OPERATION AND MAINTENANCE PLAN

FOR THE BUTTE-SILVER BOW

SUPERFUND STORM WATER SYSTEM

WITHIN THE BUTTE PRIORITY SOILS OPERABLE UNIT

PREPARED FOR:

US Environmental Protection Agency, Region 8

Butte Office

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1.0 Introduction

Storm sewer systems have many components that require proper operation & maintenance (O&M) to ensure the components function as designed. These components can consist of landscaping, ditches, curb and gutter, inlets, manholes, conveyance pipes, detention/retention ponds, and any other structure that collects, conveys, or controls the flow of storm water. These structures are required to convey storm water away from infrastructure to prevent or minimize flooding. Proper maintenance of these structures will help to ensure that:

- Storm sewer systems operate as they were designed
- Pollution sources are removed, or minimized, prior to runoff entering the storm sewer system
- Pollutants that accumulate within the storm sewer system are removed to minimize the impact on downstream infrastructure and surface waters
- Intended infrastructure function is maintained or restored
- Vegetation removal is avoided or minimized where required
- Flooding is prevented or reduced to protect private and public facilities

The components of a storm water system need to be inspected to determine the maintenance that is required to ensure proper operation. Storm sewer components should be inspected on a regular basis, with the inspection frequency depending on many factors including the function of the structure (conveyance vs. sediment capture), weather (dry vs. wet years), and manpower requirements. The inspection frequency can be varied to accommodate infrastructure type or specific locations with greater maintenance requirements, but minimum frequencies must be maintained to detect such issues as deterioration, structural problems, sediment accumulation, and overgrown vegetation.

This plan pertains to specific Superfund Storm Water Structures (SSWS) as shown in Figure 1. Storm water infrastructure not specifically listed in this document is not classified as a SSWS; these structures will be maintained separately according to regular Butte-Silver Bow maintenance procedures. This plan addresses the twenty nine (29) structures identified in the BSB-ARCO allocation agreement. A list of the SSWS is provided in Appendix A. Maintenance of the municipal storm water system within the Butte Priority Soils Operable Unit (BPSOU) will be conducted separately; however, some components of the municipal system are directly related to the SSWS listed in this plan. The BSB municipal Storm Water System is shown in Figure 2. Inspection and maintenance will be performed by BSB Public Works Department with coordination from other departments as detailed in Section 1.6. The funding mechanism will be through BSB public works budget and funds from the BSB-ARCO allocation agreement.

1.1 Data Management & Documentation

Documentation of all activities described in this O&M plan is required to ensure regulatory compliance and efficient execution. Documentation is also required to ensure that proper health and safety procedures are followed, and to identify new hazards that may develop.

Identification of structures and sites within the BSB storm water system will be dictated by the following databases: 1) the List of Superfund Storm Water Structures in Appendix A and shown in Figure 1, and 2) the BSB storm water infrastructure inventory covering inlets, conveyance pipes & ditches, detention ponds, etc, shown in Figure 2. The maps included in this manual use the standardized GIS site identification system to label all storm water infrastructure. This identification system must be followed when completing any documentation of inspection or maintenance activities. If questions arise regarding the identification and/or location of a site or structure, contact the BSB GIS, Public Works or Planning Department for assistance. A GIS key for the BSB alphanumeric system used to identify storm water structures is included in Appendix A.

SSWS identification is by common name as available for the existing structures listed in Appendix A. Additionally, a three-part alphanumeric code will accompany the common name, consistent with the GIS naming system developed for BSB's *Municipal Storm Water Improvements Plan* (March 2009). All SSWS structures will be given a unique alphanumeric code consisting of 1) a location code (e.g. the drainage basin), 2) a structure code (PND = Pond), and 3) an "S" (indicating SSWS) followed by a sequential ID number. For example, Lower Missoula Gulch Catch Basin 8 is a pond located in the West Side Basin; it would have a SSWS code of WS-PND-S0001. The following structure codes are utilized:

- PND = Pond
- D = Drainage Ditches, Channels and Biofiltration Swales
- I = Inlet
- M = Manhole
- C = Combination Manhole and Inlet
- O = Outfall
- HD = Hydrodynamic Device
- PVC, CMP, etc. = type of pipe material

Several components of the SSWS network will not be named. These components include trash racks, energy dissipaters, fences, gates and water quality signs. These will be inspected and maintained under the associated SSWS inspection sheets and all SSWS will be in a separate GIS layer maintained by BSB.

1.2 Ownership & Accessibility

Storm water structures are located on land owned by both public and private entities. Ownership is documented in the BSB GIS database. Maps included with this O&M Plan also show ownership, indexed to Table C-1 in Appendix C, listing private property owners, contact information, and access or scheduling procedures that must be followed to complete O&M tasks.

BSB storm water structures, sites, and access points are located on both public and private property. The BSB GIS database contains ownership information that should be checked before completing any inspection or maintenance activities. This information may include owner-specific requirements for notification, scheduling, and securing access to a site or structure. Maps provided in this O&M Plan and

in the BSB GIS database provide ownership information for BSB storm water infrastructure. Private ownership is summarized in Table C-1; structures/sites not listed in Table C-1 are located on and accessed through public property, and do not require special arrangements or permission prior to O&M activities.

1.3 Health, Safety, and Environment

Butte-Silver Bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times. If sites are located on private property or other areas with additional safety and health requirements, BSB shall follow those requirements. Any such requirements will be identified during the maintenance access process.

1.4 Inspection and Maintenance Procedures

Each Superfund storm water structure will have a specified inspection protocol and frequency based on the type, size, and location of each structure. Detailed information on the required maintenance procedures for each type of structure is included in Section 2.0.

1.5 Sediment Disposal

Sediments collected in and removed from the BSB storm water system within BPSOU are considered contaminated material that must be transported to an EPA approved repository for final disposal. Areas designated for temporary storage or cleaning of equipment (vac-truck washing) must be approved by the EPA and DEQ, and must be designed with appropriate BMPs to prevent sediments from being re-released into the storm water system and surface waters. The approved sediment disposal sites for BSB are the BSB Mine Waste Repository and the ARCO treatment lagoons.

Refer to the BSB Storm Water Ordinance or BSB Storm Water Engineering Standards for appropriate BMPs.

1.6 Coordination with other Departments

A successful storm water maintenance program will require the Public Works Department to coordinate and communicate with various Butte-Silver Bow departments.

Road Department – Communication between the Road Department and Public Works department will be necessary in areas where superfund structures are located or cross public roadways. Maintenance and condition of superfund structure culverts or ditches located within the County road system should be communicated between departments. The BSB maintenance supervisor will notify the Road Department at least 24-hours prior to scheduled work.

Planning and GIS Department – Coordination with the Planning Department may be necessary in order to ensure that needs and requirements for perpetual storm water maintenance are met. As future development occurs in Butte, Pubic Works and Planning personnel must ensure that maintenance access and easements are maintained or secured, and that existing structures are not impacted by

development. The BSB maintenance supervisor will notify the Planning Department at least 24-hours prior to scheduled work.

Coordination with the GIS department will also be important to ensure that naming conventions and additional infrastructure work is incorporated into BSB's GIS database. The BSB maintenance supervisor will notify the GIS department of any changes that need to be made to the GIS database in writing within 30-days of completion of work.

Weed Control – Coordination with District Weed Board. The objective of the Weed Board is to control, contain, and in some cases, eradicate noxious weeds and to maintain vigilance for new and potential invasions of noxious weeds into the County. Excessive growth of any vegetation, including weeds, can impair the proper functioning of storm water facilities. The Maintenance Department will coordinate with the weed control supervisor to identify and control noxious and non-noxious weeds associated with storm water facilities. Maintenance procedures for vegetation and weed control are provided for each type of storm water component in this Plan. The BSB maintenance supervisor will notify the District Weed Board at least 24-hours prior to scheduled work to coordinate identifying weed control needs.

Staff from the Public Works, Planning/GIS, Roads, and Weed Control departments will meet on a quarterly basis to address storm water maintenance needs.

1.7 Reporting

BSB maintenance personnel will perform regular maintenance work on storm water structures as defined in this document. All site inspection forms and maintenance activities will be completed and kept on file within the BSB Public Works department. BSB will compile all information into an annual maintenance report for the system which will be submitted to the agencies for review. This report will identify the effectiveness of existing maintenance and inspection protocol, identify any significant repairs, deviations, or changes from the specified O&M activities, and will include recommended changes to the plan, if necessary.

1.8 Staffing Requirements

Inspection and maintenance of SSWS will be conducted by a combination of BSB Public Works Department staff. Private contractors may be used for the 5-year SSWS evaluation. All staff conducting operation and maintenance work will be appropriately trained in inspection and maintenance procedures, and relevant hazardous waste and safety requirements. Staffing and required training details are detailed in **Table 1.**

Table 1. Annual Butte-Silver Bow Storm Water O&M Staffing and Time Estimate

Department	Staff Description	Time Estimate	Required Training
Semi-Annual Inspection and Monitoring			
Metro Maintenance	2 – Operators 1 – Laborer 1 – Supervisor 1 – GIS 1 – Administrative	160 hours 80 hours 80 hours 80 hours 100 hours	OSHA 1910.120 – Hazwoper Annual Refresher
5-year Superfund Storm Water Structure Evaluation			
Metro Maintenance	1 – Supervisor	240 hours	OSHA 1910.120 – Hazwoper Annual Refresher
Public Works - Utilities	Consultant Engineer	240 hours Engineering 80 hours Drafting/GIS/Admin	
Maintenance and Repair Activities			
Metro Maintenance	2 – Operators 1 – Laborer 1 – Supervisor 1 – GIS 1 - Administrative	500 hours 500 hours 200 hours 200 hours 100 hours	OSHA 1910.120 – Hazwoper Annual Refresher

The proposed schedule for semi-annual inspection of SSWS will be in the Spring (April – June) and Fall (September – November) of each year. BSB staff will begin semi-annual inspections starting in Fall of 2013. New infrastructure added under the Superfund program shall be incorporated into the program and this document upon completion and turn-over of the design and as-built documents.

1.9 Contingency Plan

During the implementation of this operation and maintenance schedule, BSB realizes that an unanticipated event or condition may occur that is outside of the scope of this plan that results in damage or failure of a SSWS. Such events may include but are not limited to a flood event (or other natural disaster), vandalism, illegal dumping, or structural failure.

The BSB Metro Sewer Maintenance Division will be the primary entity responsible for activating the contingency plan. The contingency plan will consist of the following actions:

Response

Upon notification of an incident that requires activation of the Contingency plan, BSB Public Works Department staff will:

- Conduct a preliminary assessment of the damaged SSWS. The assessment will identify the following information: date of inspection, name of inspector, name of the structure(s), the type of damage associated with the structure(s), reason for failure/impact, areas affected,

and the appropriate entities for internal and external notification. Responsible Entity: BSB Metro Sewer Maintenance.

- Notify the appropriate entity to assist in addressing the problem, as necessary:

  Internal Notification

  - Flooding/Natural Disaster: BSB Emergency Management Agency – 497-6295
  - Vandalism: BSB Police Department – 497-1120 or 911
  - Fire: BSB Fire Department – 497-6481 or 911
  - Illegal Dumping: BSB Health Department, Dan Powers – 497-5020
  - Public Works Operations Manager, Rick Larson – 497-6518

  External Notification

  - EPA: Sara Sparks – 782-7415
  - MDEQ: Joe Griffin – 560-6060
  - BP/ARCO: Lindy Hanson – 782-9964

Replacement/Restoration

Once the threat or damage has been addressed by the appropriate entity, BSB Public works will consult with the appropriate entities and develop a corrective action plan to make necessary repairs to the SSWS. The corrective action plan will also detail actions taken to prevent future damage to the SWSS. The corrective action plan will be submitted to EPA, MDEQ, and ARCO for review prior to implementation. Repair work will be conducted and supervised by BSB Metro Sewer Maintenance Crews, or other specified entity as identified by the agencies.

Resumption

Once all repairs are completed and the SSWS has been inspected by the agencies and any other required parties, the SSWS will be returned to service.

2.0 Storm Water System Components

2.1 Detention/Retention Ponds

A storm water detention or retention pond is an open basin built by excavating below existing ground or by constructing aboveground berms (embankments). A detention pond temporarily stores storm water runoff during rain events and slowly releases it through an outlet (control structure). Retention facilities are designed to store storm water (up to a specified storm event) for subsequent infiltration and evaporation. Detention/retention facilities contain an emergency overflow structure for the safe conveyance of water from a storm event greater than the design event. Detention/retention facilities require proper maintenance to ensure proper operation. Access to ponds may vary greatly; they may be fenced off for controlled access or may appear in more natural or park-like settings that do not limit access and use.

The following types of ponds are in the SSWS:

- Wet Pond – has permanent pool and runoff from each storm event is detained and treated until displaced by the next event.
- Dry Pond – does not have a permanent pool as it is designed to release or infiltrate storm water before the next storm water event.
- Multiple Pond System – a group of ponds designed to collectively treat the water quality design storm.
- Shallow Wetland – has wetland vegetation on the pond bottom to enhance pollutant removal, usually has a base flow to sustain wetland vegetation.
- Pond/Wetland System – a shallow wetland with a deep permanent pool upstream of the wetland containing wetland vegetation.

Facility components that are typically associated with a Detention/Retention Pond include:

- access road or easement
- fence, gate, and water quality sign
- control structure/flow restrictor
- energy dissipaters
- conveyance storm water pipe
- sediment forebays

Health & Safety

Butte-Silver Bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the "Pond Maintenance Inspection Form" to document O&M activities performed on detention/retention facilities. Site specific pond inspections forms are tailored to each site and will be used for semi-annual inspections by BSB personnel. A more detailed evaluation of the ponds will be completed by an engineer on a less frequent basis, approximately once every five years. Inspection personnel will document the common name and GIS ID number, if applicable, of any associated structures inspected during the pond inspection. Inspection Forms are included in Appendix E.

Location: Detention/retention pond SSWS are shown on the map provided as Figure 1.

An overview of inspection and maintenance procedures for detention/retention ponds is included below. Refer to Table D-1 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the system is functioning properly following maintenance.

Inspection

Detention/retention facilities should be inspected in the spring and the fall and as soon as practicable and after a major storm event or series of events that equal or exceed 0.50-inches of rainfall in a 24-hour period of time. The rain gauge at the Kelley Mine Yard will be used for rainfall monitoring. Many structures are susceptible to debris blockage, therefore it may be determined that the inspections should occur more frequently after smaller storm events. In the event that an inspection is required for specific structures after smaller storm events, this O&M plan will be revised accordingly.

Ponds may be lined with HDPE or similar materials, it is imperative that the integrity of the liner be inspected for seam separation, tears, and punctures.

Inspect the facility for accumulated sediments, litter, debris, oil or other pollutants, dead vegetation, or the invasion of noxious weeds, shrubs, or trees. Identify upstream storm water sources contributing pollution to the facility. Identify any signs of rodent holes in embankments as rodent holes can lead to failures of the embankment. Identify any signs of embankment settlement or sinkholes as these are serious problems. Identify sand boils or seepage water surfacing downstream of embankments. Inspect emergency spillways to ensure they are covered with a minimum of 12 inches of riprap or have adequate vegetation for erosion protection. An inspection form documenting the date and time of the inspection, the inspector, the condition of the infrastructure, corrective actions taken (if any), and any other pertinent information, must be completed during the inspection procedure.

Maintenance Procedures

- Remove sediment from detention ponds when sediment accumulation exceeds 10% of the design pond capacity or as determined necessary to maintain pond design capacity and functionality. Sediment removal will be focused on sediment forebays or other engineered areas where maintenance equipment has adequate access. Removed sediments must be transported to an EPA-approved repository for disposal.
- Remove sediment from retention ponds when the facility does not drain between storms, or when infiltration is reduced significantly below the design capability.
- Sediment removal should be conducted during the drier summer months.
- Detention/retention ponds and outflow control structures are not to be altered from the original approved design.
- Remove accumulated litter.
- Remove any pollutants with volumes greater than a surface sheen.
- Remove debris/obstructions from control structures.
- Remove noxious weeds, shrubs, or trees that are growing within the pond, on side slopes, berms, or within the emergency overflow area. Trees and shrubs can block flows or lead to berm failure and should not be allowed to grow in the pond or on berms. Trees and shrubbery may be allowed to grow around the perimeter of the pond unless that growth interferes with the facility's proper function or maintenance activities.
- If vegetation is present, mow vegetation to match surrounding areas or to sustain additional intended uses of the facility such as recreation areas or wildlife habitat.
- Use mechanical methods to control weeds. Pesticides, herbicides, and fertilizers should not be used in storm water control facilities.
- Repair eroded slopes when rills form.
- Reseed bare areas with vegetation suitable for the site.
- Where applicable, repair pond liners if tears, punctures, and seam separation is visible and repair or replace where there are more than three holes greater than 1/4-inch diameter.
- When possible, maintenance and repairs should be timed to avoid or minimize impacts on wildlife.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Maintains or restores the intended infrastructure function.

- Minimizes scour damage to downstream conveyance pipes.
- Prevents or reduces flooding to protect infrastructure and/or structures.

Notes

Following proper maintenance procedures for detention/retention ponds ensures that the ponds operate as designed, have adequate storage and/or infiltration capacities, and minimize or prevent the transport of sediments and pollutants downstream.

2.2 Drainage Ditches

Drainage ditches are open channels, often manmade, that carry only storm water. Drainage ditches are often vegetated, but can be lined with riprap or concrete. Ditches need to be maintained to prevent localized flooding during storm events.

Facility objects that are typically associated with a Drainage Ditches include:

- access road or easement
- fence, gate, and water quality sign
- energy dissipaters
- debris barrier (e.g. trash rack)
- catch basins/field inlets
- sediment trap

Health & Safety

Butte-Silver Bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the "Ditch Maintenance and Inspection Form" to document O&M activities performed on channels/ditches. Site specific ditch inspection forms will be used for semi-annual inspections by BSB personnel. A more detailed evaluation of the ditches will be completed by an engineer on a less frequent basis, approximately once every five years. Document the ID number, if applicable, of any associated structures included with the inspection of the ditch. Inspection Forms are included in Appendix E.

Location: Drainage Ditches are shown on the map provided as Figure 1.

An overview of inspection and maintenance procedures for drainage ditches is included below. Refer to Table D-2 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the system is functioning properly and/or following maintenance.

Inspection

Drainage ditches should be inspected during routine site maintenance of adjacent infrastructure or in the spring and the fall and as soon as practicable after a major storm event or series of events that equal or exceed 0.50-inches of rainfall in a 24-hour period of time. The rain gauge at the Kelley Mine Yard will be used for rainfall monitoring. Inspections should look for areas of soil erosion, concrete deterioration, and areas of sediment, trash, or debris accumulations. If areas with significant sediment accumulations are discovered, the source area for the sediment should be determined if possible. An inspection form documenting the date and time of the inspection, the inspector, the condition of the infrastructure, corrective actions taken (if any), and any other pertinent information, must be completed during the inspection procedure.

Maintenance Procedures

- Perform maintenance during the growing season when vegetation is easy to reestablish.
- Remove sediment accumulations greater than 6-inches in depth or that significantly reduce the designed or historical hydraulic capacity.
- A typical application is to install strategic concrete or alternative hard-surfaced sediment traps within the vegetated channels that can be cleaned periodically without affecting the established vegetation. If present, remove sediment accumulations that significantly reduce the designed hydraulic capacity.
- Clean vegetated ditches in sections, leaving undisturbed areas to filter sediments between cleaned areas.
- Remove vegetation only when it reduces the hydraulic capacity of the ditch by 20% or more of the design capacity. Never remove vegetation in excess of what is needed because vegetation is an effective sediment filter and protects the channel bed from erosion.
- Trap sediments that are generated by the maintenance activities. Use sediment-trapping BMPs at the lower end of each excavated area. Refer to the BSB Storm Water Ordinance for BMPs to be used during typical construction and cleaning activities.
- Vegetation removed and sediments trapped must be taken off-site to prevent these materials from reentering ditches. Removed sediments must be transported to an EPA-approved repository for disposal.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Prevents roads, parking areas, and drainage systems from becoming pollutant sources.
- Maintains or restores the intended infrastructure function.
- Avoids or minimizes vegetation removal.
- Prevents or reduces flooding.
- Protects infrastructure.

Notes

Reseed bare soils and install temporary erosion control BMPs after removing accumulated sediments to minimize sediment transport from disturbed areas if vegetation rooting has been removed. Trees and shrubbery should not be allowed to grow within drainage ditches as they impede maintenance activities and can interfere with the facility's function.

2.3 Biofiltration Swales

A biofiltration swale uses grass or other dense vegetation to filter sediment and oily materials out of storm water. Usually they look like flat-bottomed channels or ditches with grass growing in them. Biofiltration uses vegetation in conjunction with slow and shallow-depth flow for runoff treatment. As runoff passes through the vegetation, pollutants are removed through the combined effects of filtration, infiltration, and settling. These effects are aided by the reduction of the velocity of storm water as it passes through the biofilter.

Biofiltration swales provide storm water quality control (treatment), but do not provide storm water quantity control (detention/retention). Swales are storm water treatment devices that must be properly maintained to sustain pollutant removal capacity.

Facility objects that are often associated with a typical biofiltration swale include:

- access road or easement
- fence, gate, and water quality sign
- energy dissipaters
- debris barrier (e.g. trash rack)
- catch basins/field inlets
- sediment trap

Health & Safety

Butte-Silver Bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the Biofiltration Maintenance & Inspection Form included in Appendix E. Document the ID number, if applicable, of any associated structures included with the inspection of the swale. Inspection Forms are included in Appendix E. Separate forms are provided for each type of Superfund Storm water System Component.

Location: Biofiltration swales are shown on map provided as Figure 1.

An overview of inspection and maintenance procedures for biofiltration swales is included below. Refer to Table D-3 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the system is functioning properly and/or following maintenance.

Inspection

Swales need to be well maintained to treat storm water. Inspect in the spring and the fall and as soon as practicable after a major storm event or series of events that equal or exceed 0.50-inches of rainfall in a 24-hour period of time. The rain gauge at the Kelley Mine Yard will be used for rainfall monitoring. Inspect for problems such as channeling flow, rills, bare ground, sediment accumulation, oily material, and debris. Vegetation bare spots shall be identified and maintained with seeding to achieve adequate grass growth. Identify and remove pollutant sources that are discharging to the swale. Maintain access to inlet and outlet structures for pollutant removal, and maintain access to the swale for mowing and noxious weed removal.

Maintenance Procedures

- Remove leaves, litter, sediment, oily materials, and grass cuttings when mowing or at any time that debris is observed in the swale as this can cause blockage of inlets and outlets.
- Clear inlets, outlets, curb cuts, and level spreaders of debris to prevent blockage of storm water flow.
- Use a rake and shovel to remove, by hand, sediment accumulations greater than 2-inches thick that cover grass areas; avoid vegetation removal. Reseed bare areas. Removed sediments must be transported to an EPA-approved repository for disposal.
- Mow to keep grass at the maximum height (9-inches). Mow to no less than 4-inches in height and remove clippings from the swale. Preserve healthy vegetation or reestablish vegetation where needed. Seed bare spots. Use appropriate BMPs such as hydroseeding or mulches to

cover bare soils. Refer to the BSB Storm Water Ordinance for BMPs to be used during typical construction and cleaning activities.

- Vegetation removed must be taken off-site to prevent these materials from reentering swales.

Maintenance Goals

- Avoid or minimize sediment and pollutant discharges from the surrounding area.
- Prevents roads, parking areas, and drainage systems from becoming pollutant sources.
- Maintains or restores the intended infrastructure function.
- Meet public expectations for aesthetics.

Notes

Trees and shrubbery are not allowed to grow within the biofiltration swale as they interfere with the facility's function and maintenance activities. Level spreaders must be in proper working order for swales to function properly. Where level spreaders are damaged, sunken, or bypassed by erosion, repair them to design standards. If there is a problem with grass dying due to the swale being flooded during the wet season, consider two options: convert the swale vegetation to a plant variety that can tolerate flooding, or improve swale drainage.

2.4 Trash Rack (Debris Barrier or Access Barrier)

A debris barrier is a bar grate over the open end of a culvert or storm water conveyance pipe. The intent of a debris barrier is to prevent large materials from entering a closed pipe system. Debris barriers are typically located on the control structure outlet pipe. If a debris barrier is not located on the outlet pipe, one should be installed to prevent plugging of the control structure and possible flooding.

An access barrier is similar to a debris barrier but is installed on all pipe ends that exceed 18 inches in diameter. Their function is to prevent debris and unauthorized access into the storm conveyance pipe. Only qualified personnel should attempt to maintain or remove debris from the barrier when water is flowing through the conveyance pipe.

Facility objects that are often associated with a trash rack include:

- access road or easement
- fence, gate, and water quality sign
- energy dissipaters

Health & Safety

Butte-Silver Bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Trash racks are not given dedicated identification numbers. Identify the trash rack according to the associated major structure, e.g. drainage ditch, detention pond, etc.

Inspection Form: Depending on the type of SSWS, trash rack inspection details may be included on the major structure inspection form. If necessary, use the "Trash Rack Inspection Form" to document O&M activities performed. Document the ID number of the major structure associated with the inspection of the rack. Inspection Forms are included in Appendix E

Location: Trash racks are not specifically identified, but will be part of other superfund structures.

An overview of inspection and maintenance procedures for trash racks is included below. Refer to Table D-4 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the structure is functioning properly and/or following maintenance.

Inspection

Trash racks should be inspected in the spring and in the fall. Additional inspections may be needed after significant rainfall events. Trash racks should be inspected for accumulations of debris, trash, or sediments and for damaged or missing racks and bars. An inspection form documenting the date and time of the inspection, the inspector, the condition of the infrastructure, corrective actions taken (if any), and any other pertinent information, must be completed during the inspection procedure.

Maintenance Procedures

- Remove debris, trash, and sediments when openings are obstructed and impacting ability of storm water to pass through.
- Straighten bent bars back into position.
- Replace bars that have rusted to the point where they may be easily removed.
- Replace missing racks or bars.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Prevents roads, parking areas, and drainage systems from becoming pollutant sources.
- Maintains or restores the intended infrastructure function.
- Prevents or reduces flooding to protect infrastructure.

Notes

Reseed bare soils after removing accumulated sediments to minimize sediment transport from disturbed areas. Vegetation and sediments removed must be taken off-site to prevent these materials from reentering ditches. Removed sediments must be transported to an EPA-approved repository for disposal.

2.5 Conveyance Pipes and Culverts

Inlet and outlet storm water pipes and culverts convey storm water in, through, and out of storm water facilities. Pipes are built from many materials and are sometimes perforated to allow storm water to infiltrate into the ground. Storm water pipes are cleaned to remove sediment or blockages when problems are identified. Storm water pipes must be clear of obstructions and breaks to prevent localized flooding. All storm water pipes should be in proper working order and free of the possible defects listed below.

Visual inspections may be conducted on shorter culverts and accessible sections of conveyance pipe connected to major storm water structures such as inlets, manholes, ditches, etc. Longer culverts and pipes will require inspection using remote video equipment.

Facility objects that are often associated with conveyance pipes include:

- Inlets and manholes
- Trash racks
- Energy dissipaters

Health & Safety

Butte-Silver Bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the "Storm Water Conveyance Pipe" form in Appendix E. Document the ID number of the major structure and identify connecting conveyance pipes.

Location: Conveyance pipes and culverts are shown on maps provided as Figure 2.

An overview of inspection and maintenance procedures for conveyance pipes and culverts is included below. Refer to Table D-5 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the structure is functioning properly and/or following maintenance.

Inspection

Perform visual inspections of conveyance pipes during the performance of O&M for associated structures. For example, inspect all pipes connected to an inlet or manhole during cleaning or minor repairs. Culverts should be inspected annually, and during O&M for associated structures, such as during the inspection of a ditch leading to a culvert. Perform video inspections when evidence, such as recurring blockages or excessive sediment accumulation, suggests a problem in the pipe that cannot be observed through simple visual inspection.

Inspect pipes and culverts for obstructions such as roots, debris, and sedimentation. Inspect pipes for dents, cracks, breaks, or deterioration from rust (if applicable). Inspect associated structures such as trash racks for missing racks or bars. Inspect pipes for obstructions, collapsed or caved in sections, pipe deterioration, and broken lateral connections.

Maintenance Procedures

Clean pipes when sediment depth is greater than 20 percent of pipe diameter. When cleaning a pipe, minimize sediment and debris discharges from pipes to the storm sewer. Install downstream debris traps (where applicable) before cleaning and then remove any accumulated material. A vacuum truck will be used to remove sediment accumulated during jetting.

The condition of the pipe must be carefully evaluated before considering the use of mechanical methods to remove roots or other obstructions. Do not put root-dissolving chemicals in storm sewer pipes. If there is a problem, remove the vegetation over the line.

Maintenance Goals

- Avoid or minimize sediment and pollutant discharges from the work area
- Prevent parking areas, roads, drainage systems, and drainage facilities from becoming pollutant sources.
- Maintain or restore the intended infrastructure function.
- Prevent or reduce flooding.
- Protect infrastructure.

Notes

Vegetation and sediments removed must be taken off-site to prevent these materials from re-entering conveyance pipes. Removed sediments must be transported to an EPA-approved repository for disposal. Repair or replace pipes when a dent or break closes more than 20 percent of the pipe diameter. Repair or replace pipes damaged by rust or deterioration.

2.6 Drop Inlets, Catch Basins, Sediment Traps, and Manholes

Drop inlets are vertical risers connected to an underground culvert or piping system. They are designed to collect storm water off roads and other surfaces during storm events and convey it to the storm drain piping/culverts. Typical drop inlets are fitted with metal grates.

A catch basin is a receptacle located at a drop inlet that is designed to retain sediment, debris, trash, oils, and other obstructions that would normally enter the storm sewer system. Typical catch basins have inlet grates and a small storage volume (sump) to collect sediment and debris. The terms drop inlet and catch basin are often used interchangeably; however, storage capacity must be present for a structure to be considered a catch basin.

Sediment traps resemble larger drop inlets or in-line catch basins designed to have larger sediment trapping capabilities. Surface flow is routed into the sediment trap which fills with water and sedimentation occurs. The surface outflow elevation is set at a slightly lower elevation than the inflow. Once the sediment trap has filled with water, outflow is routed into another man-made ditch or drop inlet. Sediment in the sediment trap can easily be removed with a skid-steer or vacuum (vactor) truck.

Manholes are typically placed at locations where storm sewer pipes join or have abrupt changes in direction. They are included in a piping system to assist with flow routing and to allow for maintenance access. Manholes may have steps mounted on the side of the structure to allow access, and may be fitted with an inlet to collect runoff. Drop inlets, catch basins, sediment traps, and manholes need to be inspected and cleaned to remove accumulated sediments, debris, and trash. The most common tool for cleaning these structures is a truck with a tank and vacuum hose (vactor truck) to remove sediment and debris from the sump.

Drop inlets and manholes are generally considered confined spaces and should not be entered unless maintenance personnel have OSHA approved training and equipment. Manholes and drop inlets may contain dangerous gasses that can cause injury or death if safety precautions are not followed.

Health & Safety

Butte-Silver bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the “Manhole, Catch Basin, Sediment Traps, and Drop Inlet Maintenance and Inspection Form” to document O&M activities performed. Identify associated structures such as conveyance pipes by noting the pipe ID number. Inspection Checklist forms are included in Appendix E.

Location: Drop inlets, catch basins, sediment traps, and manholes are located on various sites within BPSOU. The municipal system is shown on maps provided as Figure 2.

An overview of inspection and maintenance procedures for drop inlets, catch basins, sediment traps, and manholes is included below. Refer to Table D-6 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the structure is functioning properly and/or following maintenance.

Inspection

Inlets, catch basins, sediment traps, and manholes will be inspected as time allows. In the 2009 BSB Storm Water Municipal Improvement Plan, approximately 1,928 inlets and 225 manholes were identified. Additional inlets and manholes may be identified during future maintenance activities. Priority will be given to inlets, catch basins and manholes with known problems and complaints from the public. Inspections should be performed after completing street sweeping to remove sediments and traction sand from public roadways. Inlets should be inspected for accumulated sediments, debris, and trash that may reduce the inlet's efficiency to collect and convey storm water. Inlets should also be inspected for structural damage that prevents the inlet from functioning as designed.

Manhole, drop inlet, sediment trap, and catch basin frames and lids should be inspected for cracks, wear, or other structural damage. Metal grates and the invert/sump of the structure should be inspected for sediment accumulation, debris, trash, or other blockages that restrict flow from entering the downstream conveyance pipe or ditch. If sediment accumulation restricts the conveyance to the downstream pipe or ditch or prevents additional storage of material, the sediment shall be removed.

If storm water structures exhibit higher than normal volumes of collected materials or oily residues, the vicinity around the inlet, catch basin, or manhole should be examined for contributing source areas.

Maintenance Procedures

- Clean grates to remove debris and litter.
- Clean inlets to prevent captured materials from being transported into conveyance pipes or to downstream waters.
- Clean catch basins when they become one third full to maintain sediment-trapping capacities.
- Clean manholes and sediment traps where sediments, debris, or trash have accumulated or blockages prevent storm water from freely flowing into the downstream conveyance pipe.
- Repair structural damage.
- Replace inlets, catch basins, sediment traps, or manholes with structural damage that is not repairable.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Prevents roads, parking areas, and drainage systems from becoming pollutant sources.
- Maintains or restores the intended infrastructure function.
- Minimizes scour damage to conveyance pipes.
- Prevents or reduces flooding to protect infrastructure.

Notes

Cleaning must be performed in a manner that prevents sediment and contaminated water from being discharged back into the storm sewer system. Removed sediments must be transported to an EPA-approved repository for disposal.

2.7 Energy Dissipaters

Energy dissipaters are placed at storm drain outfalls, manholes, or locations of high velocity and are critical for preventing erosion and controlling the flow of water as it enters ditches, channels, or ponds. There are many designs for energy dissipaters including rock splash pads, wire gabion baskets, trenches, and specially designed pools or manholes.

Health & Safety

Butte-Silver bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the "Energy Dissipator Inspection Form" to document O&M activities performed. Inspection Checklist forms are included in Appendix E. Separate forms are provided for each type of Superfund Storm Water Structure.

Location: Energy Dissipaters are shown on maps provided as Figure 1 and Figure 2.

An overview of inspection and maintenance procedures for energy dissipaters is included below. Refer to Table D-7 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the structure is functioning properly and/or following maintenance.

Inspection

All storm sewer outfalls should be inspected in the spring and in the fall and as soon as practicable after a major storm event or series of events that equal or exceed 1.0-inches of rainfall in a 24-hour period of time. The rain gauge at the Kelley Mine Yard will be used for rainfall monitoring. Outfalls that do not have energy dissipaters should be noted. Outfalls should be inspected for signs of oily residues, erosion and/or sediment deposition. Significant erosion around outfalls is an indicator that a different energy dissipater may need to be constructed and possibly designed for the higher storm water flow rates and velocities. An inspection form documenting the date and time of the inspection, the inspector, the condition of the infrastructure, corrective actions taken (if any), and any other pertinent information, must be completed during the inspection procedure.

Maintenance Procedures

- Remove any accumulated sediments, debris, or trash.
- Replace missing or removed rocks from rock splash pads to cover exposed soil.
- Replace concrete energy dissipaters when the structure deteriorates significantly such that the structure no longer functions as designed, becomes structurally unsound, or the downstream channel shows signs of significant erosion.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Prevents erosion and vegetation loss from downstream infrastructure
- Maintains or restores the intended infrastructure function.
- Prevents or reduces flooding to protect infrastructure.

Notes

Proper maintenance of energy dissipaters minimizes the potential impact on downstream facilities or surface waters. Removed sediments must be transported to an EPA-approved repository for disposal. Reseed bare soils after removing accumulated sediments to minimize sediment transport from disturbed areas.

2.8 Hydrodynamic Devices

A hydrodynamic device (HD) or vortex-enhanced sedimentation vault consists of a cylindrical vessel designed so that the inlet flow spirals around the perimeter in a vortex-type action causing the heavier particles to settle out of the storm water. HDs use a vortex-enhanced settling mechanism (swirl-concentration) to capture settleable solids, and a baffle to capture floatables, oil, and grease. A

diversion structure connected to the HD bypasses storm water discharges greater than the HD design flow rate.

Hydrodynamic units are proprietary manufactured systems. Refer to the manufacturer's publications for additional maintenance information.

Facility objects that are often associated with a hydrodynamic device include:

- access road or easement
- fence, gate, and water quality sign
- diversion and bypass structures
- conveyance storm water pipe

Health & Safety

Butte-Silver bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Follow alpha-numeric identification guidance in Section 1.1.

Inspection Form: Use the "Hydrodynamic Device Inspection Form" to document O&M activities performed. Site specific HD inspection forms will be used for semi-annual inspections by BSB personnel. A more detailed evaluation of the HD will be completed by an engineer on a less frequent basis, approximately once every five years. Inspection Forms are included in Appendix E.

Location: Hydrodynamic Devices as shown on maps provided as Figure 1 and Figure 2.

An overview of inspection and maintenance procedures for hydrodynamic devices is included below. Refer to Table D-8 in Appendix D for a detailed listing of structural features, potential defects, conditions requiring maintenance, and the results expected when the structure is functioning properly and/or following maintenance.

Inspection

Inspect Hydrodynamic Devices in the spring and in the fall at a minimum and more frequently for streets or areas that have high sediment loads. Inspect device inlets for accumulated sediments, debris, and trash that may reduce the inlet's efficiency to convey storm water. Inspect the internal structures of hydrodynamic devices for cracks, wear, or other structural damage. Inspect the device for sediment accumulations, debris, trash, or other blockages that restrict flow from entering or exiting the device. If storm water structures exhibit higher than normal volumes of collected materials or oily residues, inspect the drainage area reporting to the hydrodynamic device for contributing source areas. Inspections may occur more frequently if initial monitoring and monitoring after large storm events indicates that more frequent inspections are necessary.

Maintenance Procedures

- Clean grates (if applicable) to remove debris and litter.
- Measure from finished grade to the top of sediment pile in the sump, and record the measurement.
- Compare the measurement to the known (as-built) distance from grade to the sump bottom.
- Clean sumps at least twice per year, or when they reach 75% of capacity to maintain sediment-trapping capacities.
- Repair structural damage.
- Replace devices with structural damage that is not repairable.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Prevents roads, parking areas, and drainage systems from becoming pollutant sources.
- Maintains or restores the intended infrastructure function.
- Minimizes scour damage to conveyance pipes.
- Prevents or reduces flooding to protect infrastructure.

Notes

Cleaning must be performed in a manner that prevents sediment and contaminated water from being discharged back into the storm sewer system. Removed sediments must be transported to an EPA-approved repository for disposal. In the event of an oil or gasoline spill, Butte-Silver Bow will immediately clean up small spills (less than 25-gallons) with appropriate spill response, absorbent materials, and a vactor truck, as required. Contaminated materials will be containerized and disposed of according to applicable local, state, and federal regulations. Butte-Silver Bow will report large spills (greater than 25-gallons) immediately to Montana Disaster and Emergency Services and contract with a private contractor for cleanup.

2.9 Fence, Gate, and/or Water Quality Sign

Storm water facilities such as detention ponds or drainage ditches often have fences to protect them from damage and keep people away from ponds or hazardous areas. Certain facilities such as biofiltration swales may also have informational signs telling the public that the swale is a storm water facility.

Health & Safety

Butte-Silver bow personnel shall follow all provisions of the Butte-Silver Bow Safety Policy at all times.

Documentation

Identification: Fences, gates and water quality signs are not considered separate structures.

Inspection Form: Information related to fences, gates, and/or water quality signs will be included on site specific forms, as appropriate.

Location: Fences, gates, and water quality signs are not specifically identified. Information related to these features will be included on site specific forms, as appropriate.

An overview of inspection and maintenance procedures for hydrodynamic devices is included below. Maintenance of fences, gates, and water quality signs will be conducted as part of the site specific superfund storm water structure inspections.

Inspection

Inspect fences, gates, and signage during routine inspections of associated facilities and structures, and note any conditions requiring attention on the inspection form for the major structure or facility.

Maintenance Procedures

- Replace missing gates and locks, if applicable.
- Repair or replace damaged signs and sign posts.
- Repair breaks in fences or openings under fences that may allow entry by people or animals.

Appendix A

List of Superfund Storm Water Structures

List of Superfund Storm Water Structures

The following is a list of Superfund Storm Water Structures (SSWS) as defined in Definition 119 of the Allocation Agreement and shown on the accompanying Map in Figure 1. This list shall be updated if additional Superfund Storm Water Structures are added in the future, after they have been approved by the EPA and formalized in additional Allocation Agreement Addenda.

1. Alice Pit Diversion
2. Moose Ditch Diversion to Green Mountain Shaft
3. Green Mountain Shaft Sedimentation Basin
4. Upper (East) Missoula Gulch Channel
5. Upper (West) Missoula Gulch Channel
6. Centerville Channels to Syndicate Pit – (Upper Missoula Gulch Storm Water Channels)
7. Syndicate Pit Catch Basin 1 (CB-1)
8. Lower Missoula Gulch Splash Basin and Base Flow Diversion Structure
9. Lower Missoula Gulch Catch Basin 8 (CB-8)
10. Lower Missoula Gulch Catch Basin 9 (CB-9)
11. Lower Missoula Gulch Channel to Silver Bow Creek
12. Uptown Trail Catch Basin 2 (CB-2) - (Far West Drainage, south of Montana Tech football fields) - Uptown Trail
13. Uptown Trail Channel
14. Little Minah Channel
15. Buffalo Gulch Channel
16. Buffalo Gulch Detention Basin
17. Mountain Con Channel
18. Kelley Channel “A” to Berkeley Pit
19. Kelley Channel “B” to Kelley Catch Basin
20. Kelley Catch Basin at lower Anaconda Road
21. Kelley Catch Basins (2) north of Kelley Shaft
22. Parrot Channels (2 - North and South)
23. Belmont Diversion
24. Dexter Addition (Pipe)
25. Warren Ave. HD
26. Anaconda Road-Butte Brewery HD
27. Texas Ave. HD
28. Buffalo Gulch-Webster Garfield HD
29. Montana Street HD

Appendix B

GIS Naming Key

GIS Naming Key

Subwatershed drainage areas (subbasins) were used to classify storm water infrastructure for the Butte area. The original BSB storm water map provided subbasin data for the primary drainages within the BPSOU, but corrections were made to these subbasins based on field assessment and topographic map analysis. Additional subbasins were developed for the drainages in the Flats Study area using an ArcSWAT extension in GIS. The following sub-basins have been defined for the Butte Area:

- Anaconda Road/Butte Brewery (AB)
- Basin Creek (BC)
- Blacktail Creek (BT)
- Buffalo Gulch (BG)
- Grove Gulch (GG)
- Idaho Street (IS)
- Missoula Gulch (MG)
- Montana Street (MS)
- Sand Creek (SC)
- Silver Bow Creek (SB)
- Warren Avenue (WA)
- West Side (WS)

Identification is by common name as available for the structures listed in Appendix A. Additionally, a three-part alphanumeric code will accompany the common name, consistent with the GIS naming system developed for BSB's *Municipal Storm Water Improvements Plan* (March 2009). All other structures are given a unique alphanumeric code consisting of 1) a location code (e.g. the drainage basin), 2) a structure code (PND = Pond), and 3) an "S" (indicating SSWS) followed by a sequential ID number. For example, a SSWS pond in the Buffalo Gulch drainage would be labeled BG-PND-SXXXX, with XXXX being the next available four-digit ID number. The following structure codes are utilized:

- PND = Pond
- D = Drainage Ditches and Biofiltration Swales
- I = Inlet
- M = Manhole
- C = Combination Manhole and Inlet
- O = Outfall
- HD = Hydrodynamic Device
- PVC, CMP, etc. = type of pipe material

Several components of the SSWS network will not be named. These components include energy dissipaters, trash racks, fences, gates and water quality signs. These will be inspected and maintained under the associated SSWS.

Appendix C

Superfund Structure Ownership Information and Notification Requirements

NOTE: Specific forms will be developed for the following structures. The forms will be developed in the second or third quarter of 2012 after the snow has melted and the infrastructure may be closely examined. A GPS will be utilized to determine the exact boundary and GIS will be utilized to more precisely determine ownership.

Ownership concerns such as notification, private property, or specific protective equipment will be included on the detailed form. The information included in Table C-1 is the overlap of the structures as provided on Exhibit 2 of the BSB/AR Allocation Agreement and the Cadastral ownership layer.

Table C-1. Superfund Storm Water Structure Ownership

SSWS GIS ID	Superfund Storm Water Structure Common Name	Ownership
MG-D-S0001	Alice Pit Diversion	ARCO, Cheryl Nancy Ann Gordon, Barry Browne, Ferry Lane Limited
AB-D-S0001	Moose Ditch Diversion to Green Mountain Shaft	ARCO, Barry Browne
AB-PND-S0001	Green Mountain Shaft Sedimentation Basin	ARCO
MG-D-S0002	Upper (East) Missoula Gulch Channel	BSB, Ferry Lane Limited, ARCO, two unlisted private
MG-D-S0003	Upper (West) Missoula Gulch Channel	BSB, Ferry Lane Limited, ARCO, two unlisted private
MG-D-S0004	Centerville Channels to Syndicate Pit – (Upper Missoula Gulch Storm Water Channels)	Same as above
MG-PND-S0001	Syndicate Pit Catch Basin 1 (CB-1)	BSB
MG-PND-S0002	Lower Missoula Gulch Splash Basin and Base Flow Diversion Structure	ARCO
WS-PND-S0001	Lower Missoula Gulch Catch Basin 8 (CB-8)	ARCO
WS-PND-S0002	Lower Missoula Gulch Catch Basin 9 (CB-9)	ARCO
WS-D-S0001	Lower Missoula Gulch Channel to Silver Bow Creek	ARCO
WS-PND-S0003	Uptown Trail Catch Basin 2 (CB-2) - (Far West Drainage, south of Montana Tech football fields) - Uptown Trail	BSB, Montana Tech

WS-D-S0002	Uptown Trail Channel	BSB, Montana Tech
AB-D-S0002	Little Minah Channel	BSB
BG-D-S0001	Buffalo Gulch Channel	ARCO, BSB, CPLT, Robert Day
BG-PND-S0001	Buffalo Gulch Detention Basin	BSB
AB-D-S0003	Mountain Con Channel	ARCO, BSB
AB-D-S0004	Kelley Channel "A" to Berkeley Pit	ARCO, BSB
AB-D-S0005	Kelley Channel "B" to Kelley Catch Basin	ARCO, BSB
AB-PND-S0002	Kelley Catch Basin at lower Anaconda Road	BSB, ARCO, Paul Rajacich
AB-PND-S0003 AB-PND-S0004	Kelley Catch Basins (2) north of Kelley Shaft	ARCO
AB-D-S0006 AB-D-S0007	Parrot Channels (2 - North and South)	BSB, Montana Resources, ARCO, one unlisted private
WA-D-0001	Belmont Diversion	ARCO, Public Housing Authority, Christie Transfer and Storage, Robert Chamberlin, Montana Resources, Burlington Northern, Bill LaHood, Central Education Foundation, Daniel Burns & Mary Folio, Irme Ratatics, John & Marie Cashell, one unlisted private
WS-D-S0003	Dexter Addition Pipe	ARCO, BSB
WA-HD-S0001	Warren Ave. Hydrodynamic Device	BSB
AB-HD-S0001	Anaconda Road-Butte Brewery Hydrodynamic Device	BSB
SB-HD-S0001	Texas Ave. Hydrodynamic Device	BSB
BG-HD-S0001	Buffalo Gulch-Webster Garfield Hydrodynamic Device	BSB
MS-HD-S0001	Montana Street Hydrodynamic Device	BSB

Appendix D

Superfund Storm Water Structure O&M Procedure Summary

Table D-1. O&M Procedures for Detention Ponds

	Detention Pond			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Spring and Fall As soon as practicable after a storm event(s) equaling or exceeding 0.5-inches in 24-hours	General	Trash and Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted BSB policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with BSB Weed Management department) Complete eradication of noxious weeds may not be possible. Compliance with State or BSB eradication policies required.
		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants in quantities greater than a surface sheen (Coordinate removal/cleanup with local water quality response agency).	No contaminants or pollutants present.
		Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordinate with BSB Maintenance and Operations department; coordinate with Dam Safety Office if pond exceeds 10 acre-feet.)
		Beaver Dams	Dam results in change or function of the facility.	Facility is returned to design function. (Coordinate trapping of beavers and removal of dams with appropriate permitting agencies)
		Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site. Apply insecticides in compliance with adopted BSB Maintenance and Operations policies.
		Tree Growth and Hazard Trees	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access or maintenance, do not remove. If dead, diseased, or dying trees are identified (Use a certified Arborist to determine health of tree or removal requirements)	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., for firewood). Remove hazard trees.
	Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.

Table D-1 continued. O&M Procedures for Detention Ponds

Spring and Fall As soon as practicable after a storm event(s) equaling or exceeding 0.5-inches in 24-hours	Storage Area	Sediment	Accumulated sediment that affects inletting or outletting condition of the facility.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
		Liner (If Applicable)	Liner is visible and has more than three 1/4-inch holes in it due to seam separation, punctures, or tears.	Liner repaired or replaced. Liner is fully covered.
	Pond Berms (Dikes)	Settlements	Any part of berm which has settled 4 inches lower than the design elevation. If settlement is apparent, measure berm to determine amount of settlement. Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.	Dike is built back to the design elevation.
		Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
	Emergency Overflow/ Spillway and Berms Over 4 Feet in Height.	Tree Growth	Tree growth on emergency spillways creates blockage problems and may cause failure of the berm due to uncontrolled overtopping. Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
		Piping	Discernable water flow through pond berm. Ongoing erosion with potential for erosion to continue. (Recommend a Geotechnical engineer be called in to inspect and evaluate condition and recommend repair of condition.	Piping eliminated. Erosion potential resolved.
	Emergency Overflow/ Spillway	Rock Missing	Less than 12” of riprap exists above native soil in area five square feet or larger, or any exposure of native soil at the top of outflow path of spillway. (Rip-rap on inside slopes need not be replaced.)	Rocks and pad depth are restored to design standards.
		Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.

Table D-2. O&M Procedures for Drainage Ditches

	Drainage Ditches			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Spring and Fall As soon as practicable after a storm event(s) equaling or exceeding 0.5-inches in 24-hours	General	Sediment Accumulation	Remove sediment accumulations greater than 6-inches or that significantly reduce the designed or historical hydraulic capacity.	Sediment cleaned out to designed ditch shape and depth; ditch reseeded if necessary to control erosion.
		Trash and Debris	Any trash and debris which exceed 5 cubic feet per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size garbage can). In general, there should be no visual evidence of dumping. If less than threshold all trash and debris will be removed as part of next scheduled maintenance.	Trash and debris cleared from site.
		Poisonous Vegetation and noxious weeds	Any poisonous or nuisance vegetation which may constitute a hazard to maintenance personnel or the public. Any evidence of noxious weeds as defined by State or local regulations. (Apply requirements of adopted BSB policies for the use of herbicides).	No danger of poisonous vegetation where maintenance personnel or the public might normally be. (Coordinate with BSB Weed Management department) Complete eradication of noxious weeds may not be possible. Compliance with State or BSB eradication policies required.
		Contaminants and Pollution	Any evidence of oil, gasoline, contaminants or other pollutants in quantities greater than a surface sheen (Coordinate removal/cleanup with local water quality response agency).	No contaminants or pollutants present.
		Tree Growth and Hazard Trees	Tree and shrub growth within the ditch channel should be removed in order to maintain flow during a storm event.	Vegetation growth does not hinder flow during a storm event.
		Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If discharge pipes are causing erosion, a spreader may be warranted.
		Concrete deterioration	Spalling or cracked concrete may be a sign of concrete in need of replacement. Assess if concrete should be replaced.	Concrete ditch conveys water during storm events with minimal obstruction. Note condition of concrete and replace as necessary.
		Rip Rap voids	Scour marks and erosion near rip rap are an indication that rock depth is inadequate or rock diameter is undersized.	Rocks are restored to design standard to eliminate soil erosion.

Table D-3. O&M Procedures for Biofiltration Swales

	Biofiltration Swales			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Spring and Fall As soon as practicable after a storm event(s) equaling or exceeding 0.5-inches in 24-hours	General	Sediment Accumulation	Use a rake and shovel to remove, by hand, sediment accumulations greater than 2-inches thick that cover grass areas; avoid vegetation removal. Removed sediments must be transported to an EPA-approved repository for disposal.	Sediment cleaned out to designed swale shape and depth; swale reseeded if necessary to control erosion.
		Trash and Debris	Clear leaves, litter, and sediment. Oily materials, and grass cuttings when debris is observed and can cause blockage of inlets, outlets, curb cuts, or level spreaders. Use a rake and shovel to remove sediment from the base of the swale when greater than two-inches thick to preserve vegetation.	Trash and debris cleared from site. Swale can function to treat water quality storm event.
		Vegetation growth / lack of growth	When grass height is greater than nine (9) inches, mow and collect clippings. If trees or shrubs are growing in the swale remove appropriately. If vegetation has been denuded, use appropriate BMPs such as hydroseeding or mulches to cover bare soils.	Biofiltration swale is covered with a plant variety that allows for the retention / detention of the water quality event and does not interfere with inlet / outlet / or level spreader function.
		Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
		Level spreader not in working order	Level spreader may be damaged, sunken, bypassed by erosion, or in need of other repair.	Level spreader is effective at preventing downgradient erosion from the swale.

Table D-4. O&M Procedures for Trash Racks

	Trash Rack			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Spring and Fall Additional inspections may be necessary after a storm event(s)	General	Trash and Debris	Any trash and debris should be removed from the bars or racks.	Trash and debris cleared from site.
		Bars or Racks damaged or missing	Trash, debris and sediment may not be detained if the bars or racks are damaged or missing.	Repair bars and racks. Replace as necessary.

Table D-5. O&M Procedures for Conveyance Pipes and Culverts

	Conveyance Pipes and Culverts			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Annually for culverts associated with a ditch. As needed upon manhole / inlet / catch basin inspection.	General	Sediment	The JetVac truck shall be used to remove sediment once sediment accumulation is greater than 20% of the conveyance pipe diameter.	Sediment does not hinder flow during a storm event.
		Roots	Use the mechanic cutter or remove vegetation from the surface if roots are present.	Vegetation growth does not hinder flow during a storm event.

Table D-6. O&M Procedures for Inlets, Catch Basins, Sediment Traps, and Manholes

	Inlets, Catch Basins, and Manholes			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Per BSB O&M schedule and as time allows	General	Sediment Accumulation	Clean inlets to prevent captured materials from being transported into conveyance pipes or to downstream waters. Clean catch basins and sediment traps when they become one third full to maintain sediment-trapping capacities. Clean manholes where sediments, debris, or trash have accumulated or blockages prevent storm water from freely flowing into the downstream conveyance pipe.	Maintains or restores infrastructure function.
		Trash and Debris	Any trash, sediment and/or debris which plugs the grated lid or plugs the invert on inlet and outlet piping decreases the efficiency of the storm sewer network. Any evidence of oil, gasoline, contaminants or other pollutants (sanitary) should be noted and investigated.	Remove sediment and trash from the grated cover. Use the JetVac truck to remove sediment or debris from the catch basin sump or pipe inverts.
		Lid / Cover is cracked or structurally damaged.	A cracked or damaged lid may cause a safety concern for vehicle traffic or for capturing storm water. An ill-fitting lid may also pose a safety concern and warrants replacement.	Replace lid or cover as needed.
		Pipe inverts plugged more than 30%	Use the JetVac truck to clean the manhole and piping inverts.	Minimal sediment present and inverts clear for storm water conveyance.
		Manhole rungs, ingress / egress obstruction, manhole covers secure	Loose or damaged manhole rungs or vehiclular or personnel concerns for ingress / egress should be addressed in the diversion structure and manhole. I	Replace missing manhole rungs and remove obstructions to ingress / egress ports.
		Vertical Structure Damaged	Concrete cracks, spalling, or voids; Bricks loose and falling into the sump, and loose rungs pose a safety concern for personnel entry and for potential pipe blockages. Severe conditions should be repaired or the vertical structure should be replaced.	Vertical structure material is intact.

Table D-7. O&M Procedures for Energy Dissipaters

	Energy Dissipaters			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Spring and Fall As soon as practicable after a storm event(s)	General	Accumulated Sediment, debris or trash	Any trash, sediment and/or debris has the potential impact to surface water as carried in a storm event. Any evidence of oily residues should be noted and investigated.	Trash and debris cleared from site.
		Rocks missing; scour or erosion present	Replace rocks as needed. If scour or erosion present and rocks are not held in place; rock diameter may be too small. Contact an engineering firm to calculate predicted velocity from outlet and replace rock structure.	Rocks cover the outlet to reduce or eliminate sediment erosion and to reduce velocity.
		Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.

TableD-8. O&M Procedures for Hydrodynamic Devices (HDDs)

	Hydrodynamic Devices			
Inspection Frequency	**Drainage System Feature**	**Potential Defect**	**Conditions When Maintenance Is Needed**	**Results Expected When Maintenance Is Performed Or Not Needed**
Spring and Fall Frequency may be increased or decreased based on sediment loading	General	Manhole rungs, ingress / egress obstruction, manhole covers secure	Loose manhole rungs or vehiclular or personnel concerns for ingress / egress should be addressed in the diversion structure and manhole. Ingress / egress covers are labeled with CONTECH and should seat securely into rings.	Replace missing manhole rungs and remove obstructions to the HDD or ingress / egress ports.
		Concrete spalling, cracked or joint failure.	Leaks into the concrete from joints or failed concrete should be repaired. Spalling concrete should be noted and repaired as large crack, missing sections or rebar is visible.	Precast concrete structure should be in good working order with minimal surface features (cracks, spalled concrete, or leaks at joints).
		Corrosion of separation screen or fiberglass separation cylinder	Corrosion on the separation screen or fiberglass separation cylinder should be monitored.	None to minimal corrosion present.
		Surface oil / grease	Any evidence of oil, gasoline, contaminants or other pollutants in quantities greater than a surface sheen (Coordinate removal/cleanup with local water quality response agency).	No contaminants or pollutants present.
		Trash / sediment / debris	Measure the depth to the accumulated sediment from the manhole ring. If sediment accumulation is greater or equal to 75% of the sump capacity, the sump must be cleaned. The inspector should compare the measured depth to the stamped cleanout depth to determine if the sediment accumulations have filled 75% of the sump capacity.	Sediment less than 75% of the sump capacity of the manhole.
		Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.

Appendix E

Site Inspection Forms

POND MAINTENANCE & INSPECTION FORM

Facility GIS ID Number: _____ Date: _____ Time: _____

Weather: _____ Inspector(s): _____

Date of Last Rainfall: _____ Amount: _____ Inches Streets: _____

GPS Coordinates: _____

Property Classification: Residential Government Commercial Other: _____

Type of Pond: Wet Pond Dry Pond Multiple Pond System

Shallow Wetland Pond/ Wetland Lined Pond

Confined Unconfined Barrel Size _____ As-built Plan Available? Yes No

Is Facility Inspectable? Yes No Why? _____ Comments Specific Location(s): _____

Scoring Breakdown:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor (potential for future problem exists)
2 = Routine Maintenance Required
3 = Immediate Repair Necessary
*** Use open space in each section to further explain scoring as needed**

Outfall Channel(s) from Pond						
Woody growth within 5' of outfall barrel	N/A	N/I	0	1	2	3
Outfall channel functioning	N/A	N/I	0	1	2	3
Manholes, Frames and Covers	N/A	N/I	0	1	2	3
Released water undercutting outlet	N/A	N/I	0	1	2	3
Erosion	N/A	N/I	0	1	2	3
Displaced rip rap	N/A	N/I	0	1	2	3
Excessive sediment deposits	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
Downstream Dam Bank						
Cracking, bulging, or sloughing of dam	N/A	N/I	0	1	2	3
Erosion and/or loss of dam material	N/A	N/I	0	1	2	3
Animal burrows	N/A	N/I	0	1	2	3
Soft spots or boggy areas	N/A	N/I	0	1	2	3
Woody growth or unauthorized plantings on dam	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
Upstream Dam Bank						
Cracking, bulging, or sloughing of dam	N/A	N/I	0	1	2	3
Erosion and/or loss of dam material	N/A	N/I	0	1	2	3
Animal Burrows	N/A	N/I	0	1	2	3
Soft spots or boggy areas	N/A	N/I	0	1	2	3
Woody growth or unauthorized plantings on dam	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Emergency Spillway						
Woody growth or unauthorized plantings	N/A	N/I	0	1	2	3
Erosion or back cutting	N/A	N/I	0	1	2	3
Soft or boggy areas	N/A	N/I	0	1	2	3
Obstructions / debris	N/A	N/I	0	1	2	3
Principal Spillway Built to Plans						
# of Barrels: _____ Size:_____	RCP	CMP	PVC	STEEL	or	MASONRY (Circle One)
Confined space entry permit required for entry into all riser and barrels			Entry Approved	9		Entry Denied 9
Minor spalling or parging (<1")	N/A	N/I	0	1	2	3
Major spalling (exposed rebar)	N/A	N/I	0	1	2	3
Joint failure	N/A	N/I	0	1	2	3
Loss of joint material	N/A	N/I	0	1	2	3
Leaking	N/A	N/I	0	1	2	3
Corrosion	N/A	N/I	0	1	2	3
Protective material deficient	N/A	N/I	0	1	2	3
Misalignment or split seams / joints	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
Riser Built to Plans						
Size:_____	CONC	CMP	or	MASONRY	(Circle One)	
Minor spalling or parging (<1")	N/A	N/I	0	1	2	3
Major spalling (exposed rebar)	N/A	N/I	0	1	2	3
Joint failure	N/A	N/I	0	1	2	3
Loss of joint material	N/A	N/I	0	1	2	3
Leaking	N/A	N/I	0	1	2	3
Manhole access and steps acceptable	N/A	N/I	0	1	2	3
Corrosion	N/A	N/I	0	1	2	3
Protective material deficient	N/A	N/I	0	1	2	3
Misalignment or split seams / joints	N/A	N/I	0	1	2	3
Anti-vortex device secure / acceptable	N/A	N/I	0	1	2	3
Sediment Accumulation within riser	N/A	N/I	0	1	2	3
Woody or vegetative growth within 25' of riser	N/A	N/I	0	1	2	3
Safety Rebar/pipes in place	N/A	N/I	0	1	2	3
Safety Rebar/pipes corroded	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
Low Flow Built to Plans						
Orifice and/or trash rack obstructed	N/A	N/I	0	1	2	3
Trash Rack Corrosion	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
Weir Trash Rack						
Structurally sound	N/A	N/I	0	1	2	3
Debris removal necessary	N/A	N/I	0	1	2	3
Corrosion	N/A	N/I	0	1	2	3

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Control Valve(s) Built to Plans							
Size:_____ Type:							
Operation limited	N/A	N/I	0	1	2	3	
Exercised	N/A	N/I	0	1	2	3	
Leaks	N/A	N/I	0	1	2	3	
Chains & Locks	N/A	N/I	0	1	2	3	
Set to design opening	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	
Pond Drain Valve							
Operation limited	N/A	N/I	0	1	2	3	
Exercised	N/A	N/I	0	1	2	3	
Leaks	N/A	N/I	0	1	2	3	
Chained & locked correctly	N/A	N/I	0	1	2	3	
Other:	N/A	N/I	0	1	2	3	
Permanent Pool							
Visible pollution	N/A	N/I	0	1	2	3	
Shoreline and / or side slope erosion	N/A	N/I	0	1	2	3	
Aquatic bench inadequately vegetated	N/A	N/I	0	1	2	3	
Abnormally high or low water (pool) levels	N/A	N/I	0	1	2	3	
Sediment / debris accumulation	N/A	N/I	0	1	2	3	
Bathometric study recommended			No		Yes		
Other?	N/A	N/I	0	1	2	3	
Dry Storage							
Vegetation sparse	N/A	N/I	0	1	2	3	
Undesirable woody or vegetative growth	N/A	N/I	0	1	2	3	
Low flow channels obstructed	N/A	N/I	0	1	2	3	
Standing water or spots	N/A	N/I	0	1	2	3	
Sediment or debris accumulation	N/A	N/I	0	1	2	3	
Bathometric study recommended			No		Yes		
Other:	N/A	N/I	0	1	2	3	
Pretreatment							
Maintenance access	N/A	N/I	0	1	2	3	
Is pretreatment a practice other than a forebay			No		Yes		Of so, _____(code)
Dredging required			No		Yes		
Hard pad condition (Wet pond only)	N/A	N/I	0	1	2	3	
Fixed vertical sediment depth marker present			No		Yes		
Marker Reading_____							
Sediment accumulation	N/A	N/I	0	1	2	3	Estimated % full_____%

N/A = Not Applicable **1 = Monitor for Future Repairs**
N/I = Not Investigated **2 = Routine Repairs Needed**
0 = Not a Problem **3 = Immediate Repair Needed**

Inflow Points							
Number of inflow pipes:_____	Direction:		N	E	W	S	
Endwalls, headwalls, end sections	N/A	N/I	0	1	2	3	
Outfall pipes	N/A	N/I	0	1	2	3	
Discharge undercutting outlet or displacing rip-rap	N/A	N/I	0	1	2	3	
Discharge water is causing outfall to erode	N/A	N/I	0	1	2	3	
Sediment accumulation	N/A	N/I	0	1	2	3	
Wet Pond Vegetation							
Invasive plants	N/A	N/I	0	1	2	3	
% cover_____							
Vegetation matches landscape design plan	N/A	N/I	0	1	2	3	
Planting needed	N/A	N/I	0	1	2	3	
Shore erosion	N/A	N/I	0	1	2	3	
Coverage needs improvement	N/A	N/I	0	1	2	3	
Pond Buffer							
Encroachment by structures	N/A	N/I	0	1	2	3	
Clearing of vegetation	N/A	N/I	0	1	2	3	
Planting needed	N/A	N/I	0	1	2	3	
Predominant vegetation types:	Forested 9		Shrubs 9		Meadow 9	Maintained Grass 9	Other:___
Special Structures							
Manhole access (steps, ladders)	N/A	N/I	0	1	2	3	
Vehicular access	N/A	N/I	0	1	2	3	
Concrete/masonry condition	N/A	N/I	0	1	2	3	
Trash racks	N/A	N/I	0	1	2	3	
Elbows	N/A	N/I	0	1	2	3	
Sediment / trash removal	N/A	N/I	0	1	2	3	
Manhole lockable nuts	N/A	N/I	0	1	2	3	
Liner							
Punctures	N/A	N/I	0	1	2	3	
Tears	N/A	N/I	0	1	2	3	
Seam Separation	N/A	N/I	0	1	2	3	
Miscellaneous							
Encroachment in pond area and/or easement area	N/A	N/I	0	1	2	3	
Fence condition	N/A	N/I	0	1	2	3	
Safety signs	N/A	N/I	0	1	2	3	
Complaints from local residents	N/A	N/I	0	1	2	3	
Graffiti	N/A	N/I	0	1	2	3	
Public hazards	N/A	N/I	0	1	2	3	
Were any pad locks cut and replaced			No	Yes	How Many? _____		

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Overall Condition of Facility

Total number of concerns receiving a:

(1) - Need Monitoring

(2) - Routine Repair

(3) - Immediate Repair Needed

Inspector's Summary

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Pictures	Clock/Degrees	Prin. Spill. Barrel Joints	Clock/Degrees
1.		1.	
2.		2.	
3.		3.	
4.		4.	
5.		5.	
6.		6.	
7.		7.	
8.		8.	
9.		9.	
10.		10.	
11.		11.	
12.		12.	
13.		13.	
14.		14.	
15.		15.	

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem

1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Sketches, If Necessary:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

DITCH MAINTENANCE & INSPECTION FORM

Ditch Name: _____

Facility GIS ID Number: _____ Date: _____ Time: _____

Weather: _____ Inspector(s): _____

Date of Last Rainfall: _____ Amount: _____ Inches Streets:

GPS Coordinates: _____

Property Classification: Residential Government Commercial Other:

Inspection			Notes
Evidence of Trash, or Pollution (oil, gas or illicit discharge)	Y	N	
Evidence of Noxious weeds or large vegetative growth/obstruction in channel	Y	N	
Soil erosion / scour	Y	N	
Sediment accumulation > 6-inches	Y	N	
Concrete deterioration or rip rap voids	Y	N	
Maintenance			
Remove trash, determine source of illicit discharge	Y	N	
Remove nuisance, obstructive vegetation	Y	N	
Determine cause of soil erosion	Y	N	
Remove sediment accumulation	Y	N	
Replace/ repair concrete or rip rap	Y	N	

Sketches or comments, If Necessary:

BIOFILTRATION SWALE MAINTENANCE & INSPECTION FORM

Facility GIS ID Number: _____ Date: _____ Time: _____

Weather: _____ Inspector(s): _____

Date of Last Rainfall: _____ Amount: _____ Inches Streets: _____

Mapbook Location: _____ GPS Coordinates: _____

Property Classification: Residential Government Commercial Other:

Inspection			**Notes**
Evidence of Trash, or Pollution (oil, gas or illicit discharge)	Y	N	
Evidence of Noxious weeds or large vegetative growth/obstruction in channel	Y	N	
Soil erosion / scour	Y	N	
Sediment accumulation > 2-inches	Y	N	
Vegetation height greater than nine (9) inches	Y	N	
Inlet, outlet or level spreader not functioning	Y	N	
Maintenance			
Remove trash, determine source of illicit discharge	Y	N	
Remove nuisance, obstructive vegetation	Y	N	
Removed sediment with a rake / shovel if greater than two (2) inches deep	Y	N	
Mow vegetation	Y	N	
Hydroseed or mulch bare soil	Y	N	
Replace/ repair inlet, outlet or level spreader	Y	N	

Sketches, If Necessary:

TRASH RACK MAINTENANCE & INSPECTION FORM

Identify Trash Rack from Major Structure: _____

Inspectors: _____ **Date:** _____

Inspection			**Notes**
Trash, Debris or Sediment held in trash rack	Y	N	
Bars or Racks missing or damaged	Y	N	
Maintenance			
Remove trash, debris or sediment	Y	N	
Replace/ repair bars or racks	Y	N	

Sketches or comments, If Necessary:

STORM WATER CONVEYANCE PIPE MAINTENANCE & INSPECTION FORM

Pipe from Manhole _____ **to** _____ (i.e. BG-M-1010)

Street Locations:_____

Inspectors: _____ **Date:** _____

Inspection and Maintenance

			Notes
Entire length of pipe jetted	Y	N	
Hours required to jet and remove sediment			_____ hours
Length of pipe as measured with wheel above ground			_____ feet
Length of pipe CCTV inspected			_____ feet
Length of pipe unable to be inspected			_____ feet
CCTV log attached	Y	N	
Localized Rehabilitation			
Pipe replaced by excavation	Y	N	
CIPP Spot Repair	Y	N	

Sketches or comments, If Necessary:

INLETS, CATCH BASINS, SEDIMENT TRAPS, AND MANHOLES MAINTENANCE & INSPECTION FORM

Manhole Identification: _____ (i.e. BG-M-1010)

Inspectors: _____ **Date:** _____

Inspection			**Notes**
Lid openings plugged with debris/sediment	Y	N	
Lid cracked, worn or structurally damaged	Y	N	
Pipe inverts plugged more than 30%	Y	N	
Sediment Traps/Catch basin more than 1/3 full with sediment	Y	N	
Vertical Structure structurally damaged	Y	N	
Maintenance			
Sediment removed from lid	Y	N	
Lid replaced	Y	N	
Sediment removed from lid	Y	N	
Jet/Vac pipe inverts / sump	Y	N	
Clean sediment traps/catch basins if more than 1/3 full of sediment to maintain sediment-trapping capabilities	Y	N	
Replace vertical structure	Y	N	

Number of inflow pipes: Direction: N E W S

Sketches, If Necessary:

OUTLET – ENERGY DISSIPATOR MAINTENANCE & INSPECTION FORM

OUTLET: _____

DISCHARGES TO: _____**(IDENTIFY SURFACE WATER)**

Street Locations:_____

Inspectors: _____ **Date:** _____

Inspection			**Notes**
Sediment / Trash present	Y	N	
Oily Residue present	Y	N	
Rocks missing	Y	N	
Rock diameter possibly too small	Y	N	
Sediment from pipe present	Y	N	
Erosion or scouring present	Y	N	
Maintenance			
Remove trash, debris or sediment	Y	N	
Replace rocks	Y	N	

Sketches, If Necessary:

HYDRODYNAMIC DEVICE MAINTENANCE & INSPECTION FORM

Facility GIS ID Number: _____ Date: _____ Time: _____

Weather: _____ Inspector(s): _____

Date of Last Rainfall: _____ Amount: _____ Inches Streets: _____

Mapbook Location: _____ GPS Coordinates: _____

Property Classification: Residential Government Commercial Other:

Confined Unconfined Barrel Size _____ As-built Plan Available? Yes No

Is Facility Inspectable? Yes No Why? _____ Comments Specific Location(s): _____

Scoring Breakdown:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor (potential for future problem exists)
2 = Routine Maintenance Required
3 = Immediate Repair Necessary
*** Use open space in each section to further explain scoring as needed**

1. Accessibility

Vehicular access from public right-of-way	N/A	N/I	0	1	2	3
Ingress / egress to structure	N/A	N/I	0	1	2	3
Manholes, frames and covers	N/A	N/I	0	1	2	3
Steps and / or ladders secure	N/A	N/I	0	1	2	3
Top slab cracks or spalling	N/A	N/I	0	1	2	3
Erosion around structure	N/A	N/I	0	1	2	3
Structure obstructed by objects	N/A	N/I	0	1	2	3

2. HD Device

Is Unit:	Cast in place		or		Precast	
Manhole spacing rings	N/A	N/I	0	1	2	3
Accumulation of floatables, trash or debris	N/A	N/I	0	1	2	3
THE SYSTEM SHOULD BE CLEANED WHEN THE FLOATING HYDROCARBON LAYER REACHES AN APPRECIABLE THICKNESS.						
Cracks and / or displacements	N/A	N/I	0	1	2	3
Minor spalling (1” or less)	N/A	N/I	0	1	2	3

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Major spalling (exposed rebar)	N/A	N/I	0	1	2	3
Joint failure	N/A	N/I	0	1	2	3
Loss of joint material	N/A	N/I	0	1	2	3
Leaking	N/A	N/I	0	1	2	3
Permanent pool elevation	N/A	N/I	0	1	2	3
Sump:	Depth from surface to top of sediment pile (inches):					
	Depth from surface to water (inches):					
IF DIFFERENCE IS LESS THAN 18 INCHES, THE SUMP MUST BE CLEANED.						
Other:	N/A	N/I	0	1	2	3
2.1 Oil Baffle Skirt						
Corrosion	N/A	N/I	0	1	2	3
Other	N/A	N/I	0	1	2	3
2.1 Separation Screen						
Corrosion	N/A	N/I	0	1	2	3
Obstruction	N/A	N/I	0	1	2	3
Other:	N/A	N/I	0	1	2	3
3. Diversion Structure						
Manhole spacing rings / brick	N/A	N/I	0	1	2	3
Access Lid	N/A	N/I	0	1	2	3
Accumulation of sediment, trash or debris	N/A	N/I	0	1	2	3
Condition of inflow and outflow pipes	N/A	N/I	0	1	2	3
Concrete condition: cracks and / or displacements	N/A	N/I	0	1	2	3
Minor spalling (1” or less)	N/A	N/I	0	1	2	3
Major spalling (exposed rebar)	N/A	N/I	0	1	2	3
Joint failure	N/A	N/I	0	1	2	3
Loss of joint material	N/A	N/I	0	1	2	3
Leaks	N/A	N/I	0	1	2	3
4. Miscellaneous						
Encroachment by vegetation into facility or outfall area	N/A	N/I	0	1	2	3
Complaints from local residents	N/A	N/I	0	1	2	3
Graffiti	N/A	N/I	0	1	2	3
Public hazards	N/A	N/I	0	1	2	3
Vehicular access from public right-of-way	N/A	N/I	0	1	2	3

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Overall Condition of Facility

Total number of concerns receiving a:

(1) - Need Monitoring

(2) - Routine Repair

(3) - Immediate Repair Needed

Inspector's Summary

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Pictures	**Clock/Degrees**
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem

1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Sketches, If Necessary:

N/A = Not Applicable
N/I = Not Investigated
0 = Not a Problem
1 = Monitor for Future Repairs
2 = Routine Repairs Needed
3 = Immediate Repair Needed

Figures