-entering the aquatic environment. All contaminated materials will be disposed of at an approved and permitted disposal facility. No reuse of treated wood will occur.

The intent of this MM is to prevent treated wood debris from entering natural water bodies and contaminating them.

This MM is not specifically addressed in the standard specifications. Handling of treated wood should be incorporated into the special provisions. Depending on the site, it may be prudent to require drip tarps that contain and prevent the release of construction-generated debris to waters of the state.

MM-74. Sound pressure will be monitored per the approved WSDOT Hydroacoustic Monitoring Protocol for in-water pile driving to determine ambient conditions and the sound pressure generated during in-water impact pile driving of steel piles, including H-piles, and sheet piles. Sound pressure monitoring will occur for in-water work where listed fish species may be present. Monitoring results will be provided to the Service within 90 days following completion of pile driving.

6.3.2.20 Herbicide Use

MM-75. Herbicides will not be used within 200 feet of listed fish species spawning and rearing streams unless site specific review completed by the project biologist indicates that topography or other factors preclude herbicides from reaching spawning and rearing stream occupied by listed fish species.

6.3.2.21 Lighting

MM-76. Temporary lights for night work will be directed away from waters with listed fish species to the greatest extent possible, with the intent to prevent light from shining on surface waters.

MM-77. When permanent lighting is needed on a bridge or road segment adjacent to surface waters with listed fish species, individual “cobra head” or similar lamps will be used when possible, rather than area lights that illuminate larger areas. Lights will be directed away from waters with listed fish species to the extent possible.

MM-78. Walkways and bicycle lanes on bridges will be lit from below if possible to minimize nighttime light exposure of waters with listed fish species.

MM-79. When permanent lighting is needed on a road segment adjacent to prairie species habitat, individual “cobra head” or similar lamps will be used when possible, rather than area lights that illuminate larger areas. Lights will be directed away from prairie species habitat to the extent possible.

6.3.2.22 Geotechnical Investigations

MM-47. For Geotechnical Drilling: No geared mechanisms (e.g., tires, tracks) will enter the wetted perimeter of a waterbody. Truck mounted and tracked drilling equipment will work from a location outside of the wetted perimeter unless working off a temporary floating work platform or barge. The temporary work platform will not ground on the bed of State waters.

6.4 Developing Appropriate Impact Minimization Measures for Sensitive Species and Habitats

The listed species and habitats present in the vicinity of a project also determine the specific impact minimization measures to be implemented. Frequently, habitat- or species-specific conditions (e.g., restrictions on distance of construction from streams, stream crossing measures, timing restrictions, or noise shields) must be established to support the effect determination for the habitat or species.

The following sections provide explanations of MMs and BMPs developed for sensitive species and also for sensitive habitats. In addition, an example of timing restrictions is provided in a BA writing sample. Compiled lists of common MMs and BMPs illustrate impact minimization measures for selected sensitive habitats.

6.4.1 Impact Minimization Measures for Sensitive Species

If a sensitive species is present or could occur within the project action area, a project biologist may define measures and practices to avoid or minimize project impacts. Two of the most common measures defined to protect sensitive species and ensure given effect determinations are 1) timing restrictions, or 2) excluding or removing the species of concern from the area where impacts are anticipated.

Consider the following project example: Suitable marbled murrelet nesting habitat surrounds a paving project that has an action area confined to the developed portion of a roadway and the area within 200 feet of the roadway to account for noise related impacts. The project is scheduled for construction during the breeding season (April 1 through September 23). It is likely that this project would adversely affect marbled murrelet due to noise and visual impacts. However, if the timing of the project is altered, such that project activities will take place between September 24 and March 31 (outside the breeding season), the potential impacts could be avoided, because murrelets would not utilize the stand outside the breeding season. In that case the project could receive a determination of *no effect* (NE). Similarly, BMPs related to specific equipment or techniques might be required in order to minimize the construction-related noise associated with the project.

Where more than one listed species may be present, timing restrictions must be developed to accommodate the sensitive periods for all potentially affected species. Project biologists should always consult calendars showing sensitive periods for particular species to determine appropriate project timing. Note that timing restrictions must be approved by the project office. If timing restrictions proposed by the project biologist are not feasible, formal consultation may be necessary.

Timing of construction in or near water bodies is dictated by the in-water work windows required in an HPA permit or by the area habitat biologist. NMFS, USFWS, or the U.S. Army Corps of Engineers may have different in-water work windows defined for different species and

water bodies. Therefore, it is important to consult with WDFW and the Services to ensure that the proper in-water work window is cited. Calendars of sensitive periods for listed species are provided in PART 3, WILDLIFE SENSITIVE PERIODS CALENDAR.

If an incidental *take* permit is issued by the Services for a project, reasonable and prudent measures (RPMs) likely are stipulated by the Services. These specific measures must be incorporated into the contract to ensure that the project complies with the RPMs, and that impacts to the listed or proposed species are minimized to the greatest extent possible.

6.4.1.1 Exclusion or Removal of Species of Concern from Project Area

Exclusion or removal of listed wildlife species from the vicinity of a project should always be conducted by a trained wildlife or fisheries biologist to ensure that the risk of injury to wildlife is minimized. Because handling listed wildlife or affecting its behavior by preventing access to its customary habitat could constitute a *take* under the Endangered Species Act, often the preferred option for reducing impacts on the species is to establish timing restrictions on construction.

6.4.2 Impact Minimization Measures for Sensitive Species and Associated Habitats

If a sensitive habitat type (e.g., designated critical habitat, suitable habitat, or aquatic resource) could potentially sustain impacts, a project biologist may need to define MMs and BMPs to minimize impacts on those habitat characteristics upon which listed species depend. The following section provides examples of MMs and BMPs that could be used to minimize impacts of proposed activities on sensitive aquatic and terrestrial habitats.

Properly worded MMs and BMPs use committing or obligatory language to emphasize that they are required conditions to be implemented during project construction. Some common MMs and BMPs for transportation-related projects occurring near sensitive aquatic resources are provided below.

6.4.2.1 Prairie Habitat and Species

MM-79. When permanent lighting is needed on a road segment adjacent to prairie species habitat, individual “cobra head” or similar lamps will be used when possible, rather than area lights that illuminate larger areas. Lights will be directed away from prairie species habitat to the extent possible.

MM-80. Activities located within 200 feet of native upland prairies and open oak woodlands potentially suitable to listed prairie species as identified by the project biologist, will install and maintain all appropriate BMPs to ensure that no foreign material, such as pavement slurry, is sidecast, and that sediments are minimized unless site specific review completed by the project biologist indicates that topography or other factors preclude impacts to this habitat.

MM-81. No contractor staging areas will be allowed within 200 feet of native upland prairies and open oak woodlands potentially suitable to listed prairie species as identified by the project biologist, unless site specific review completed by the project biologist indicates that no impacts to the sensitive resource areas will occur due to topography or other factors.

6.4.2.2 *Marbled Murrelet and Northern Spotted Owl*

MM-82. Activities located within one mile of a murrelet detection section or designated critical habitat will develop and implement a trash handling plan to insure that food wastes and other items attractive to crows, jays, and other Corvidae will be disposed of in a manner that makes it unavailable to these species at any time.

The intent of this MM is to prevent potential predation of murrelet nestlings by corvids.

This MM is not addressed in the standard specifications and should be incorporated into the special provisions.

MM-83. Trees that are removed in potential murrelet nesting habitat will be dropped into the road ROW or areas that will be cleared of vegetation to avoid impacts to adjacent potential habitat. Downed trees will be retained onsite unless prohibited by the land owner. In those circumstances, LWM will be removed and used for future environmental restoration efforts where possible. The PBA Project Notification Form will provide justification for not retaining downed trees on-site or if they are not used for restoration efforts.

When it is absolutely necessary to remove trees in suitable spotted owl or murrelet habitat, the intent of this MM is to reintroduce the trees as large woody material (LWM) habitat on the forest floor. This way, the trees can be put to a good use and provide habitat for small mammals and other wildlife. In addition, the felled trees can function as nurse logs for other vegetation such as red huckleberry and western hemlock trees.

This MM is not addressed in the standard specifications. The designer should specify the locations for placement of large woody debris on the construction plans or provide measures in the special provisions for a biologist to approve locations during construction.

MM-84. Currently or previously-known occupied murrelet or northern spotted owl nest trees will not be removed.

MM-85. The number of large conifers (20 inches dbh or larger) removed will be minimized.

MM-86. If an active murrelet or northern spotted owl nest is discovered, the activity will cease immediately. A WSDOT and USFWS biologist will be notified immediately and all

activities within the disturbance threshold distances (within 0.25 mile of an active nest tree for all activities except blasting, which is 1 mile) will be postponed until after the nesting season.

MM-87. When working within the early northern spotted owl or murrelet nesting season is unavoidable (i.e., due to adverse weather conditions and snow at high elevations [including blasting], low temperature or coastal fog, or emergency actions, work will be phased to the extent possible so activities within disturbance threshold distances are conducted as late as possible in the nesting period.

MM-88. All activities that may result in visual or noise disturbance based on accepted thresholds, and have daytime work within suitable murrelet nesting habitat, will restrict activities to between two hours after sunrise and two hours before sunset during the murrelet nesting season (crepuscular LOP, April 1 to September 23).

MM-89. For projects with night work only, work will be conducted during the period from 2 hours after sunset to 2 hours before sunrise.

This is typically applicable to highways with high traffic volumes. It is important that limited operating periods be discussed with USFWS during early coordination.

MM-90. For projects with night work only, work will be conducted during the period from 1 hour after sunset to 1 hour before sunrise

This is typically applicable to highways with high traffic volumes. It is important that limited operating periods be discussed with USFWS during early coordination.

MM-91. For projects with night work only, work will begin at such time as WSDOT determines is necessary based upon daytime traffic volumes and cease work 2 hours before sunrise

This is typically applicable to highways with high traffic volumes. It is important that limited operating periods be discussed with USFWS during early coordination.

MM-92. For projects with night and day time work (24/7), no work will occur from 1 hour before sunrise to 2 hours after sunrise and no work from 2 hours before sunset to 1 hour after sunset

MM-93. For projects with night and day time work (24/7), no work will be conducted from 1 hour before sunrise to 2 hours after sunrise (avoiding the am crepuscular period only).

MM-94. If blasting is to occur in or adjacent to murrelet or northern spotted owl suitable habitat during the nesting season, no blasting will occur that may physically impact potential nest

trees, the trees buffering the nest tree, the individual murrelets, northern spotted owls, and/or their eggs.

MM-95. Activities will not downgrade a forested stand of suitable murrelet nesting habitat to unsuitable murrelet nesting habitat.

MM-96. Activities will not downgrade suitable northern spotted owl nesting habitat to roosting and foraging habitat; roosting and foraging habitat to dispersal habitat, and/or dispersal habitat to non-dispersal habitat.

MM-97. Suitable nest trees and suitable habitat cannot be removed during the nesting season.

6.4.2.3 Western Snowy Plover

MM-98. Activities located within one mile of suitable western snowy plover critical habitat, as identified by the project biologist, will develop and implement a trash handling plan to insure that food wastes and other items attractive to crows, jays, and other Corvidae will be disposed of in a manner that makes it unavailable to these species at any time.

6.4.2.4 Grizzly Bear

MM-99. Projects involving bridge replacements within the range of the grizzly bear will design the new structure to accommodate the passage of wildlife when practicable.

The intent of this MM is incorporate measures that support the recovery of grizzly bears.

This MM is not addressed in the standard specifications and should be incorporated into the construction plans and special provisions.

6.4.2.5 Oregon Spotted Frog

MM-100. An Environmentally Sensitive Area fence (for example, high visibility exclusion fencing) will be installed as necessary along project boundaries to protect offsite habitat including potential breeding sites for Oregon spotted frog. A separate fencing plan should include a map showing the preliminary location of the fence for the project. Construction personnel will not enter the Environmentally Sensitive Areas.

MM-101. Projects within or adjacent to suitable Oregon spotted frog habitat (except exempt activities as listed in section 3-2.2 of the Highway Runoff Manual) (HRM, WSDOT 2016), are subject to minimum stormwater management requirements as outlined in Section 3-3 of the HRM. Non-exempt projects must address erosion control if = 7,000 ft² of soil will be disturbed or if there is = 2000 ft² of new, replaced, or new + replaced impervious surface. Erosion control requirements include: 1) a temporary erosion and sediment control (TESC) plan (see TESC Manual), and a project specific spill prevention,

control and countermeasures (SPCC) Plan as required in Standard Specification 1.07-15(1).

MM-102. Stormwater will not be discharged to habitat potentially suitable for Oregon Spotted Frog. Detention ponds will be designed to not attract or promote bullfrogs.

MM-103. Projects within 200 ft of surface water or areas inundated for four or more months per year will install and maintain BMPs as stated in the Contract to ensure that no foreign material, such as pavement slurry from asphalt grinding equipment, is sidecast, and to control and prevent sediments from entering aquatic systems.

MM-104. WSDOT Designers will minimize the removal of riparian vegetation and the contractor will replant riparian vegetation. Replanting may not be possible in permanent impact areas, the roadway clear zone, or adjacent to or under bridges. However, potential replanting of riparian vegetation near the site should be evaluated. In areas containing suitable Oregon Spotted Frog habitat, ensure revegetation does not change vegetation from a low vegetation type (grasses and forbs) to a high vegetation type (shrubs and trees).

MM-105. Upon completion of all in-water work, all stream diversion devices, equipment, pipe, and conduits will be removed and disturbed soil will be restored after diversions are removed. Streambank plantings may occur at a later date during the planting season. In areas with suitable Oregon Spotted Frog breeding habitat, do not plant trees, especially conifers, along the shoreline to avoid shading of potential breeding sites.

MM-106. Herbicides will not be used within 200 feet of waterbodies unless site specific review completed by the project biologist indicates that topography or other factors preclude herbicides from reaching habitats used by Oregon Spotted Frog. Herbicides applied during the dry season on lands that flood during the winter/spring must break down in the environment before the next inundation

MM-107. For waters that may be used by Oregon Spotted Frog, culvert cleaning will occur either by hand or from the top of the bank when flow is in the channel, when the stream is either dry, or a flow bypass is installed.

: