

## SECTION 3.0

### BEST MANAGEMENT PRACTICES

#### 3.1 Overview

*[3.2.1.1 A detailed description of best management practices that will be implemented]*

*[3.2.1.2 A detailed description of sediment controls for all downslope boundaries (and for those side slope boundaries deemed appropriate as dictated by individual site conditions) of a construction area.]*

BMPs are chosen to protect and enhance the quality of the receiving waters from storm water runoff discharged from NDOT's MS4s. NDOT's Permit requires NDOT to define and describe the BMPs to be implemented in the CCSWMP. NDOT has created the Storm Water Quality Manuals; the Planning and Design Guide (PDG) and the Construction Site BMPs Manual (BMP Manual). The PDG explains NDOT's planning and project design process including guidance for implementing storm water controls into new projects. NDOT, through the development of the PDG, has approved a selection of permanent BMPs to be incorporated into NDOT projects. The BMP Manual provides detailed information on regulatory requirements concerning storm water mitigation at construction sites. The BMP Manual also provides selection and implementation guidance for NDOT-approved temporary BMPs for construction activity. This section will identify the permanent and temporary (construction) site BMPs NDOT has approved for use in the Clear Creek watershed.

#### 3.2 Permanent BMPs

NDOT projects in the Clear Creek watershed require design consideration to select appropriate BMPs that will protect the receiving water to the MEP. This section will identify and describe the Permanent BMPs approved by NDOT and briefly discuss considerations for selecting individual permanent BMPs. Additional design and application information for the implementation of permanent controls is available in the NDOT PDG and the statewide SWMP.

NDOT has approved permanent BMPs for the CCSWMP that fall into one of two categories: soil stabilization (source control) or treatment control BMPs. These BMPs are implemented to control sedimentation and erosion. Soil stabilization BMPs aim to control the source of pollution. The

following table describes the soil stabilization BMPs approved for use at individual NDOT sites in the Clear Creek watershed.

<b>Table 3-1. Permanent Soil Stabilization BMPs</b>	
<b>Soil Stabilization BMP</b>	<b>BMP Description</b>
Consideration of Downstream Effects Related to Potentially Increased Flow (SS-1)	The planning and design elements that may be considered to protect the downstream environment from increased flows.
Preservation of Existing Vegetation (SS-2)	The planning consideration and rationale to preserve as much of the existing vegetation as possible.
Ditches, Berms, Dikes, and Swales (SS-3)	Conveyance structures used to intercept and redirect runoff to prevent erosion.
Slope Down Drains (SS-4)	Pipes, flumes, or paved spillway to convey surface runoff downslopes preventing erosion.
Flared Culvert End Sections (SS-5)	Flared end sections placed at the inlet or outlet of pipes and channels to enhance hydraulic operation and prevent scour and erosion.
Outlet Protection/Velocity Dissipation Devices (SS-6)	Energy dissipators to protect the outlet from scour and erosion due to the high velocity of the storm water flows.
Vegetated Surfaces (SS-7)	Vegetative surfaces installed in disturbed areas to minimize erosion and promote infiltration. However, past re-vegetation has not been widely successful in the Clear Creek watershed.
Mulching (SS-8)	The application of loose bulk material to disturbed soils to prevent wind and water erosion.
Slope Roughening/Terracing/Rounding (SS-9)	Techniques to create uneven surfaces to reduce the erosive potential by decreasing the velocity of the runoff, trapping sediment, and allowing infiltration into the soil.
Retaining Walls (SS-11)	Retaining walls used to stabilize slope surfaces and reduce slope length preventing scour and erosion.

The second classification of permanent BMPs, treatment control BMPs are employed to reduce the amount of pollutants in storm water by using a physical, biological, or chemical mechanism. Treatment controls treat the storm water runoff before it is discharged into receiving waters. Treatment controls can also be employed when discharging directly into receiving waters or addressing projects that may have special requirements such as Total Maximum Daily Load (TMDL) considerations. Clear Creek has been listed on Nevada's 2002-303(d) impaired waters list for pH. A TMDL for Clear Creek has not been established.

The treatment controls approved by NDOT for use at sites in the Clear Creek watershed are listed in Table 3-2.

<b>Treatment Control BMP</b>	<b>BMP Description</b>
Infiltration Basins (TC-2)	Designed to capture and hold runoff allowing infiltration, promoting pollutant removal, and reducing runoff volumes. Conditions in Clear Creek may require infiltration basins to be used in conjunction with sand traps.
Detention Basins (TC-3)	Used to capture and detain storm water runoff promoting pollutant removal.
Traction Sand Traps (TC-4)	Allows traction sand to settle out of highway runoff before discharged into receiving waters.
Gross Solids Removal Devices (TC-5)	Designed to remove trash and solids from storm water runoff through physical and mechanical means.

The NDOT-approved Permanent BMPs can be applied to NDOT projects in the Clear Creek watershed on a project-by-project basis. The application of an individual BMP requires the designer to consider objectives for both types of permanent BMPs, soil stabilization BMPs and treatment control BMPs.

The following design objectives are considered before selecting which permanent soil stabilization BMPs are to be included in the project design:

- Prevent downstream erosion
- Stabilize areas of disturbed soils
- Maximize areas of vegetation

The main design consideration for treatment controls is to reduce the pollutant load in storm water runoff before discharging into the receiving waters while considering possible site-specific constraints (e.g. right-of-way). Projects in Clear Creek will follow the same process of BMP selection and implementation as other NDOT projects as described in the statewide SWMP.

### 3.3 Construction Site BMPs

Construction or temporary BMPs are used to control sedimentation at construction sites. This section identifies and describes the BMPs selected by NDOT for potential use at construction sites in the Clear Creek watershed. The statewide SWMP outlines the Construction Site BMP Program element to be implemented by NDOT. The statewide SWMP Construction Site BMP Program element includes NDOT construction activity in the Clear Creek watershed.

Tables 3-3 and 3-4 describe the temporary BMPs for soil stabilization and sediment control that may be considered for construction sites in the Clear Creek watershed. NDOT's BMP Manual provides working details for these soil stabilization and sediment control BMPs.

<b>Temporary Soil Stabilization BMP</b>	<b>BMP Description</b>
Scheduling (SS-1)	Scheduling construction activities in conjunction with construction site BMPs to reduce the impact on the site and surrounding area.
Preservation of Existing Vegetation (SS-2)	Identifying and protecting the vegetation at the site to provide erosion and sediment control.
Hydraulic Mulch (SS-3)	Applying fiber mixture and tackifier with hydromulching equipment to protect soil from erosion.
Hydroseeding (SS-4)	Applying a mixture of wood fiber, seed, fertilizer, and stabilizing emulsion with hydromulch equipment to minimize erosion.
Soil Stabilizer (SS-5)	Applying soil stabilizer to exposed soils to temporarily protect soils from erosion.
Straw Mulch (SS-6)	Incorporating a uniform layer of straw by roller or stabilizing emulsion to protect disturbed soils.
Geotextiles, Plastic Covers, & Erosion Control Blankets/Mats (SS-7)	Temporarily stabilizing disturbed soils by placing mats, covers, or erosion control blankets on soil.
Wood Mulching (SS-8)	Applying wood mulch to minimize erosion, increase infiltration, and reduce surface runoff.
Earth Dikes/Drainage Swales & Lined Ditches (SS-9)	Structures designed to divert and convey runoff away from sensitive areas.
Outlet Protection/Velocity Dissipation Devices (SS-10)	Techniques to reduce erosion and scour at outlet by reducing velocity of runoff.

**Table 3-3. Temporary Soil Stabilization BMPs - Continued**

<b>Temporary Soil Stabilization BMP</b>	<b>BMP Description</b>
Slope Drains (SS-11)	Conveying surface runoff away from slopes and into stabilized areas to prevent erosion.
Streambank Stabilization (SS-12)	Employing any number of BMPs in the stream zone to protect the stream.
Wind Erosion Control (SS-13)	Applying water or soil stabilizers to minimize dust or wind erosion.

**Table 3-4. Temporary Sediment Control BMPs**

<b>Temporary Sediment Control BMP</b>	<b>BMP Description</b>
Silt Fence (SC-1)	Sediment barrier made of permeable fabric designed to slow runoff and intercept sediment before leaving the construction site.
Sediment Basin (SC-2)	Temporary basin to capture and detain runoff, allowing sediments to settle out before water is discharged.
Sediment Trap (SC-3)	Temporary containment to settle out sediment before infiltration or discharge.
Check Dam (SC-4)	Rock, gravel bags, or fiber rolls placed across channel to reduce flow velocity and scour in channel or drainage ditch.
Fiber Rolls (SC-5)	Rolls or wood excelsior, rice, straw or coconut fibers bound and placed at the toes and along the face of slopes to intercept runoff, reduce slope length, and remove sediment.
Gravel Bag Berm (SC-6)	Single row of gravel bags placed across a slope to intercept runoff and provide sediment removal.
Street Sweeping and Vacuuming (SC-7)	Removal of tracked sediment to prevent sediment from entering conveyance systems or receiving waters.
Storm Drain Inlet Protection (SC-8)	Protection of storm drain inlets from construction site sediment-laden runoff.

Several of the BMPs listed in this section of the CCSWMP are applicable to downslope boundaries at construction sites in the Clear Creek watershed as the right-of-way will allow. NDOT, in the BMP Manual, has selected the following BMPs as the required minimum measures to address slope protection:

- Geotextiles and Erosion Control Blankets (SS-7)
- Earth Dikes/Drainage Swales and Lined Ditches (SS-9)
- Slope Drains (SS-11)
- Fiber Rolls (SC-5)
- Gravel Bag Berm (SC-6)

NDOT recognizes these BMPs as the minimum required BMP options. The BMP Manual recommends employing at least one of these minimum required BMPs. Additional BMPs may be required and implemented for slope protection depending on site-specific conditions.

Additional temporary BMPs selected by NDOT are categorized as follows: Tracking Control, Non-Storm Water Management, and Waste Management and Materials Pollution Control BMPs. These BMPs are described in the following three tables and are defined in NDOT's BMP Manual.

<b>Tracking Control BMP</b>	<b>BMP Description</b>
Stabilized Construction Entrance/Exit (TC-1)	Stabilizing the entrance and exit of construction sites to reduce tracking sediment onto public roads.
Stabilized Construction Roadway (TC-2)	Stabilize construction roads to limit erosion or dust from vehicle traffic.
Entrance/Outlet Tire Wash (TC-3)	Tire wash stations to clean tires and undercarriage to prevent sediment from being transported onto public roads.

<b>Table 3-6. Non-Storm Water Management BMPs</b>	
<b>Non-Storm Water Management BMP</b>	<b>BMP Description</b>
Water Conservation Practices (NS-1)	Activities using water conservatively to avoid causing erosion or transporting sediments off the site.
Dewatering Operations (NS-2)	Managing non-storm water and accumulated storm water and removing the water from the site.
Paving and Grinding Operation (NS-3)	Practices to minimize the release of pollutants associated with these activities into the storm drain system.
Temporary Stream Crossing (NS-4)	Temporary stream crossing during construction projects to minimize the impact to the waterway.
Clear Water Diversion (NS-5)	Practices to isolate the construction site from live water by diverting waters around the site and limiting the impact the construction activity has on the waterway.
Illicit Connection/Illegal Discharge detection and Reporting (NS-6)	Activities which identify and report illicit discharges or illegally dumped materials at construction sites.
Potable Water/Irrigation (NS-7)	Practices to manage discharges from irrigation activities, discharges from potable water, water line flushing, and hydrant flushing.
Vehicle and Equipment Cleaning (NS-8)	Procedures to protect the downstream environment from discharges associated with vehicle cleaning.
Vehicle and Equipment Fueling (NS-9)	Procedures to prevent fuel spills and leaks into the storm drain system and receiving waters.
Vehicle and Equipment Maintenance (NS-10)	Vehicle and equipment maintenance procedures to prevent the discharge of pollutants into the storm drain system.
Pile Driving and Drilling Operation (NS-11)	Controls to reduce the discharge of pollutants during pile driving operations.
Concrete and Pavement Curing (NS-12)	Practices to control the potential pollutants from the chemical and water methods used in concrete curing.
Material and Equipment Use Over Water (NS-13)	Procedures on barges or boats to properly store, use, and dispose of materials to prevent discharge of pollutants into the waterways.
Concrete Finishing (NS-14)	Activities to minimize the runoff from concrete finishing methods and employ site protection methods to prevent runoff from impacting receiving waters.
Structure Demolition/Removal Over or Adjacent to Water (NS-15)	Demolition and removal control practices to reduce the potential for wastes and debris entering the waterways.
Temporary Batch Plants (NS-16)	BMPs presented to assist with permit compliance as temporary batch plants must comply with the General Permit requirements

<b>Table 3-7. Waste Management and Materials Pollution Control BMPs</b>	
<b>Waste Management and Materials Pollution Control BMP</b>	<b>BMP Description</b>
Material Delivery and Storage (WM-1)	Descriptions of the proper handling and storage of materials to minimize discharges into the receiving waters.
Material Use (WM-2)	Practices for using materials to protect the downstream environment from potential discharges.
Stockpile Management (WM-3)	Management procedures to reduce the potential for discharges from stockpiles of soil and paving materials.
Spill Prevention and Control (WM-4)	Methods to prevent spills and procedures for managing and reporting spills.
Construction Debris and Litter Management (WM-5)	Managing stockpiles and construction site wastes to prevent impacting the downstream environment.
Concrete Waste Management (WM-6)	Concrete waste practices to prevent the waste materials from entering the storm drain system.
Sanitary/Septic Waste Management (WM-7)	Proper placement and maintenance of sanitary/septic waste materials to prevent discharge into the storm drain system.
Liquid Waste Management (WM-8)	Management practices to control non-hazardous liquid materials at construction sites.