FEBRUARY, 2020

BUTTE-SILVER BOW MS4 STORMWATER SAMPLING AND ANALYSIS PLAN



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1 INTRODUCTION

1.1 BACKGROUND

Butte-Silver Bow (BSB) operates its storm drainage system under the authorization of the Montana Pollution Discharge Elimination System (MPDES) General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s), hereafter referred to as the MS4 General Permit. The current MS4 General Permit, issued by the Montana Department of Environmental Quality (MDEQ), is effective from January 1, 2017 through December 31, 2021.

In accordance with Part III of the MS4 General Permit, BSB is required to develop a sampling plan for Total Maximum Daily Load (TMDL) related monitoring. The results from the TMDL-related monitoring will be used in conjunction with the TMDL section of the SWMP to address applicable TMDLs. Additionally, Part IV of the MS4 General Permit requires semi-annual monitoring (self-monitoring) to determine effectiveness of control measures and activities identified in the SWMP.

1.2 PURPOSE

The purpose of this sampling plan is to describe BSB's TMDL and self-monitoring programs for the 2020 through 2021 permit term. ***This monitoring plan updates and supersedes the sampling plan submitted with the 2017 annual report*.** More specific details relating to the purpose of this plan are as follows:

- BSB has selected Part III TMDL-related monitoring Option 1; therefore, this plan will be implemented to sample and track the pollutant(s) listed as a source of impairment specific to the receiving water body.
- BSB has selected Part IV self-monitoring Option 1 (see Part IV of the MS4 General Permit). The monitoring locations identified in this plan will be used to fulfill the self-monitoring requirements.
- This document, when implemented, will fulfill the requirements of Part III.B of the MS4 General Permit, requiring a sampling plan for TMDL-Related Monitoring.

2 BSB MS4-RELATED TMDLS

2.1 TMDL OVERVIEW

There are 5 named or perennial surface waters that receive stormwater discharges from BSB's MS4 outfalls. These receiving waters are as follows:

- Basin Creek
- Blacktail Creek
- Silver Bow Creek
- Sand Creek
- Grove Gulch Creek

Basin Creek, Blacktail Creek and Sand Creek are classified as non-impaired surface waters of the state. Silver Bow Creek (SBC) is classified as impaired from the confluence of Silver Bow Creek and Blacktail Creek and has an approved pollutant TMDL with waste load allocation (WLA). Table 1 summarizes the impaired waterbodies with TMDLs within the BSB MS4 boundary and the associated pollutant of impairment. Figures 1 through 3l provide maps of BSB's outfalls and associated receiving waterbodies.

Table 1. Summary of TMDLs with BSB MS4 Approved WLAs

Waterbody	Pollutants of Impairment			
	Total Phosphorus	Total Nitrogen[1]	Metals (As, Cd, Cu, Pb, Hg, Zn)	Sediment (TSS)
Silver Bow Creek	X	X	X	X

[1] TN is a surrogate TMDL for Nitrate+Nitrite

2.2 TMDL STRATEGY

Part III.B of the MS4 General Permit specifies that BSB shall develop and implement a section of their SWMP to address TMDLs. More specifically, BSB must include in its SWMP a section identifying the measures and BMPs it plans to implement, describing BSB's impairment priorities and long term strategy, and outlining interim milestones (i.e., a completion schedule for action items) for controlling the discharge of the pollutants of concern and making progress towards meeting the TMDL. BSB is in a unique situation in that 100% of the outfalls into SBC originate from drainage basins within the Butte Priority Soils Operable Unit (BPSOU) Superfund site. The responsible party (Atlantic Richfield-AR) works closely with BSB and has invested heavily in stormwater controls and BMPs. The Superfund Storm Water System within the Butte Priority Soils Operable Unit – Operation and Maintenance Plan is in Appendix A. This document details all the stormwater features, including catch basins, ditches, conveyances, and hydrodynamic separators. Furthermore, the Silver Bow Creek/Butte Area One Consent Decree has been recently released. Although not yet approved, this Consent Decree outlines the negotiated cleanup activities, including significant future stormwater system improvements. The documents can be found at:

https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.scs&id=0800416&doc=Y&colid=39487&region=08&type=SC

Multiple outfalls into SBC have been monitored for several years by AR and will continue to be monitored for the foreseeable future. BSB has selected its monitoring locations for the Part III TMDL sampling at outfalls discharging into SBC. These locations include one within the listed portion of SBC, below the confluence of SBC and Blacktail Creek and three upstream of the confluence in the recently renamed SBC (formerly Metro Strom Drain). The section of SBC above the confluence with Blacktail Creek is not currently listed; however, additional stormwater outfall locations that are both within the listed reach of SBC and the identified urban area are not available. BSB anticipates that this section would be added to the impaired stream list..

3 MONITORING METHODOLOGY, LOCATIONS AND STRATEGY

3.1 FIELD SAMPLING METHODS

TMDL monitoring as required by Part III takes place within the BPSOU and is the responsibility of AR. Monitoring may be either manual or automatic depending on the site but is primarily automated. Self-monitoring as required by the Part IV monitoring requirements will be collected by BSB or an assigned contractor. Monitoring may be either manual or automatic depending on the site but is primarily manual.

3.1.1 MANUAL SAMPLE COLLECTION

Manual grab techniques may be used to collect samples. The grab sample method is suitable because samples will be collected within minutes of each other and the stormwater hydraulic residence time in the system is limited. The samples will be collected by field personnel during rainfall events.

Rainfall events will be observed by monitoring the radar on weather stations and websites, so personnel can determine when to be present during active events to obtain manual samples. Samples will be collected in clean, labeled bottles provided by the laboratory. If necessary, an extension pole, rope or other apparatus can be used to aid the field crew in safe sample collection, especially during high flow conditions.

3.1.2 AUTOMATED SAMPLE COLLECTION

Automated sampling devices are currently employed at all the chosen TMDL monitoring sites and will be used to collect flow proportional composite samples; which are, small constant volume samples that are collected throughout a runoff event (as opposed to a manual grab sample, which only represents one point in time during an event). Flow-weighted sampling is used by collecting multiple aliquots (small samples) over the

duration of the storm in one bottle which will be shipped to the laboratory for analysis following the storm event.

3.1.3 SAMPLING EQUIPMENT DECONTAMINATION

Sampling equipment will be decontaminated between sampling locations and sampling events.

3.2 TMDL RELATED MONITORING: BMP PERFORMANCE ASSESSMENT

A summary of all TMDL-related monitoring locations is provided in Table 2. This sampling will be consistent with Part III.B Option 1 of the permit.

Table 2. TMDL-Related Monitoring Sample Locations

Name	Watershed	Receiving Waterbody	Location	Sample Collection Method	Number of Samples (Annually)	Sample Parameter(s) (MS4 Listed Impairments)
BG-CLV-1	W. Buffalo Gulch	Silver Bow Creek	45°59'47.3"N 112°32'12.9"W	Automatic	Semi- annual[1]	TP, TN, Metals, Sediment
BG-CLV-C1A	E. Buffalo Gulch	Silver Bow Creek	45°59'51.3"N 112°31'28.4"W	Automatic	Semi- annual[1]	TP, TN, Metals, Sediment
TX-HD-OUT	Texas Ave. (Greely)	Silver Bow Creek	46°00'08.9"N 112°30'45.3"W	Automatic	Semi- annual[1]	TP, TN, Metals, Sediment
WA-CLV-1	Warren Ave & Anaconda Rd	Silver Bow Creek	46°00'05.1"N 112°31'01.3"W	Automatic	Semi- annual[1]	TP, TN, Metals, Sediment

[1] One sample must be collected between January 1st and June 30th of each permitted calendar year and the other sample between July 1st and December 31st.

Sampling location BG-CLV-1 is located at the outfall of the West Buffalo Gulch drainage after passing through a Hydrodynamic Device, draining into SBC downgradient from the SBC-Blacktail Creek confluence. The West Buffalo Gulch drainage is approximately 600 acres of mixed commercial/industrial and residential land use.

Sampling location BG-CLV-1A is at the outfall of the East Buffalo Gulch drainage and is located at the outfall of a proposed stormwater settling basin, draining into SBC upgradient from the SBC-Blacktail Creek confluence. The East Buffalo Gulch drainage is approximately 580 acres of mixed commercial/industrial and residential land use.

Sampling location TX-HD-Out is at the outlet of the Hydrodynamic Device located at the intersection of Texas Ave and Silver Bow Blvd, draining to Silver Bow Creek, upgradient from

the SBC-Blacktail Creek confluence. The area captures storm water from the Greeley neighborhood and covers approximately 520 acres of primarily residential with a small portion of commercial land use.

Sampling Location WA-CLV-1 is the outlet of the Hydrodynamic Device located near Civic Center Road draining into SBC upgradient from the SBC-Blacktail Creek confluence. The area captures stormwater from the east side of uptown Butte and covers approximately 175 acres of residential, commercial and industrial land use.

3.3 SELF MONITORING

BSB MS4 drainage area associated with site 002 drains to Blacktail Creek, which is a non-listed stream. BSB intends to follow guidelines listed in Part IV Monitoring Option 1 and sample Outfalls which represent two commercial and two residential areas and discharge into Blacktail Creek. Blacktail Creek is largely located outside of the BPSOU boundary; as a result, storm water quality better represents BSB's true municipal impact to surface water.

Extensive sampling is conducted on Silver Bow Creek and the water quality conditions are adequately documented through the sampling required within the Superfund program. These activities far exceed MS4 requirements. Superfund deliverable schedules do not match with MS4 annual report requirements. Significant remedy work is ongoing and additional work is planned. Both of these factors will make identification of trends linked to MS4 activities difficult, if not impossible. BSB has chosen to focus its MS4 monitoring efforts related to Part IV requirements in areas of Butte that are outside the Superfund area.

BSB MS4 drainage area associated with site 001A drains to Blacktail Creek, which is not listed as impaired. 001A is collected from the final manhole/inlet prior to final discharge at BT-O-11. The drainage area associated with 001A is approximately 156 acres, comprised mostly of commercial/industrial land use along Harrison Avenue.

BSB MS4 drainage area associated with site 001B drains to the Blacktail Creek/SBC at the confluence of the streams. Site 001B is collected at the end of the discharge pipe, prior to a settling/catch basin at BG-O-1. The drainage area associated with site 001B is approximately 600 acres, comprised of a mix of residential and commercial/industrial land use within Buffalo Gulch drainage in uptown Butte. The drainage associated with site 001B contains a Hydrodynamic Device prior to the discharge location. BSB is evaluating the need to implement future BMPs within these drainage areas to further reduce the MS4's discharge of pollutants to Blacktail Creek. The monitoring results from baseline samples collected within the drainage area will establish the existing conditions. Monitoring results will be compared to the baseline data if BMP(s) are added within the drainage basin.

BSB MS4 drainage area associated with 002A is located at the outfall BT-O-05 and collects from approximately 65 acres, most of which is purely residential land us-CLVe. The 2nd drainage area

associated with this monitoring requirement is Monitoring location 002B which is located at the outfall BT-O-08. The drainage area is approximately 615 acres, comprised mostly of residential land use and approximately 3% of that area is comprised of commercial land use. The monitoring results from baseline samples collected within the drainage area will establish the existing conditions. Monitoring results will be compared to the baseline data if BMP(s) are added within the drainage basin. Site 002B is a new sampling location, previously the samples were taken from the manhole just upgradient to the commercial inlets in the area. DEQ has advised BSB that samples need to be collected as close to the outfall as possible.

Table 3 below shows the Self-Monitoring locations associated with the Part IV monitoring requirements.

Table 3. Self-Monitoring Sample Locations

Name	Watershed	Receiving Waterbody	Location	Sample Collection Method	Frequency	Sample Parameter(s)
001A	Blacktail Creek	Blacktail Creek	45° 59' 7.152" N 112° 30' 30.2652" W	Grab	Semi-annual[1]	▪ Total Suspended Solids ▪ Chemical Oxygen Demand ▪ Total Phosphorus ▪ Total Nitrogen ▪ pH ▪ Copper ▪ Lead ▪ Zinc ▪ Estimated Flow ▪ Oil and Grease
001B	West Buffalo Gulch	Blacktail Creek/Silver Bow Creek	45° 59' 47.2992" N 112° 32' 12.858" W	Grab	Semi-annual[1]	
002A	Blacktail Creek	Blacktail Creek	45° 59' 7.1268" N 112° 30' 26.2944" W	Grab	Semi-annual[1]	
002B	Blacktail Creek	Blacktail Creek	45° 59' 22.182" N 112° 31' 1.3296" W	Grab	Semi-annual[1]	

[1] One sample must be collected between January 1st and June 30th of each permitted calendar year and the other sample must be collected between July 1st and December 31st of each calendar year.

4 MONITORING REQUIREMENTS

Quality Assurance/Quality Control (QA/QC) is critical for accurate sampling. This section provides details of sampling methods, laboratory analytical methods, and QA/QC procedures to be used in sampling.

4.1 SAMPLING PARAMETERS AND ANALYTICAL METHODS

The water quality samples collected will be analyzed for the MS4 listed pollutants of impairment in the specific receiving waterbody as per Part III of the permit as well as the parameters listed in Table 1 of Part IV.A in the MS4 General Permit (Small MS4 Monitoring Requirements). Table 4 shows the parameters and standard analytical methods to be used.

Table 4. Analytical Methods

Self-Sampling Parameter	Analytical Method	Reporting Limit (mg/L)
Total Suspended Solids	SM 2540 D	1
Total Phosphorus	E365.1	0.01
Nitrogen – Kjeldahl, total[1]	E351.2	0.2
Nitrate & Nitrite, total[1]	E353.2 E300A	0.01
Chemical Oxygen Demand	E410.1 E410.4	1
Total Recoverable Copper	E200.8	0.01
Total Recoverable Lead	E200.8	0.001
Total Recoverable Zinc	E200.7 E200.8	0.01
Total Recoverable Arsenic[2]	E200.7	0.01
Total Recoverable Cadmium[2]	E200.7	0.005
Total Recoverable Lead[2]	E200.7	0.015
Total Recoverable Mercury[2]	E200.7	0.002
Oil and Grease	E1664A	1
Estimated Flow	N/A	N/A
pH	E150.1	0.1 unit
TMDL Parameter	**Analytical Method**	**Reporting Limit (mg/L)**
Total Recoverable Copper	E200.8	0.01
Total Recoverable Lead	E200.8	0.001
Total Recoverable Zinc	E200.7 E200.8	0.01

Total Recoverable Arsenic[2]	E200.7	0.01
Total Recoverable Cadmium[2]	E200.7	0.005
Total Recoverable Lead[2]	E200.7	0.015
Total Recoverable Mercury[2]	E200.7	0.002
Total Suspended Solids	SM 2540 D	1

[1] Total Nitrogen is calculated from Nitrogen – Kjeldahl, total and Nitrate & Nitrite, total.
[2] TMDL only Monitoring parameters, Total Nitrogen and Total Phosphorus sampling are not required for TMDL monitoring as the Waste Load Allocation is only for times when the storm water system is not activated.

All data should meet the precision, recovery, and accuracy requirements specified in the laboratory method used. The laboratory used for this study will maintain internal quality assurance/quality control procedures as documented in their laboratory quality assurance manual. The laboratory will use a combination of blanks, laboratory control spikes, surrogates, and duplicates to evaluate the analytical results.

4.2 SAMPLING HANDLING AND DOCUMENTATION

Automatic samplers will be serviced immediately following a storm event. Chain of custody forms will accompany all samples. A Field Log will be kept for each sampling site with the details of the date, time, personnel, and purpose of visit, weather, and conditions observed, samples collected, and actions performed.

4.3 STORM EVENTS AND SAMPLE FREQUENCY

Sampling will be attempted for measurable runoff events (that is a rainfall events that produce any volume of runoff flowing past/through the monitoring location that will allow a sample to be collected). In accordance with Part IV.a.6.a. of the MS4 General Permit, a minimum of one sample will be collected at each site between January 1st and June 30th and a minimum of one sample will be collected at each site between July 1st and December 31st of each year.

Precipitation will be monitored using web-based rain gauges, and the radar managed by the National Oceanic and Atmospheric Administration's Nation Weather Service. This data may be used to delineate storm characteristics, if necessary (timing, duration, intensity, and relative total rainfall).

4.4 QUALITY ASSURANCE/QUALITY CONTROL

Samples will be analyzed using the designated EPA Method or Standard Method as defined in Table 4. Chain-of-custody procedures will be followed for samples sent to the laboratory.

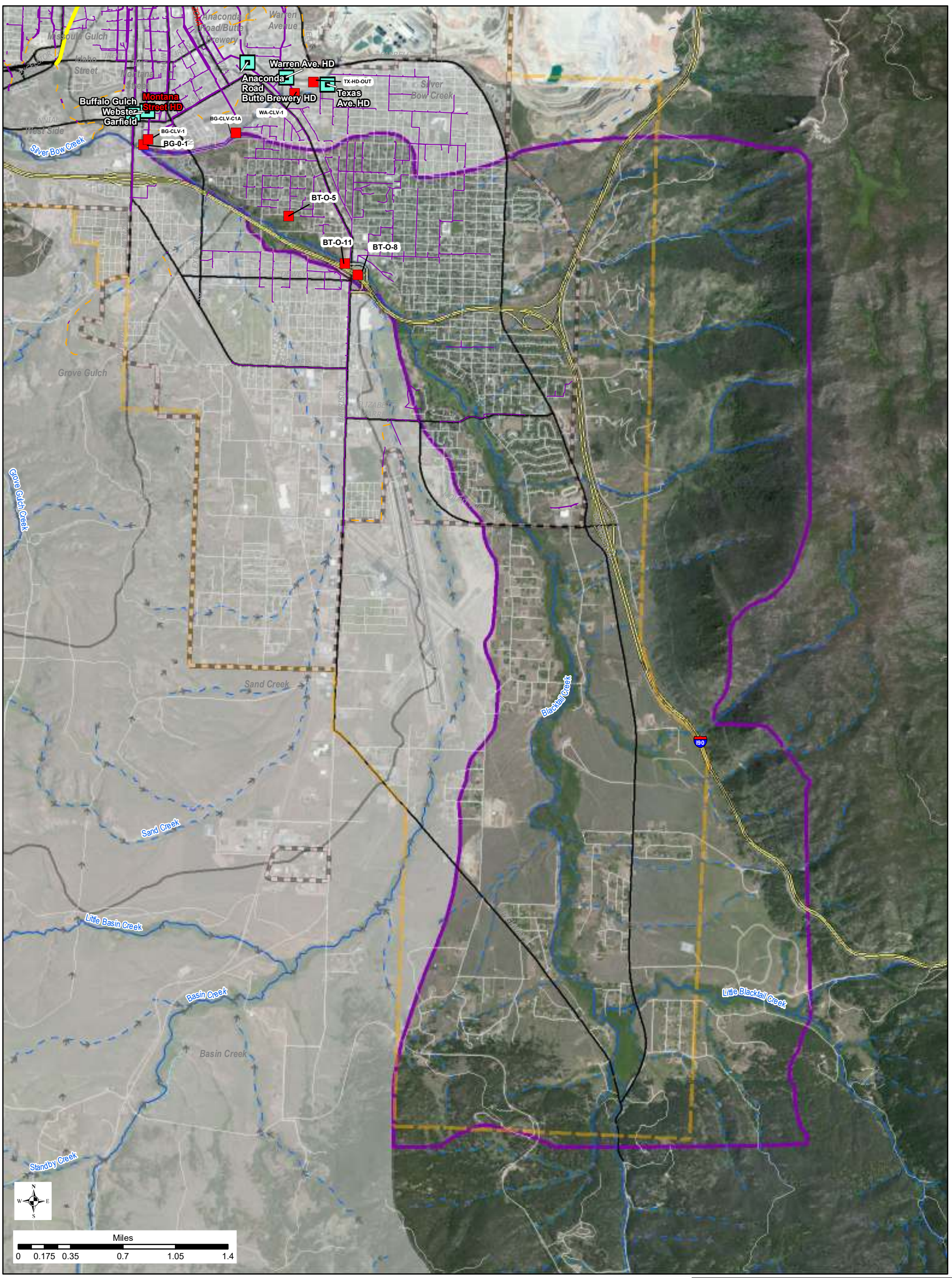
4.5 ANALYSIS OF RESULTS

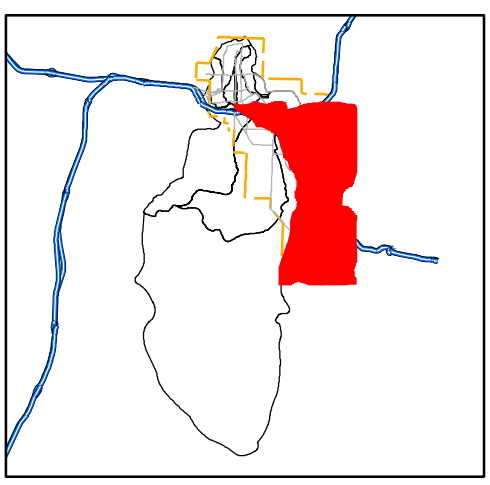
All sample results will be compiled into a spreadsheet containing the results for each parameter at every sample site.

5 REPORTING

The results from monitoring will be presented and discussed in each year's MS4 annual report. The discussion will focus on the evaluation of the effectiveness of BMPs being implemented to address pollutants of impairment within each local watershed as well as changes in water quality over time.

Figures





Legend

- HDD
- Outfall
- Spiral Wound PVC
- Primary Pipe
- Secondary Pipe
- Ditch
- Sewer District Boundary (MS4 Boundary)
- Urban Limit Boundary
- Perennial Stream
- Intermittent Stream
- Canal Ditch
- Drainage Basin

Water & Environmental Technology

MS4 Sampling Locations

City of Butte
MS4 Boundary - USGS

Job#: BSBPWM41 T5

Date: 1/28/2019

FIGURE 3

Path: M:\BSBPWM41\2019_GIS\Fig3a-3f.mxd, Author: jleprowse

Appendix A

(OPERATION AND MAINTENANCE PLAN

FOR THE BUTTE-SILVER BOW

SUPERFUND STORM WATER SYSTEM

WITHIN THE BUTTE PRIORITY SOILS OPERABLE UNIT)

INTERIM

OPERATION AND MAINTENANCE PLAN

FOR THE BUTTE-SILVER BOW

SUPERFUND STORM WATER SYSTEM

WITHIN THE BUTTE PRIORITY SOILS OPERABLE UNIT

PREPARED FOR:

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AUGUST 2016

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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; and
- Flooding is prevented or reduced to protect private and public facilities.

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

This plan pertains to the following components of the storm water system within BPSOU:

1. Specific Superfund Storm Water Structures (SSWS) as shown in Figure 1.

2. Storm water infrastructure on reclaimed mine sites operated under the Butte Reclamation and Evaluation System (BRES). For the purposes of this plan, storm water infrastructure is classified as engineered controls as defined in this document. BRES sites with storm water infrastructure are shown in Figure 4.

3. Portions of the BSB municipal storm water system that are within the boundary of the Butte Priority Soils Operable Unit (BPSOU) or directly related to the performance of a Superfund structure or remedy project. The BSB municipal Storm Water System is shown in Figure 2.

Municipal storm water infrastructure not specifically listed in this document and located outside of the BPSOU is not classified as a SSWS; these structures will be maintained separately according to regular Butte-Silver Bow maintenance procedures. This plan addresses the thirty-one (31) structures identified in the BSB-ARCO allocation agreement, as well as additional future structures that may be required

under remedy. A current list of the SSWS is provided in Appendix A. There are ninety (90) BRES sites with storm water features; the current list is provided in Appendix B. The municipal storm water system within the Butte Priority Soils Operable Unit (BPSOU) is be maintained each year according to BSB municipal schedules; however, some components of the municipal system that are directly related to the SSWS or BRES sites identified in this plan may be inspected more frequently. The BSB municipal Storm Water System within BPSOU is shown in Figure 2. Inspection and maintenance of SSWS and identified municipal infrastructure components will be performed by BSB Superfund Division or BSB Public Works Department crews, with coordination from other departments as detailed in Section 1.6. The funding mechanism will be through BSB Public Works department 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, 2) the List of BRES sites with storm water infrastructure in Appendix B and shown in Figure 2, and 3) 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 Superfund Department for assistance. A GIS key for the BSB alphanumeric system used to identify storm water structures is included in Appendix C.

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. A specific inspection form and map has been developed for the 31 SSWS identified in Appendix A. These forms will be completed and maintained by BSB personnel along with as-built reports for all structures. All inspection forms and as-built reports and maps will be kept on file in both electronic and hard copy format within the BSB Superfund Division.

O&M activities for BRES sites (under the separate approved BRES protocol) are currently being tracked in a cloud-based database that will identify and document sites that need Corrective Action Plan (CAP) work. BSB shall create a similar database to record inspections, track work orders, and produce required reports for Superfund Storm Water Structures and BRES sites with storm water features. The database will be submitted to the Agencies for review prior to implementation. Specific inspection forms are not used for maintenance of municipal infrastructure.

1.2 Ownership & Accessibility

Superfund 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 D-1 in Appendix D, 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 D-1; structures/sites not listed in Table D-1 are located on and accessed through public property, and do not require special arrangements or permission prior to O&M activities. BSB and AR will continue to pursue easements and access agreement on private parcels. In the absence of private landowner cooperation, agencies must assert CERCLA authority to secure access for maintenance purposes.

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 component of the storm water system identified in this document 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 Prioritization of Basins

This document recognizes the importance of basins that report directly to Silver Bow Creek and have not been mitigated by previous Superfund actions (detention/retention basins, diversion to Berkeley Pit, etc.). BSB will continually evaluate the implementation of new Superfund remedies, and efforts will be made to prioritize maintenance and inspection in basins that report directly to Silver Bow Creek.

1.6 Sediment Disposal

For purposes of operational efficiency, sediments collected in and removed from the BSB storm water system within BPSOU will be transported to an EPA approved repository for final disposal. The approved sediment disposal sites for BSB are the BSB Mine Waste Repository and temporary short term disposal can be provided the Butte Reduction Works drying beds at the Butte Treatment Lagoons. Long term, final disposal site is the BSB MWR.

Areas designated for temporary storage or cleaning of equipment (vactor 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 BSB Storm Water Ordinance, BSB Storm Water Engineering Standards, and Dirt Moving Protocols will be referenced for appropriate procedures and BMPs.

Saturated sediment must be dewatered sufficiently to allow transport prior to hauling, or lined trucks must be used for transport. Draining of sediments must be conducted in a manner that contains potentially contaminated water. The Butte Reduction Works drying beds at the Butte Treatment Lagoons is an EPA-approved temporary storage and sediment dewatering area.

1.7 Coordination with other Departments

A successful storm water maintenance program will require coordination and communication between various Butte-Silver Bow departments, as outlined in the organizational chart in Appendix E. The Superfund Division will be the primary entity responsible for the implementation of this plan; however, coordination with other County divisions will be critical to the program's success. The following divisions will be involved and in the implementation of the plan:

- GIS Department: The GIS Department will be responsible for updates and edits to site maps, as well as management of maintenance database information. GIS department will ensure that naming conventions and additional infrastructure work is incorporated into BSB's GIS database.

- Metro Sewer Division: Metro sewer division is responsible for maintenance of municipal storm water infrastructure. In areas where municipal infrastructure affects or is affected by Superfund

sites or structures, metro personnel will coordinate with the Superfund Division to address any issues.

- Road Division: The Road division is responsible for maintenance of the municipal and county road infrastructure. In areas where road infrastructure affects or is affected by Superfund sites or structures, Road division personnel will coordinate with the Superfund Division to address any issues. Maintenance and condition of Superfund structure culverts or ditches located within the County road system should be communicated between departments.

- Weed Department: An integral part of the maintenance plan is weed control. Excessive growth of any vegetation, including weeds, can impair the proper functioning of storm water facilities. The Weed Department is responsible for weed control on all Superfund Storm Water Structures and BRES sites. Maintenance procedures for vegetation and weed control are provided for each type of storm water component in this Plan.

Staff from the abovementioned departments will meet on a quarterly basis to address storm water maintenance needs.

1.8 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.

For the identified SSWS and BRES sites, 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. Any health and safety issues or concerns will also be documented in the annual report. For BRES sites, an electronic database management tool has been developed to manage field inspection, development of Corrective Action Plans (CAPs) and completion of O&M reports which document maintenance activities. A similar database is planned for the SSWS, which will be completed in coordination with the agencies.

For elements of the BSB municipal storm water system, BSB will not prepare specific reports for agency review. Alternatively, BSB will document time and expenses for storm water maintenance activities through its typical operations and accounting practices. These records will be made available upon request from the agencies.

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 to BSB, and a site meeting and walkthrough to review O&M requirements.

1.9 Staffing Requirements

Inspection and maintenance of SSWS, BRES storm water features, and municipal infrastructure will be conducted by a combination of BSB Superfund Division and BSB Public Works Department staff. Private contractors may be used for the 5-year SSWS evaluation and for larger maintenance and repair activities, if determined necessary. Staff requirements may vary depending on the frequency and intensity of storm events, as well as the potential for construction of additional SSWS. All staff conducting operation and maintenance work will be appropriately trained in inspection and maintenance procedures, and relevant hazardous waste and safety requirements. BSB Superfund Division Staff are detailed in **Table 1.**

Table 1. BSB Superfund Division Staff

Name	Position	Responsibility
Eric Hassler	Operations Manager – Superfund Division	Overall management of Superfund construction and O&M activities
Julia Crain	Information Technology Manager	Management of Data and Reporting
Tom Malloy	Site Inspector	Inspection and compliance of SSWS, BRES, and storm water construction sites
Michelle Bay	Data Coordinator	Data entry and Quality assurance/quality control
Brandon Warner	Water Quality District Coordinator	Sampling, inspection, and compliance
Field Crew (3 Operators, 2 Laborers)	Superfund Maintenance Crew	Field crews responsible for maintenance work on identified sites

1.10 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 Director, Dave Schultz – 497-6520
  - Superfund Coordinator, Jon Sesso – 497-6254
  - Superfund O&M Manager – Eric Hassler – 490-5794

  External Notification

  - EPA: Nikia Greene – 425-3703
  - MDEQ: Daryl Reed – 444-6433
  - BP/ARCO: Loren Burmeister– 782-9964

Replacement/Restoration

Once the threat or damage has been addressed by the appropriate entity, BSB staff will consult with the appropriate entities and develop a corrective action plan to make necessary repairs to storm water infrastructure. The corrective action plan will also detail actions taken to prevent future damage to the infrastructure. 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 Superfund Division or Metro Sewer Maintenance crews, or other specified entity as identified by the agencies.

Resumption

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

1.11 Incorporation of New Sites

Based on final remedy requirements and the results of future monitoring and maintenance, additional storm water structures may be constructed, and additional source area sites may be identified for remedy actions. If this situation occurs, sites will be submitted to EPA for inclusion into this plan, as either a Superfund Storm Water Structure or a BRES site with a storm water feature. Appropriate as-built information and inspection protocols will be developed for each new structure or site and added to this plan.

2.0 Storm Water System Components

2.1 Catch Basins (Detention/Retention Ponds)

A storm water catch basin (also known as a detention or retention pond) is an open basin built by excavating below existing ground or by constructing aboveground berms (embankments). A catch basin temporarily stores storm water runoff during rain events and slowly releases it through an outlet (control structure). Catch basins are designed to store storm water (up to a specified storm event) for subsequent infiltration and evaporation. Catch Basins contain an emergency overflow structure for the safe conveyance of water from a storm event greater than the design event. Catch basins require proper maintenance to ensure proper operation. Access to basins 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 catch basins may be a 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 catch basin include:

- Access road or easement
- Fence, gate, and water quality sign
- Control structure/flow restrictor
- Energy dissipaters
- Conveyance storm water pipe or ditch
- Sediment forebays

Documentation

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

Inspection Form: Site specific inspection forms have been developed for each SSWS 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 F.

Location: Catch basin 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 E-1 in Appendix E 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

Catch basins should be inspected 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. 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.

If ponds are 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 Summary/Tasks

- Remove sediment from catch basins 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 for disposal as described in Section 1.6 above.
- Remove sediment from catch basins when the facility does not drain between storms.
- Sediment removal should be conducted during the drier summer/fall 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 or ditches.

- Prevents or reduces flooding to protect infrastructure and/or structures.

Notes

Following proper maintenance procedures for catch basins ensures that the basins 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 are designed to carry storm water. Drainage ditches are often vegetated, but can be lined with riprap or concrete. Ditches must be maintained to prevent localized flooding during storm events.

Facility objects that are typically associated with Drainage Ditches include:

- Access road or easement
- Fence, gate, and water quality sign
- Energy dissipaters
- Debris barrier (e.g. trash rack)
- Catch basins/drop inlets
- Sediment trap

Documentation

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

Inspection Form: Site specific inspection forms have been developed for each SSWS and 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 F.

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 E-2 in Appendix E 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 Summary/Tasks

- 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 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 there is visual evidence that it reduces the hydraulic capacity of the ditch. 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 for disposal as described in Section 1.6 above.

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 according to Butte Hill Revegetation Specifications and BSB Erosion Control and Dirt Moving Protocols. 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/drop inlets
- Sediment trap

Documentation

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

Inspection Form: Site specific forms have been developed for each SSWS and will be used for semi-annual inspections by BSB personnel. Document the ID number, if applicable, of any associated structures included with the inspection of the swale. Inspection Forms are included in Appendix F. 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 E-3 in Appendix E 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 according to Butte Hill Revegetation Specifications. 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

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. Document the ID number of the major structure associated with the inspection of the rack. Inspection Forms are included in Appendix F.

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 E-4 in Appendix E 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 for disposal as described in Section 1.6 above.

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. Storm water pipes must also have sufficient integrity to convey runoff with minimal infiltration or seepage of water into or out of the pipe. 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 closed caption television (CCTV) equipment.

Facility objects that are often associated with conveyance pipes include:

- Inlets and manholes

- Drop inlets
- Trash racks
- Energy dissipaters

Documentation

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

Inspection Form: Conveyance pipes are typically included as part of site specific inspection forms that have been developed for each SSWS and will be used for semi-annual inspections by BSB personnel. 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 3.

An overview of inspection and maintenance procedures for conveyance pipes and culverts is included below. Refer to Table E-5 in Appendix E 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 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 visual inspection indicates reduced capacity. 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 t for disposal as described in Section 1.6 above. 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 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 man access, and may be fitted with a grated inlet to collect runoff (similar to a drop inlet). 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.

Documentation

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

Inspection Form: Drop inlets, catch basins, sediment traps, and manholes are typically included on the site specific inspection forms that will be used for semi-annual inspections by BSB personnel. Associated structures such as conveyance pipes will be recorded by noting the pipe ID number. Inspection Checklist forms are included in Appendix F.

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 3.

An overview of inspection and maintenance procedures for drop inlets, catch basins, sediment traps, and manholes is included below. Refer to Table E-6 in Appendix E 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. Priority will also be given to structures that are located within or near a SSWS or BRES site. 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 or illicit connections.

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 as described in Section 1.6 above.

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.

Documentation

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

Inspection Form: Energy dissipaters are typically included in the site specific inspection forms that will be used for semi-annual inspections by BSB personnel. 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 E-7 in Appendix E 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 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. 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

Documentation

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

Inspection Form: Site specific inspection forms have been developed for hydrodynamic devices and 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 F.

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 E-8 in Appendix E 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.

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 that have been developed for each SSWS, 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.

2.10 BRES Sites with Storm Water Features

There are currently 178 reclaimed mine waste source areas within the BPSOU that are managed under the Butte Reclamation Evaluation System (BRES) protocol. BRES sites typically consist of an engineered and vegetated cap consisting of clean fill. Some sites have engineered storm water infrastructure installed to manage and control runoff and preserve the integrity of the cap. Storm water features are similar to those present on other identified SSWS, such as ditches, culverts, piping, drop inlets, sediment traps, etc. BRES sites are managed through an agency-approved protocol where 25% of the sites are inspected per year, resulting in all BRES sites being inspected every four years. Vegetation and storm water improvements are conducted on inspected sites each year, as necessary.

Through previous inspections, it has been documented that some BRES storm water features require maintenance more frequently than once every four years. This document has identified BRES sites with engineered storm water infrastructure that will be inspected on a more frequent basis according to Section 3.0. These sites are provided in Appendix B and are shown on Figures 4a through 4h.

BSB will conduct inspections on these identified BRES sites independent of the regular BRES protocol, according to the inspection schedule identified in Section 3.0.

Documentation

Identification: BRES sites will be identified using their approved site name, as detailed in Appendix B.

Inspection Form: A general BRES site inspection form has been developed for storm water feature inspections and is included in Appendix G. Each BRES site will be identified on the inspection form.

Location: BRES sites with storm water features are identified in Appendix B.

Inspection and maintenance procedures for BRES sites will be consistent with those identified under each specific storm water feature.

Inspection

Inspect selected BRES sites with storm water features on an annual basis, and note any conditions requiring attention on the inspection form for each individual site. BRES storm water infrastructure inspections will be an iterative process, and sites will be evaluated annually for maintenance needs. BRES sites that do not require maintenance for 3 consecutive inspections will be removed from the annual storm water O&M list. Sites requiring continued maintenance will remain on the list, and efforts will be made to identify/redesign/repair and repair the source of the problem.

Maintenance Procedures

- Perform maintenance during the growing season when vegetation is easy to reestablish.
- Remove sediment accumulations that significantly reduce the designed or historical hydraulic capacity.
- 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.
- Clear inlets, outlets, curb cuts, and level spreaders of debris to prevent blockage of storm water flow.

Maintenance Goals

- Prevents or minimizes sediment and pollutant discharges from the area.
- Maintains or restores the intended infrastructure function.
- Avoids or minimizes vegetation removal.
- Prevents or reduces flooding.
- Protects infrastructure.

2.11 BSB Municipal Storm Water Infrastructure

BSB operates and maintains its municipal storm water system which consists of an extensive network of pipes, manholes, drop inlets, ditches, and culverts. BSB conducts regular maintenance of this system to ensure that it remains operational to convey storm water from the city to area receiving waters. Periodic storm water maintenance is typically only conducted after storm events listed in Table 3.1

below, or in response to calls from the public. Similar to other Superfund infrastructure, some areas of BSB's system have recurring problems and require more frequent maintenance.

As part of its Superfund O&M responsibilities, BSB will conduct annual maintenance on its storm water infrastructure within BPSOU. Maintenance activities will focus on the following areas:

- Areas surrounding identified SSWS, BRES sites, or where municipal infrastructure is directly related to the performance of a SSWS.
- Areas that experience frequent plugging or require frequent maintenance to avoid flooding.

As identified in its *Municipal Storm Water Improvements Plan* (WET/M-M, 2009) and future updates, BSB will continue to invest in capital improvement projects to repair areas requiring frequent maintenance and replace aging infrastructure within BPSOU.

Inspection

Inspect municipal storm water infrastructure on a regular basis as time and resources allow, and address any outstanding maintenance issues. Municipal infrastructure that is near SSWS or BRES sites will be given priority.

Maintenance Procedures

- Perform visual inspections of drop inlets and catch basins, and closed circuit television (CCTV) inspection of pipes and culverts throughout the municipal storm water system located within the BPSOU boundary.
- Remove sediment accumulations that significantly reduce the designed or historical hydraulic capacity or functionality of the system. Removal will primarily be conducted using a vactor truck or small excavating equipment.
- Sediment 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.
- Clear inlets, outlets, pipes, curb and gutters of debris to prevent blockage of storm water flow.

Maintenance Goals

- Prevents or minimizes sediment from entering the municipal system and discharging from the area to receiving waters.
- Maintains or restores the intended infrastructure function.
- Prevents or reduces flooding.
- Protects infrastructure.

3.0 Inspection Schedule

Table 3.1 includes an inspection schedule summary for each storm water infrastructure component.

Table 3.1 Storm Water Infrastructure Inspection Frequency Summary

SW Infrastructure Component	Seasonal Inspections	Event Based Inspections
1. Superfund SW Structures	Biannual - Spring/Fall	0.50-inches/24-Hours
2. BRES Sites with SW Infrastructure	Annual – Spring	Agency/Citizen Reports
3. BSB Municipal System	Continuous	Agency/Citizen Reports

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
30. Continental Drive Roadside Ditch
31. Kaw Avenue Storm Water Pipe

Appendix B

BRES Sites with Storm Water Infrastructure

BRES Site No.	BRES Site Name	Engineered SW Feature YES/NO	Engineered SW Feature Descriptions
155	Clark Mill Tailings	YES	Multiple RLDs, culvert inlets & outlets
4	Amy Dump	YES	RLDs, drop inlets & Bull Run Gulch
5	Alice Dump	YES	Multiple RLDs, & Bull Run Gulch
11	Magna Charta Lessee Dumps	YES	Multiple RLDs, culverts & Daly St. inlet
18	Walkerville Ballfield	YES	RLDs and Sub-Drain along North Street
20	Walkerville Playground	YES	RLDs on slope drainage, culvert inlets and outlets
25	Venus Dump	YES	RLD to catch basin and inlet along Walkerville Drive
29	Lexington Dump	YES	Multiple RLDs north, south, east and west, culvert inlets at B Street and outlet under Main St. (off site)
30	Atlantic-1	YES	Multiple RLDs north, south, east and west, culverts and sediment catch basin along Bernie's Way
32	Corra 2 Dump	YES	Multiple RLDs and culverts
32S	South Corra 2 Dump	YES	RLDs (2) along Bernie's' Way & Summer Street
33	Jennie Dell	YES	Ryan Road diversion berm
35	Del Monte	YES	RLD along 5th Street
36	La Platta Gulch	YES	Multiple RLDs and culverts & asphalt lined ditch and inlets on LaPlatta Street
37	Josephine Shaft	YES	Multiple RLDs and culverts
39	Rock Island Dump	YES	Multiple RLDs and culverts along Summer St. and Bernie's' Way
41	West Gray Rock	YES	Multiple RLDs and culverts along Summer St. and culverts under BA&P Walking Trail
42	Penrose	YES	Multiple RLDs and culverts under BA&P Walking Trail
45	Garfield	YES	RLD along 5th Street
46	Missoula Mine	YES	Culvert inlet and outlet under eastern access road
46E	Missoula Mine East	YES	LaPlatta Gulch outlet, sediment catch basin, Missoula Gulch inlet & outlet
51	Syndicate Pit	YES	Multiple RLDs
52	Moscow Dump	YES	RLD along N. Montana Street
53	Poulin Dump	YES	RLD and culvert on N. Montana St.
54	Spence Dump	YES	RLD and culvert on Buffalo St.
55	Kennedy Dump	YES	RLD and culvert on Buffalo St.
56	Buffalo Dump	YES	RLD on Buffalo St. & (2) SW inlets on Main St.
57	Little Mina-1	YES	RLD and inlet on Buffalo St.
58	Mountain Con-2 Dump	YES	RLD and culverts under trail (2)
59	Little Mina	YES	RLD and inlet along Buffalo St.
60	Mountain Con Mine Yard	YES	RLD (2)
60A	Mountain Con Mine Yard	YES	RLD to west

	Poly A		
60B	Mountain Con Mine Yard Poly B	YES	RLD to west
60C	Mountain Con Mine Yard Poly C	YES	RLD to west
60E	Mountain Con Mine Yard Poly E	YES	RLD with culvert inlets and outlets
60F	Mountain Con Mine Yard Poly F	YES	RLD
61N	Mountain Con-1 Dump North	YES	RLD on west
71	Anselmo Mineyard	YES	Multiple RLDs, catch basins and SW inlets
71N	Anselmo-Timber Yard Slope	YES	Multiple RLDs, catch basins (2), culvert inlets and outlets
75	National Dump	YES	RLD and inlet
77	PA020 Dump	YES	Asphalt SW Diversion Berm on Main St.
78	Original Mine Yard	YES	RLD along south fence-line and SW inlet
79	Late Acquisition	YES	
80	West Steward Parking Lot	YES	
81	Clear Grit Dump	YES	
82	Cellar Dirt Dump	YES	
83	Steward Mine Yard	YES	RLDs (2) to NE and to SE
84	Mandan Park Play Area	YES	RLD on N. Wyoming St.
94	Rialto Dump	YES	SW inlet on SE corner (across from Site)
96	Washoe Dump (Capri N.)	YES	RLDs (2) along west parking lot & south fence-line
97	Parrott Dump & Mine Yard	YES	Multiple RLDs on north and south
97S	Parrot Shop South Slope	YES	Multiple RLDs & inlets along Granite St.
97S2	Parrot Shop South Slope Poly 2	YES	RLD & inlet along Anaconda Road
97S3	Parrot Shop South Slope Poly 3	YES	RLD on south-east side
105	Lizzie Shaft	YES	Rock-lined berm along southern alley
115	Butte New England	YES	Multiple RLDs
116	Belmont Mine Yard	YES	Multiple RLDs
116N	Belmont Hoist	YES	RLD on Continental Drive & SE inlets (2)
117	Anderson Shaft	YES	RLD
117E	Anderson Shaft - East	YES	RLD
125	Child Harold-2 Dump	YES	Buried culvert from northern RR Sed. Basin. south to Second St.
127	Tension Dump	YES	RLD on east side
129	Heaney Dump	YES	RLD on east side and rock-lined SW inlet
134	Star West Dump	YES	RLD on N. and E.
148	Unnamed Dump	YES	RLD & 2 Rock Check-Dams

150	Colorado Smelter	YES	Multiple RLDs & Sed. Basins & SW inlet under I-15
154	Clark Mill Tailings NE	YES	Grove Creek Channel from Copper Mountain Park
155E	Clark Mill Tailings East	YES	RLD from Timber Butte
156	Timber Butte Mill	YES	Multiple RLDs
159	NW Syndicate Pit	YES	SW inlets (2) along N. Clark St. and Ballfield runoff ditch
160S	Syndicate Pit Dumps South	YES	RLD N. by Walking Trail & S. along Empire St.
161	Goldsmith Dumps	YES	RLDs and (2) sediment catch basins
174	Buffalo South	YES	Multiple RLDs, culvert inlets & outlets
175	Upper Missoula Gulch	YES	Multiple RLDs, culvert inlets & outlets, in addition to concrete lined main Missoula Gulch
177	North Alice Culvert	YES	Multiple RLDs, culvert inlets & outlets
177E	North Alice Culvert East	YES	RLD & culvert under haul road
177N	North Alice Culvert North	YES	RLD & culvert under road
181	Mountain Con-3	YES	Multiple RLDs, culvert inlets & outlets
1503	Hornet Addition	YES	RLD along Alabama St.
1542	Hesperus (Mercury St) (New-Mahoney)	YES	RLD & inlet
1625	Black Bird	YES	RLD from CB02
1796	Kaw at Casey	YES	RLDs & RLD drain along toe of RR slope
2000	BA&P Trail-MT Tech to Rocker	YES	Multiple RLDs & drop inlets & culverts under Trail
2330	BA&P Trail Section A	YES	Multiple RLDs & drop inlets & culverts under Trail
2340	BA&P Trail Section B	YES	Multiple RLDs & drop inlets & culverts under Trail
2350	BA&P Trail Section C	YES	Multiple RLDs & drop inlets & culverts under Trail
2360	BA&P Trail Section D	YES	Multiple RLDs & drop inlets & culverts under Trail
2370	BA&P Trail Section E	YES	Multiple RLDs & drop inlets & culverts under Trail
2380	BA&P Trail Section F	YES	Multiple RLDs & drop inlets & culverts under Trail
2390	BA&P Trail Section G	YES	Multiple RLDs & drop inlets & culverts under Trail

Appendix C

GIS Naming Key

GIS Naming Key

Subwatershed drainage areas (subbasins) were used to classify storm water infrastructure for the Butte Priority Soils Operable Unit (BPSOU). 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. The following sub-basins have been defined for the Butte Area:

- Anaconda Road/Butte Brewery (AB)
- Buffalo Gulch (BG)
- Grove Gulch (GG)
- Idaho Street (IS)
- Missoula Gulch (MG)
- Montana Street (MS)
- 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 D

Superfund Structure Ownership Information and Notification Requirements

NOTE: Specific forms have been developed for the following structures. Ownership concerns such as notification, private property, or specific protective equipment will be included on the detailed form. The information included in Table D-1 is the overlap of the structures as provided on Exhibit 2 of the BSB/AR Allocation Agreement and the Cadastral ownership layer.

Table D-1. Superfund Storm Water Structure Ownership

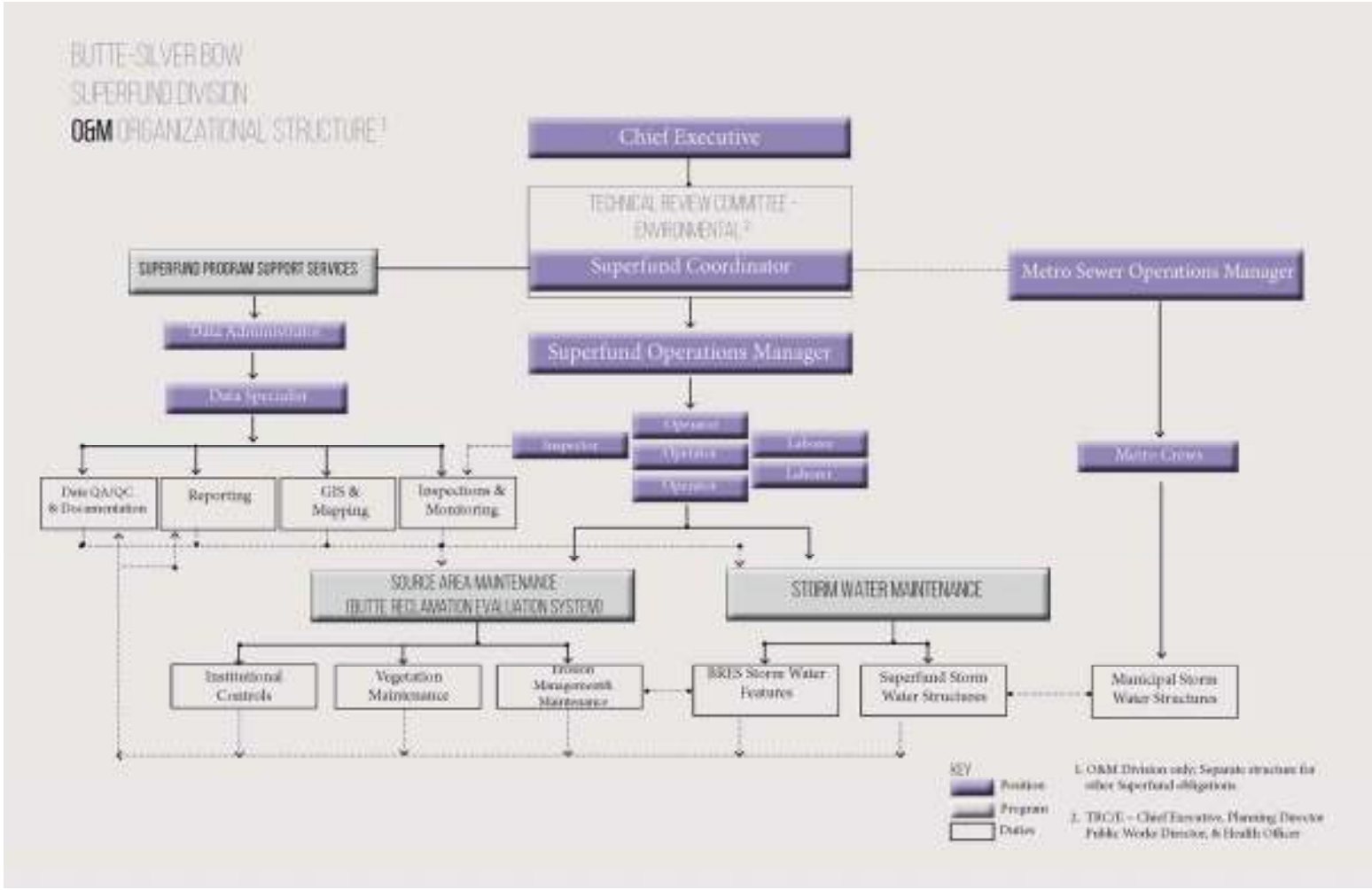
SSWS GIS ID	Superfund Storm Water Structure Common Name	Ownership
MG-D-S0001	Alice Pit Diversion	ARCO, Cheryl Nancy Ann Gordon, Barry Browne, Ferry Lane Limited
AB-D-S0001	Moose Ditch Diversion to Green Mountain Shaft	ARCO, Barry Browne
AB-PND-S0001	Green Mountain Shaft Sedimentation Basin	ARCO
MG-D-S0002	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
Need to assign	Kaw Avenue Storm Water Pipe	BNSF
Need to assign	Continental Drive Storm Water Pipe	BNSF

Appendix E

BSB Superfund Division

O&M Organizational Structure


BUTTE-SILVER BOW
SUPERFUND DIVISION
O&M ORGANIZATIONAL STRUCTURE[1]
Chief Executive
TECHNICAL REVIEW COMMITTEE - ENVIRONMENTAL[2]
SUPERFUND PROGRAM SUPPORT SERVICES
Superfund Coordinator
Metro Sewer Operations Manager
Superfund Operations Manager
Data Specialist
Inspector
Data QA/QC & Documentation
Reporting
GIS & Mapping
Inspections & Monitoring
SOURCE AREA MAINTENANCE (BUTTE RECLAMATION EVALUATION SYSTEM)
STORM WATER MAINTENANCE
Institutional Controls
Vegetation Maintenance
BRES Storm Water Features
Superfund Storm Water Structures
Municipal Storm Water Structures
KEY
Position
Program
Duties
1. O&M Division only; Separate structure for other Superfund obligations
2. TRCE – Chief Executive, Planning Director Public Works Director, & Health Officer

Appendix F

Superfund Storm Water Structure O&M Procedure Summary

Table F-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 F-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 F-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 F-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 F-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 F-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 F-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 F-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.

Table F-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 G

Site Inspection Forms

(Separate Binder)

Figures


Legend
Superfund Storm Water Channels
Superfund Storm Water Catch Basins
BPSOU Boundary
National Hydrography Dataset
Perennial Stream/River
Intermittent Stream/River
Canal/Ditch
Pipeline
Drainage Basin
* background is 2011 NAIP 1 meter resolution aerial
Alice Pit Diversion
MG-D-S0001
Moose Ditch
AB-D-S0001
Upper (East) Missoula Gulch Storm Water Channels
MG-D-S0002
Upper (West) Missoula Gulch Storm Water Channels
MG-D-S0003
Mountain Con Storm Water Channel
AB-D-S0003
Little Minah Channel
AB-D-S0002
Green Mountain Shaft Sedimentation Basin
AB-PND-S0001
Kelly Catch Basin North
AB-PND-S0003
Kelly Catch Basin South
AB-PND-S0004
Centerville Channels to Syndicate Pit
MG-D-S0004
Buffalo Gulch Detention Basin
BG-PND-S0001
Catch Basin 1 (Synd. Pit)
MG-PND-S0001
Buffalo Gulch Channel
BG-D-S0001
Kelley Catch Basin
At Lower Anaconda Road
AB-PND-S0002
Kelley Channel "A"
AB-D-S0004
Kelley Channel "B"
AB-D-S0005
North Parrot Channel
AB-D-S0006
South Parrot Channel
AB-D-S0007
Uptown Trail Channel
WS-D-S0002
Uptown Trail Catch Basin 2
WS-PND-S0003
Belmont Diversion
WA-D-S0001
Lower Missoula Gulch Splash Basin & Base Flow Diversion Structure
MG-PND-S0002
Anaconda Road Butte Brewery HD
AB-HD-S0001
Lower Missoula Gulch
Catch Basin 8
WS-PND-S0001
Warren Ave. HD
WA-HD-S0001
Texas Ave. HD
SB-HD-S0001
Dexter Addition Ditch
WS-D-S0003
Buffalo Gulch Webster Garfield
BG-HD-S0001
Lower Missoula Gulch
Catch Basin 9
WS-PND-S0002
Lower Missoula Gulch
Channel to Silver Bow Creek
WS-D-S0001
Montana Street HD
MS-HD-S0001
Sewage
Treatment
Plant
Copper Mtn Park Basin
Copper Mountain Park Channel and Basin
Missoula Gulch
West Side
Idaho Street
Buffalo Gulch
Warren Avenue
Anaconda Road / Butte Brewery
Silver Bow Creek
Blacktail Creek
Metro Storm Drain
Grove Gulch
Sand Creek
Joe Wright Gulch
Deep Straight Gulch
Hydraulic Control Channel
Silver Bow Creek
Blacktail Creek
Sand Creek
Grove Gulch Creek
N
W
E
S
1 inch = 750 feet
0 375 750 1,500 2,250 3,000
WATER & ENVIRONMENTAL TECHNOLOGIES, PC
Superfund Storm-Sewer Infrastructure
BSB Storm Water O&M Plan
Job#: BSBPWM52
Date: 6/27/2013
Path: M:\BSBPWM52\Figure_1_SuperFund_StormWater_Infra.mxd, Author: jleprowse
FIGURE 1

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Superfund Storm-Sewer & City Storm-Sewer Infrastructure

BSB Storm Water O&M Plan

Job#: BSBPWM52

Date: 6/27/2013

FIGURE 2

Path: M:\BSBPWM52\Figure_2_SuperFund_StormWater_Infra.mxd, Author: jleprowse

Legend

- Superfund Storm Water Channels
- Superfund Storm Water Catch Basins
- BPSOU Boundary
- Drainage Basin

National Hydrography Dataset

- Perennial Stream/River
- Intermittent Stream/River
- Canal/Ditch
- Pipeline

Ownership

- BSB
- Arco
- Private
- BLM
- Forest Service
- State

Alice Pit Diversion
MG-D-S0001

Moose Ditch
AB-D-S0001

Upper (East) Missoula Gulch Storm Water Channels
MG-D-S0002

Upper (West) Missoula Gulch Storm Water Channels
MG-D-S0003

Mountain Con Storm Water Channel
AB-D-S0003

Green Mountain Shaft Sedimentation Basin
AB-PND-S0001

Centerville Channels to Syndicate Pit
MG-D-S0004

Little Minah Channel
AB-D-S0002

Kelly Catch Basin North
AB-PND-S0003

Buffalo Gulch Detention Basin
BG-PND-S0001

Kelly Catch Basin South
AB-PND-S0004

Catch Basin 1 (Synd. Pit)
MG-PND-S0001

Buffalo Gulch Channel
BG-D-S0001

Kelley Catch Basin
At Lower Anaconda Road
AB-PND-S0002

Kelley Channel "A"
AB-D-S0004

Kelley Channel "B"
AB-D-S0005

North Parrot Channel
AB-D-S0006

South Parrot Channel
AB-D-S0007

Uptown Trail Channel
WS-D-S0002

Uptown Trail Catch Basin 2
WS-PND-S0003

Belmont Diversion
WA-D-S0001

Anaconda Road Butte Brewery HD
AB-HD-S0001

Warren Ave. HD
WA-HD-S0001

Texas Ave. HD
SB-HD-S0001

Lower Missoula Gulch Splash Basin & Base Flow Diversion Structure
MG-PND-S0002

Lower Missoula Gulch
Catch Basin 8
WS-PND-S0001

Dexter Addition Ditch
WS-D-S0003

Buffalo Gulch Webster Garfield
BG-HD-S0001

Lower Missoula Gulch
Catch Basin 9
WS-PND-S0002

Lower Missoula Gulch
Channel to Silver Bow Creek
WS-D-S0001

Montana Street HD
MS-HD-S0001

Sewage
Treatment
Plant

Copper Mtn Park Basin

Copper Mountain Park Channel and Basin

Missoula Gulch
West Side
Buffalo Gulch
Silver Bow Creek
Metro Storm Drain
Blacktail Creek
Grove Gulch
Sand Creek
Basin Cr
Idaho Street
Anaconda Road/Butte Brewery
Reef Straight Gulch
Hydraulic Control Channel
Silver Bow Creek
Blacktail Creek
Grove Gulch Creek

N
W E
S

1 inch = 750 feet

0 375 750 1,500 2,250 3,000

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Superfund Storm-Sewer & Ownership

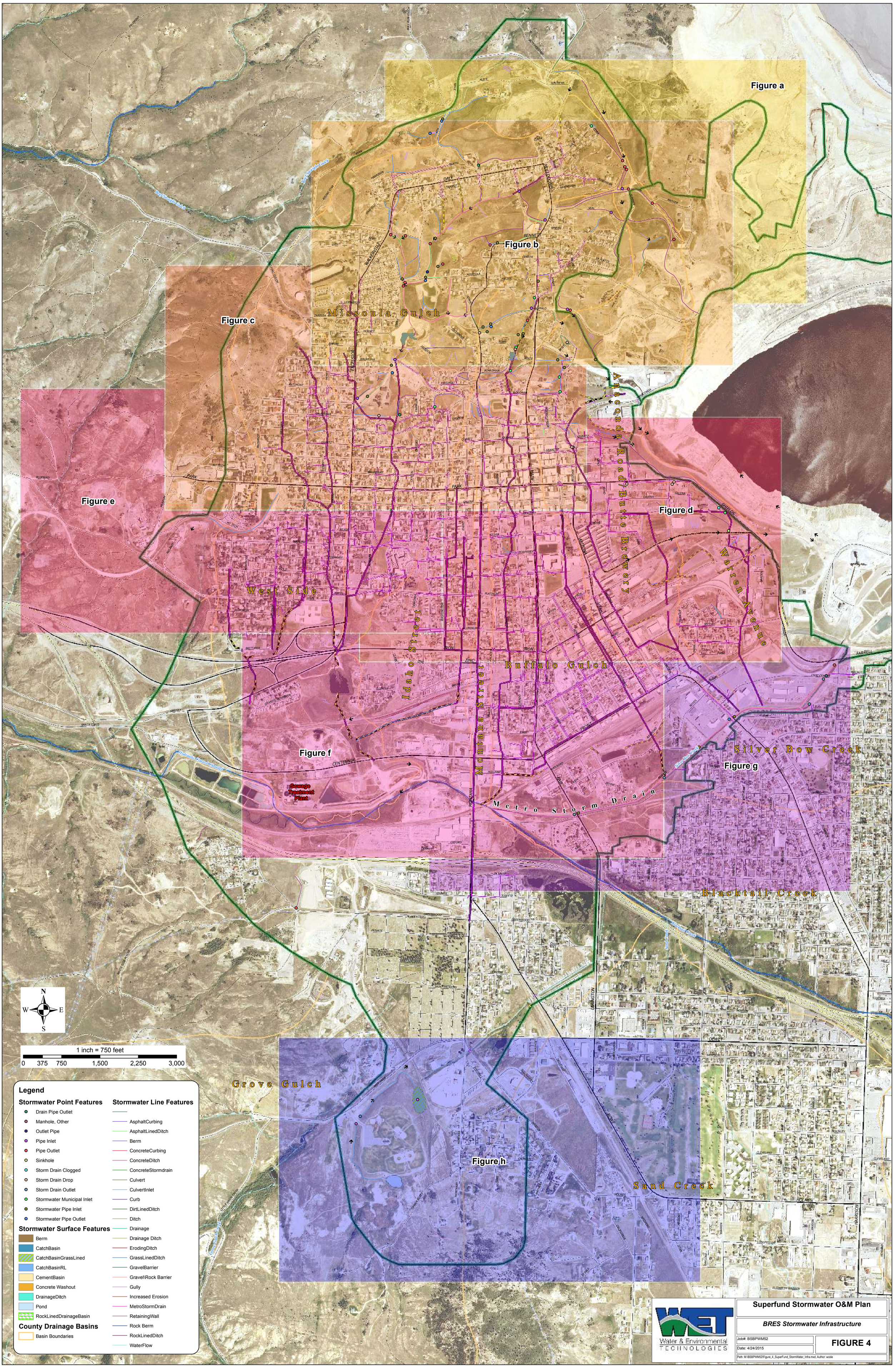
BSB Storm Water O&M Plan

Job#: BSBPWM52

Date: 6/27/2013

FIGURE 3

Path: M:\BSBPWM52\Figure_3_SuperFund_StormWater_Infra.mxd, Author: jleprowse



Water & Environmental Technologies

Superfund Stormwater O&M Plan

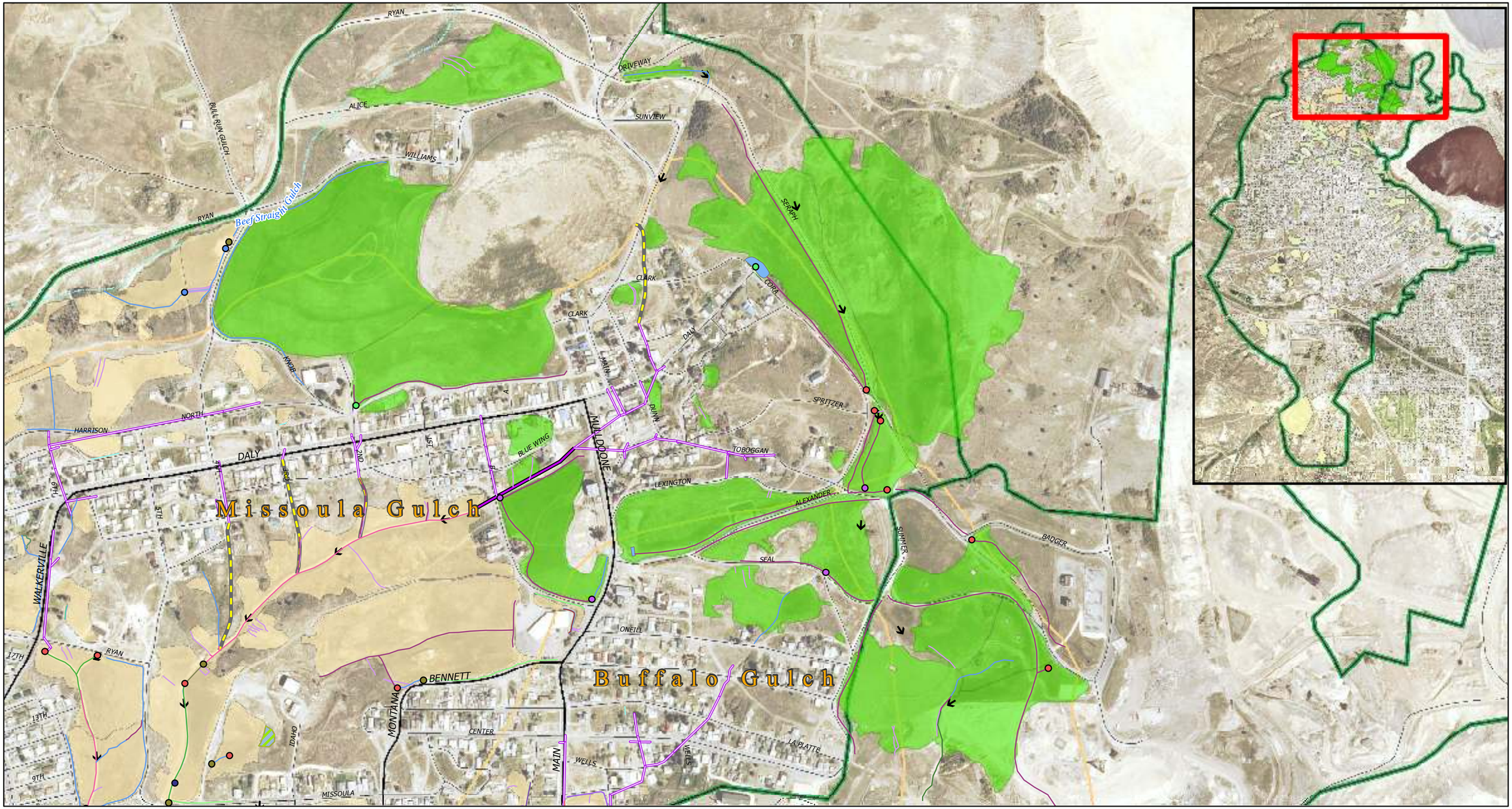
BRES Stormwater Infrastructure

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4

Path: M:\BSBPWM52\Figure_4_SuperFund_StormWater_Infra.mxd, Author: wcole



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N W E S

1 inch = 500 feet

0 250 500 1,000 1,500

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

BRES Stormwater Infrastructure Quadrant 1

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4a

Path: M:\BSBPWM52\Figure_4a_north_gulch_StormWater.mxd, Author: wcole

Figure a

Figure b

Figure c

Figure d

Figure e

Figure f

Figure g

Figure h

Missoula Gulch

West Side

Idaho Street

Montana Street

Buffalo Gulch

Anaconda Road / Butte Brewery

Warren Avenue

Metro Storm Drain

Silver Bow Creek

Blacktail Creek

Sand Creek

Grove Gulch

Sewage Treatment Plant

Hydraulic Control Channel

Bed Straight Gulch

Grove Gulch Creek

N

W E

S

1 inch = 750 feet

0 375 750 1,500 2,250 3,000

Legend

Stormwater Point Features

- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Surface Features

- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins

- Basin Boundaries

Stormwater Line Features

- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Water & Environmental Technologies

Superfund Stormwater O&M Plan

BRES Stormwater Infrastructure

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4

Path: M:\BSBPWM52\Figure_4_SuperFund_StormWater_Infra.mxd, Author: wcole

Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N W E S

1 inch = 500 feet

0 250 500 1,000 1,500

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

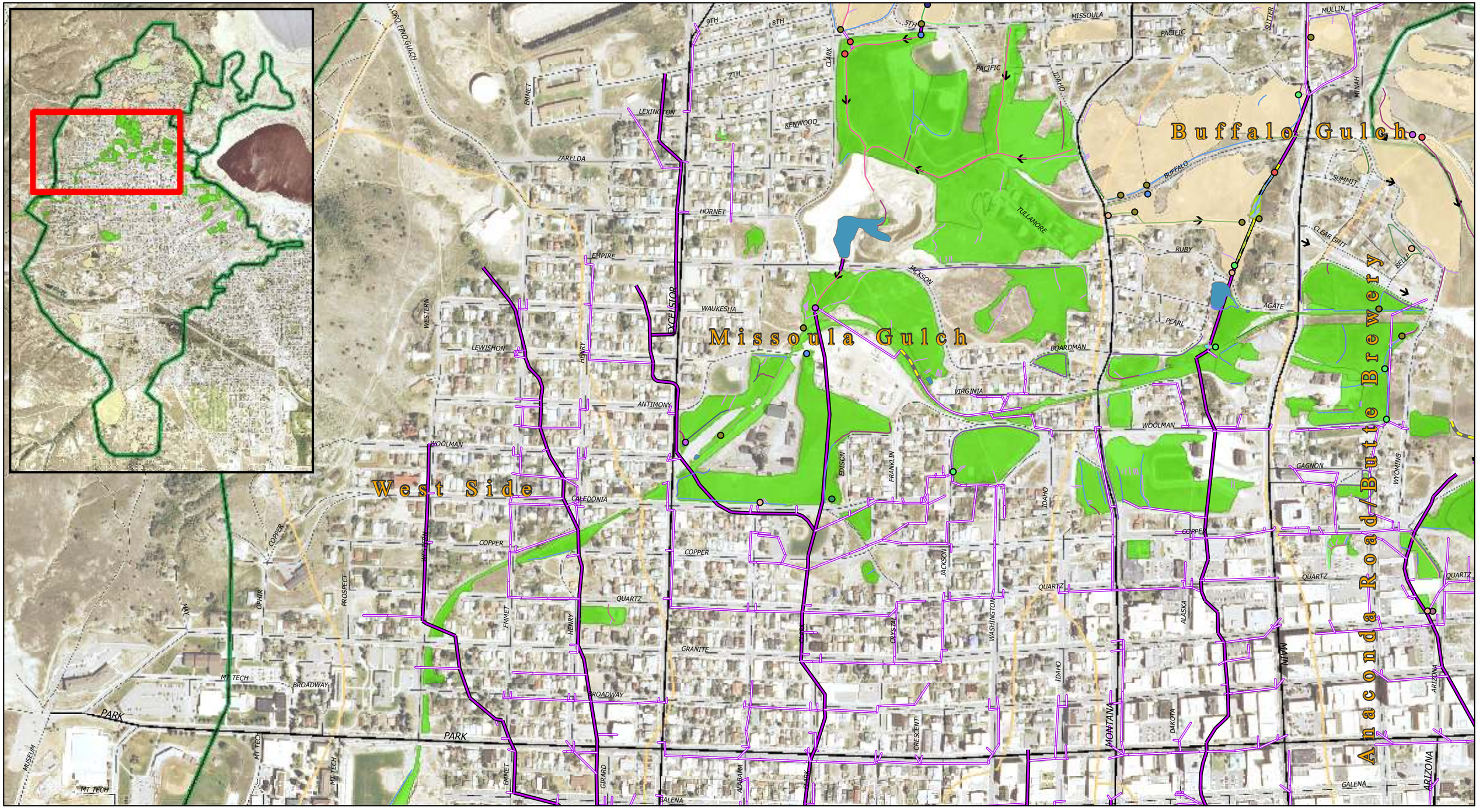
BSB Stormwater Infrastructure Quadrant 2

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4b

Path: M:\BSBPWM52\Figure_4b_south_gulch_StormWater.mxd, Author: wcole



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N W E S

1 inch = 500 feet

0 250 500 1,000 1,500 2,000

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

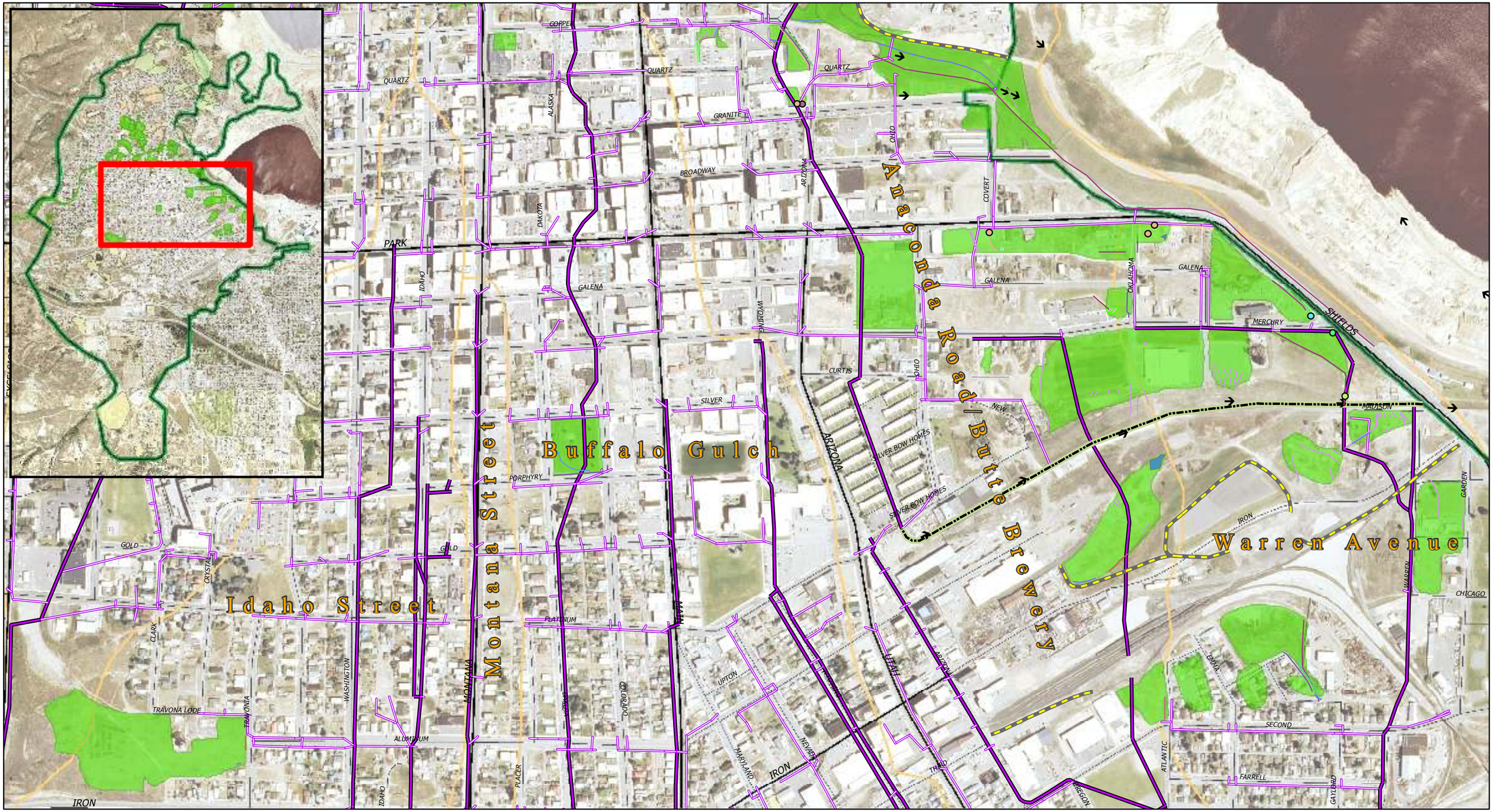
BSB Stormwater Infrastructure Quadrant 3a (north)

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4c

Path: M:\BSBPWM52\Figure_4c_buffalo_gulch_StormWater.mxd, Author: wcole



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N
W E
S

1 inch = 500 feet

0 250 500 1,000 1,500 2,000

Water & Environmental Technologies

Superfund Stormwater O&M Plan

BSB Stormwater Infrastructure Quadrant 3b (south)

Job#: BSBPWM52

FIGURE 4d

Date: 4/24/2015

Path: M:\BSBPWM52\Figure_4d_buffalo_gulch_StormWater.mxd, Author: wcole

Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N
W E
S

1 inch = 500 feet

0 250 500 1,000 1,500 2,000

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

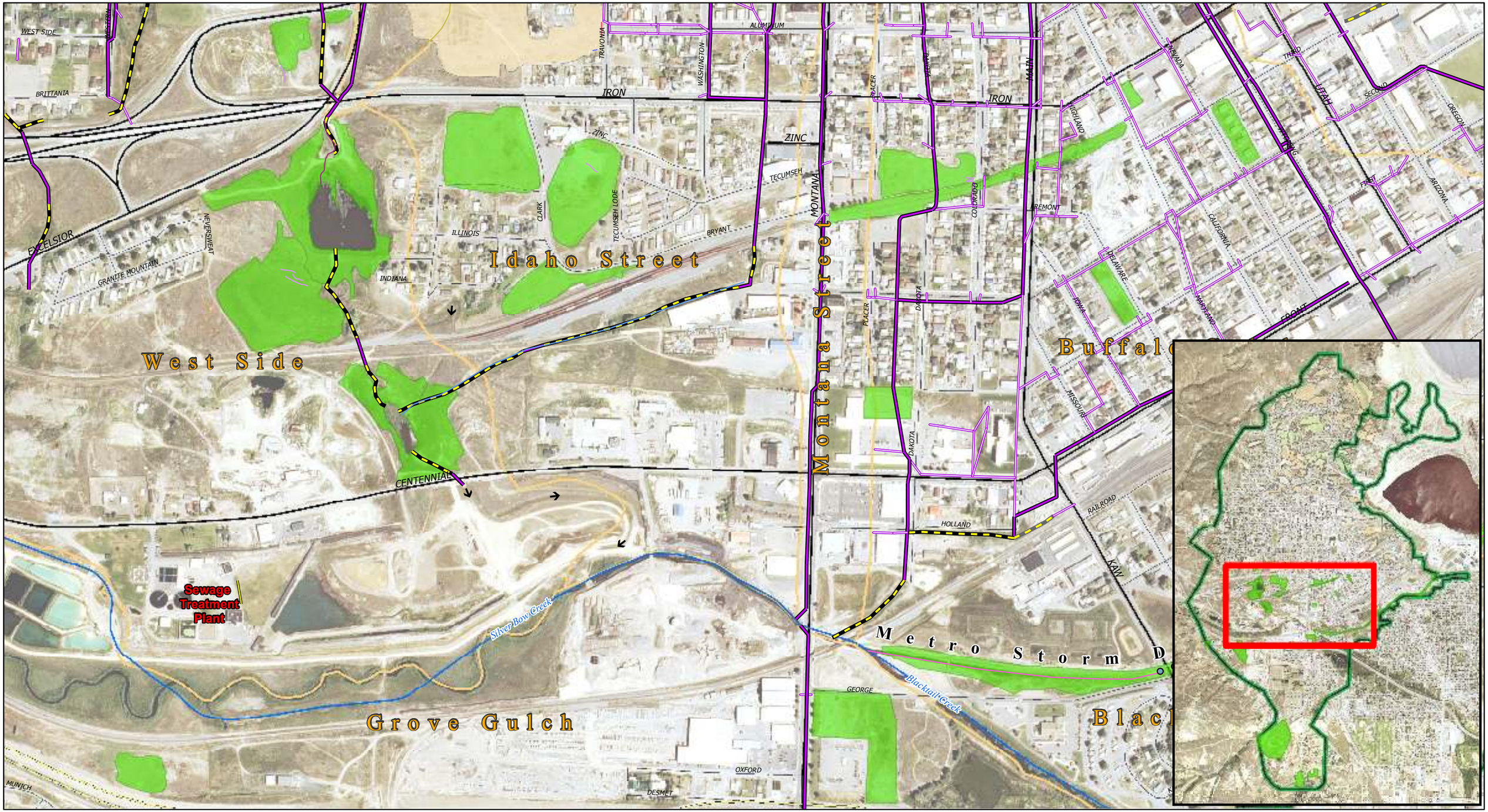
BSB Stormwater Infrastructure Quadrant 3c (west)

Job#: BSBPWM52

Date: 4/24/2015

Path: M:\BSBPWM52\Figure_4e_buffalo_gulch_StormWater.mxd, Author: wcole

FIGURE 4e



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N W E S

1 inch = 500 feet

0 500 1,000

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

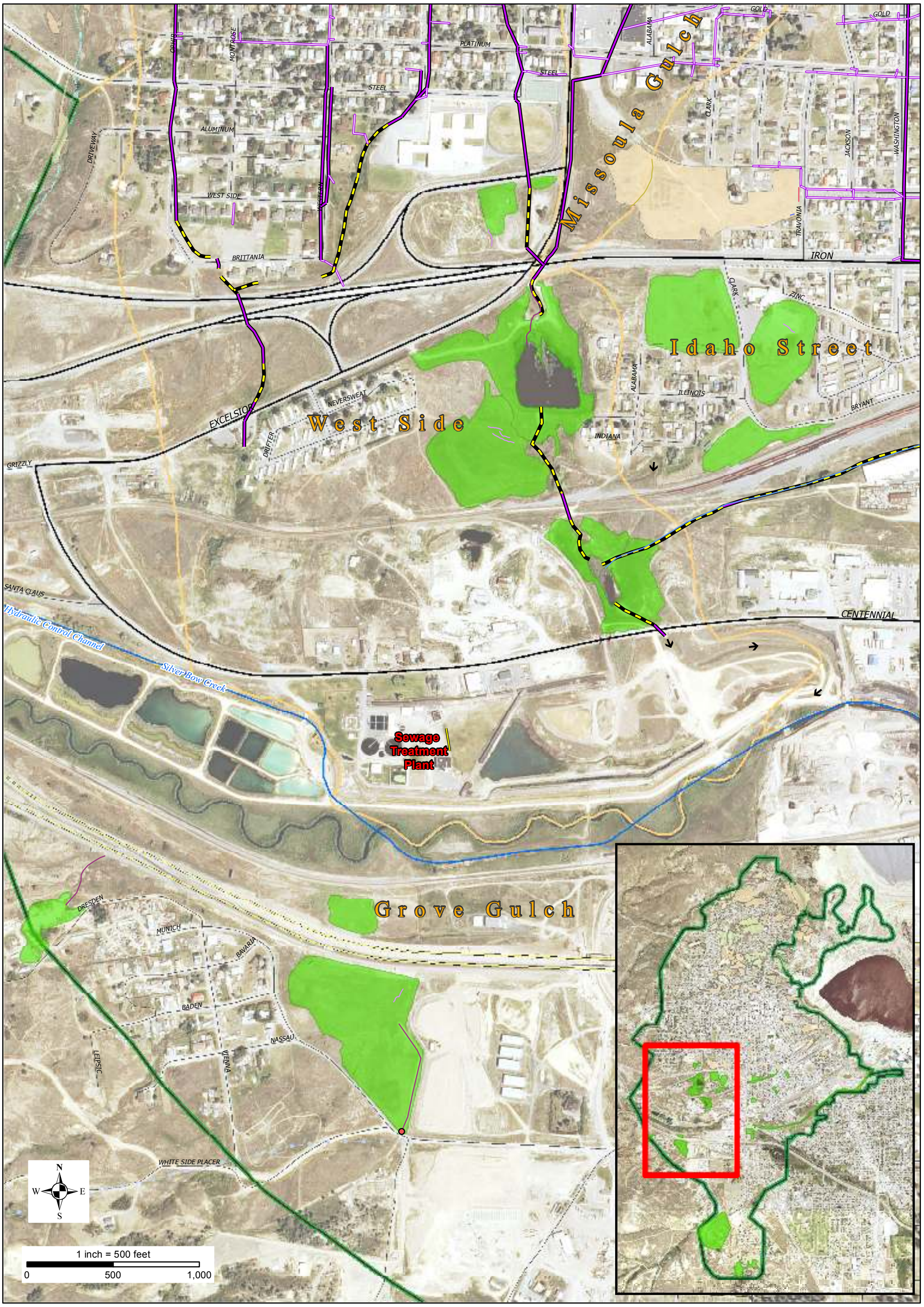
BRES Stormwater Infrastructure Quadrant 4a (west)

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4f

Path: M:\BSBPWM52\Figure_4f_grove_gulch_StormWater.mxd, Author: wcole



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

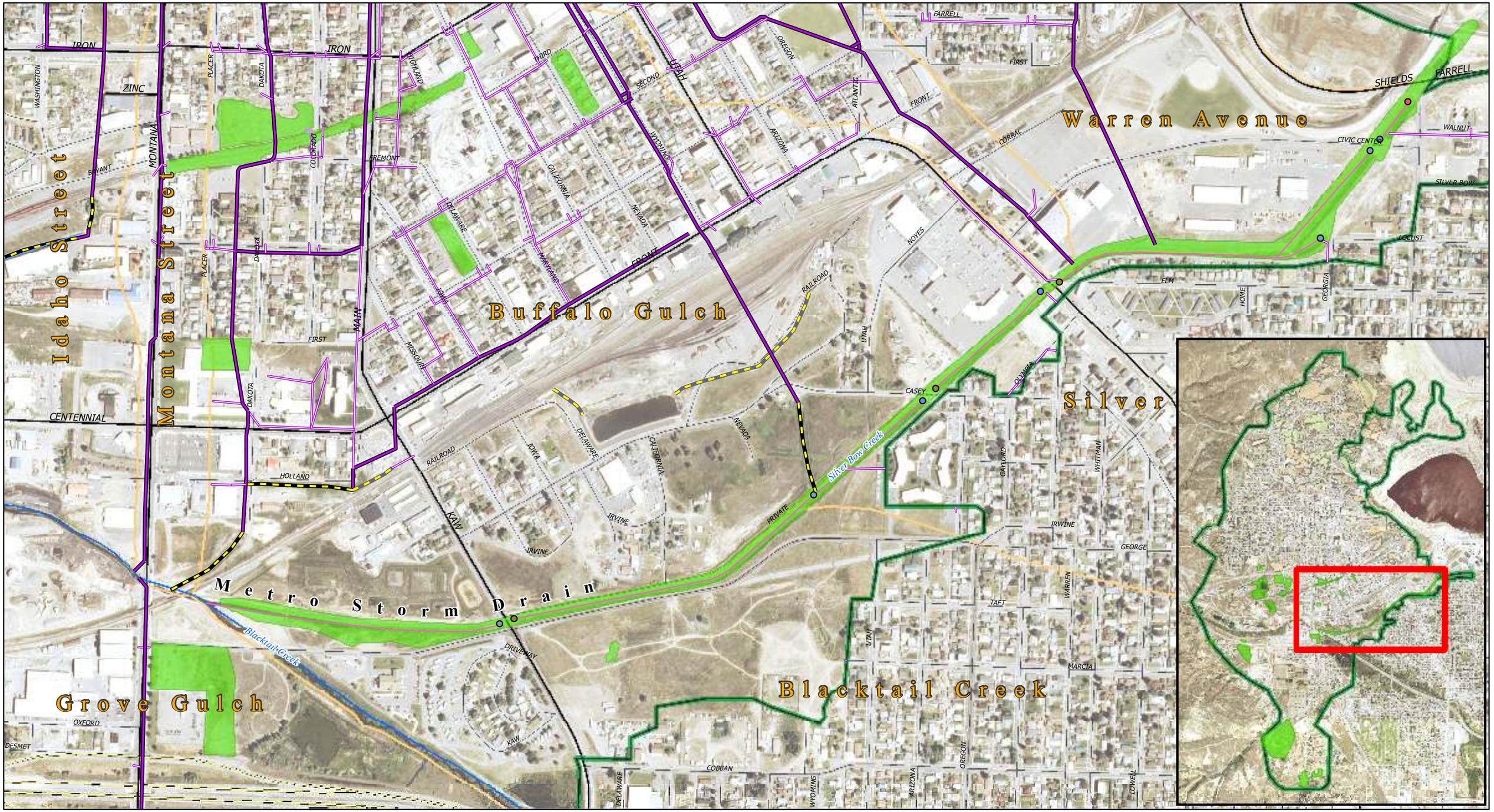
BRES Stormwater Infrastructure Quadrant 4a (west)

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4f

Path: M:\BSBPWM52\Figure_4f_portrait_grove_gulch_StormWater.mxd, Author: wcole



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
- GravelBarrier
- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N W E S

1 inch = 500 feet

0 500 1,000

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

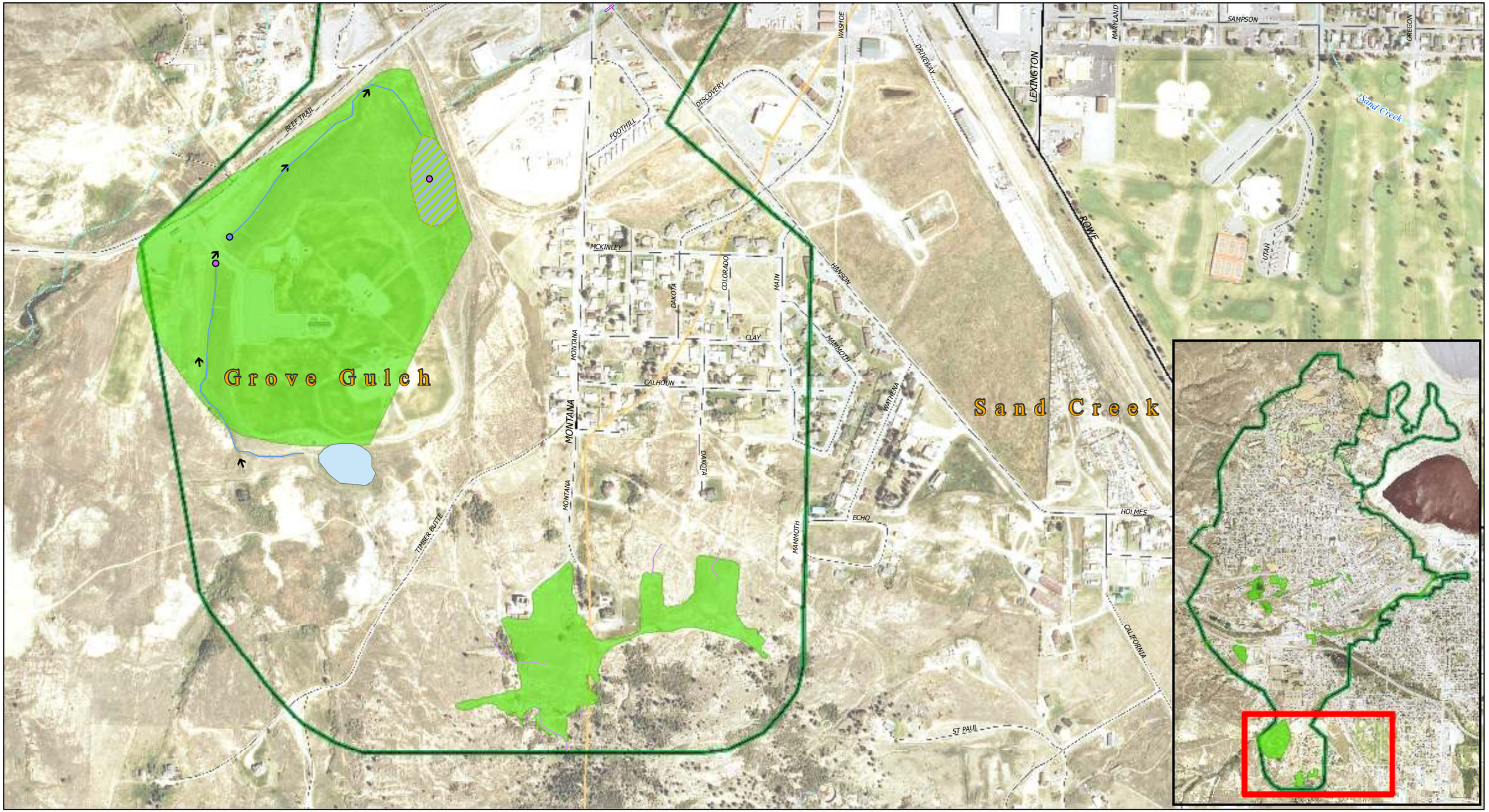
BRES Stormwater Infrastructure Quadrant 4b (east)

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4g

Path: M:\BSBPWM52\Figure_4g_grove_gulch_StormWater.mxd, Author: wcole



Legend

BRES sites Quadrants
- Quadrant 1- 2012
- Quadrant 2- 2013
- Quadrant 3- 2014
- Quadrant 4- 2015

Stormwater Point Features
- Drain Pipe Outlet
- Manhole, Other
- Outlet Pipe
- Pipe Inlet
- Pipe Outlet
- Sinkhole
- Storm Drain Clogged
- Storm Drain Drop
- Storm Drain Outlet
- Stormwater Municipal Inlet
- Stormwater Pipe Inlet
- Stormwater Pipe Outlet

Stormwater Line Features
- AsphaltCurbing
- AsphaltLinedDitch
- Berm
- ConcreteCurbing
- ConcreteDitch
- ConcreteStormdrain
- Culvert
- CulvertInlet
- Curb
- DirtLinedDitch
- Ditch
- Drainage
- Drainage Ditch
- ErodingDitch
- GrassLinedDitch
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- Gravel\Rock Barrier
- Gully
- Increased Erosion
- MetroStormDrain
- RetainingWall
- Rock Berm
- RockLinedDitch
- WaterFlow

Stormwater Surface Features
- Berm
- CatchBasin
- CatchBasinGrassLined
- CatchBasinRL
- CementBasin
- Concrete Washout
- DrainageDitch
- Pond
- RockLinedDrainageBasin

County Drainage Basins
- Basin Boundaries

N
W E
S

1 inch = 500 feet

0 500 1,000

Water & Environmental TECHNOLOGIES

Superfund Stormwater O&M Plan

BRES Stormwater Infrastructure Quadrant 4a (south)

Job#: BSBPWM52

Date: 4/24/2015

FIGURE 4h

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