



Butte-Silver Bow Public Works Department

Storm Water Management Requirements (Continued)	I	N/A	BSB Chk'd
h Where Storm Drainage is Intended to be Discharged into the Ground, Show Locations of the Wells and Drainfields (Within 200') That May be Impacted, Include Geotechnical or Infiltration Test Report			
i Culvert, Pipe, and/or Ditch System Capacities and Velocities			
j Show Calculations/Figures Required to Support the Design			
k FEMA Floodplains Identified			
l Permits, Easements, Setbacks, and Discharge Agreements			
m Professional Engineers Stamp			
2 Plans			
A General Layout			
a Title			
b Name of Entity Responsible for Maintaining Storm Water Facilities, if Other Than BSB (Note: Must Receive Approval for BSB to Assume Maintenance of Facilities)			
c Scale			
d North Arrow			
e Name of Designer and Date of Design			
f Legible Prints			
g Location, Nature, and Size of Existing Storm Drainage Facilities (If Any)			
h Professional Engineers Stamp			
Drainage Plan Content	I	N/A	BSB Chk'd
1 Plan and Profile of Each Permanent Storm Water Control			
2 Location and Details of Each Permanent Storm Water Control/ Any Proposed Structures			
3 Size, Types, Slope, Invert Elevations, Minimum Cover, and Lengths of all Culverts and Any Proposed Pipes			
4 Location and Details of Any Proposed Detention or Retention Ponds			
5 Invert Elevations, Slopes, and Lengths of Storm Drain Facilities			
6 Location, Size, Length, and Slope of any Proposed Storm Drain Lines			
7 Topographic Map of Existing and Finished Grade Contours at 2-Foot Max Intervals			
8 Direction of Drainage Flow Paths With Slope, Flow Types, Surface Type, and Run Length			
9 Site Property Boundary, Wetlands, Basin/Sub-Basin/By Pass Area, Setbacks, Easements, 2-foot Contours, etc			
Calculations and Design Documentation	I	N/A	BSB Chk'd
1 Hydrology Calculations			
A State Runoff Method Used (Rational, SCS, etc)			



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Calculations and Design Documentation (Continued)	I	N/A	BSB Chk'd
B State Modeling Constants and Assumptions			
C Description of Design Storms (Frequency, Depth, Duration)			
D Existing and Post-Development Land Uses			
E State on Each Figure the Total Area and Amount of Pervious/Impervious Area			
F Existing and Post-Development Peak Runoff Rate for Each Design Storm			
G Existing and Post-Development Runoff Volume for Each Design Storm			
2 Post-Construction BMP Sizing Calculations			
A State Design Requirements (0.5" Requirement, TSS Removal, or Other)			
B Required Permanent Controls Capacities, Flow Rates, and Operating Levels			
C Sizing Calculations with Results			
D A Statement Documenting Compliance with Designs Requirements			
E If 0.5" or TSS Removal Requirements Are Not Met, Provide Documentation Showing the Impracticability of Infiltration, Evapotranspiration, Capture for Reuse, and Treatment			
3 Culvert and Pipe System Capabilities and Outlet Velocities			
4 Ditch Capacities and Velocities			
Additional Information	I	N/A	BSB Chk'd
1 Permits, Easements, Setbacks, and Discharge Agreements			
2 Location of Storm Water Discharge from Project Boundary			
3 Floodplain Maps			
4 Operations and Maintenance Manual for each Permanent Storm Water Control			
A Identify the Owner			
B Identify the Party Responsible for Long-Term O&M			
C A Schedule of Inspection and Maintenance for Routine and Non-Routine Maintenance Tasks to be Conducted			
D Systems Failure and Replacement Criteria to Define the Structure's Performance Requirements			
5 Geotechnical Infiltration Test Report			
6 Specifications			
A Complete, Detailed, Technical Specifications Shall Be Supplied for the Proposed Drainage Project			
B Professional Engineers Stamp			
7 Attachments			
A Form #1—Storm Water Management Permit Application			
B Form #2—Storm Water Management Application Checklist			
C Form #2a—Maintenance Agreement			
D MPDES NOI Confirmation Letter and SWPPP (≥1 ac) or Form #2b—Construction Project Best Management Practice Plan (<1 ac)			

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Explanations (For Items Unchecked or N/A):

This image shows a full page of blank, lined paper. It features approximately 28 horizontal blue or grey lines spaced evenly apart, typical of notebook paper. The lines extend across the entire width of the page, leaving small margins at the top and bottom. There are no vertical lines, text, or other markings on the page.



Butte-Silver Bow Public Works Department

FORM #2a—MAINTENANCE AGREEMENT

STORM WATER MANAGEMENT/BMP MAINTENANCE AGREEMENT (PRE-CONSTRUCTION)

THIS AGREEMENT, made and entered into this ____ day of _____, 20____, by and between (Insert Full Name of Owner)_____ hereinafter called the "Landowner", and the City-County of Butte-Silver Bow, Montana, hereinafter called the "City-County".

WITNESSETH, that WHEREAS, the Landowner is the owner of certain real property described as: _____ (Butte-Silver Bow County tax parcel number/Geocode) with a physical address of: _____ hereinafter called the "Property".

WHEREAS, the Landowner is proceeding to build on and develop the property; and WHEREAS, the Site Plan/Subdivision Plan known as _____ (Name of Plan/Development), hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the City-County, provides for construction of storm water facilities within the confines of the property; and

WHEREAS, the City-County and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of Butte-Silver Bow County, Montana, require that on-site storm water management/BMP facilities be constructed and maintained on the Property; and

WHEREAS, the City-County requires that on-site storm water management/BMP facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The on-site storm water management/BMP facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan and Chapter 32 of Title 13 of the Butte-Silver Bow Municipal Code entitled "Storm Water Management".
2. The Landowner, its successors and assigns, including any homeowners association, shall adequately maintain the storm water management/BMP facilities. This includes all pipes and channels built to convey storm water to the facility, as well as all structures, improvements, and vegetation provided to control the quantity and quality of the storm water. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions. Adherence to a maintenance plan provided by an Engineer that defines procedures necessary to maintain good working condition is acceptable to the City-County.
3. The Landowner, its successors and assigns, shall inspect the storm water management/BMP facility annually to ensure functionality. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structures, pond areas, access roads, etc. Deficiencies shall be noted in the inspection report.
4. The Landowner, its successors and assigns, hereby grant permission to the City-County, its authorized agents and employees, to enter upon the Property and to inspect the storm water manage-



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ment/BMP facilities, provided the City-County gives reasonable notice. The purpose of inspection is to follow-up on reported deficiencies and/or to respond to citizen complaints. The City-County shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the repairs if necessary.

5. The Landowner, its successors and assigns, will perform the work necessary to keep these facilities in good working order as appropriate. In the event a maintenance schedule for the storm water management/BMP facilities (including sediment removal) is outlined on the approved plans, the schedule will be followed.

6. In the event the Landowner, its successors and assigns, fails to maintain the storm water management/BMP facilities in good working condition acceptable to the City-County, the City-County may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the City-County to erect any structure of permanent nature on the land of the Landowner outside of the easement for the storm water management/BMP facilities. It is expressly understood and agreed that the City-County is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the City-County.

7. In the event the City-County pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the City-County upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the County hereunder.

8. This Agreement imposes no liability of any kind whatsoever on the City-County and the Landowner agrees to hold the City-County harmless from any liability in the event the storm water management/BMP facilities fail to operate properly.

9. This Agreement shall be recorded among the land records of Silver Bow County, Montana, and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowners association.

OWNER(S):

Name/Title

Address

Name/Title

Address



Butte-Silver Bow Public Works Department

STATE OF MONTANA)
) ss.
County of Silver Bow)

I certify that I know or have satisfactory evidence that _____
is/are the person(s) who appeared before me, and said person(s) acknowledged that he/she/they
signed this instrument and acknowledged it to be his/her/their free and voluntary act for the uses
and purposes mentioned in the instrument.

Witness my hand and official seal hereto affixed the day and year first above written.

Notary Public in and for the State of Montana,
residing in _____.

Dated in Butte, Montana, this _____ day of _____, 20____.

City County

Chief Executive

Approved By:

Public Works Department



Butte-Silver Bow Public Works Department

FORM #2b—CONSTRUCTION PROJECT BEST MANAGEMENT PRACTICE PLAN

FOR PROJECTS WITH **LESS THAN TO ONE-ACRE OF DISTURBANCE (PRE-CONSTRUCTION)**

NOTE: This form is to be submitted with storm water engineering report.

Site Name/Address: _____

Type of Development (Residential, Commercial, etc.) Areas (ac): _____

a. Total Disturbed Area: _____

b. Existing Impervious Area: _____

c. Post-Development Impervious Area: _____

Construction Start Date: _____ Project Description: _____

Construction End Date: _____

Project Completion Date: _____

Attach Proposed BMP Map. The Map Must Show:

a. Proposed BMP Location

b. Discharge Points (Outfall) Clearly Labeled

c. Receiving Surface Waters Identified

d. FEMA Floodplains Identified

e. Existing On-Site Natural Resources Identified and Protected (i.e., wetlands)

The Checklist Below Includes BMP Options. Mark 'Yes' or 'No' For Proposed BMPs.

Erosion Control BMPs	Yes	No
Surface Roughening		
Diversion Ditches		
Slope Drains		
Check Dams		
Preserving Natural Vegetation & Vegetative Buffers		
Sediment Control BMPs	Yes	No
Silt Fence		
Straw Wattles		
Earthen Berms		
Inlet Protection		
Sediment Traps (Small Drainage Areas)		
Sediment Basins (Large Drainage Areas)		
Roadway Management	Yes	No
Track Pads		
Sweeping		
Stabilization BMPs	Yes	No
Seeding		
Erosion Control Blankets		
Straw Mulch		
Pollution Prevention Measures	Yes	No
Bulk Storage		
Equipment Management		
Spill Prevention and Response		
Refuse and Trash		
Concrete Washout Areas		
Saw Cutting		
Portable Toilets		



Butte-Silver Bow Public Works Department

FORM #3—EXCAVATION AND DIRT MOVING PERMIT APPLICATION (PRE-CONSTRUCTION STAGE)

BSB Permit No. 2020-1

Date Submitted: _____

Finalized: _____

NOTE: Prior to submitting this "Excavation and Dirt Moving Permit Application," a Storm Water Management Permit must be approved, if applicable.

PROPERTY OWNER CONTACT INFORMATION

Contractor or Owner: _____ Mailing Address: _____
Phone: _____ City: _____
Mobile Phone: _____ State: _____
Email: _____ Zip: _____

Physical Address of the Property: _____

CONTRACTOR/DEVELOPER/PERSON DOING THE WORK/CONTACT INFORMATION

Contractor or Owner: _____ Mailing Address: _____
Phone: _____ City: _____
Mobile Phone: _____ State: _____
Email: _____ Zip: _____

Physical Address of the Property: _____

PROJECT INFORMATION

Project Location and Volume of Excavation:

- | | |
|--|---|
| ☐ Excavation Control District | ☐ Butte Priority Soils Operable Unit |
| ☐ Less Than 3 Cubic Yards | ☐ Less Than 1 Cubic Yard |
| ☐ Greater Than 3 Cubic Yards | ☐ Greater Than 1 Cubic Yard |

Property Type: ☐ Residential ☐ Commercial/Industrial ☐ Recreation/Open Space

Type of Excavation:

- ☐ Footing ☐ Foundation ☐ Posts/Poles ☐ Landscaping ☐ Sidewalk ☐ Driveway
☐ Fencing ☐ Utility Repairs/Maintenance

PROJECT SCHEDULE (ESTIMATED)

Start Date: _____ Duration Soil Will Be Exposed: _____ Completion Date: _____

SITE PLAN AND PROJECT DETAILS

Dimensions of Surface Area to be Distributed: _____

Depth of Excavation: _____

Estimated Volume of Soil Needed for Backfill: _____

Source of Backfill: _____ Source of Backfill: _____

Volume of Soil to be Disposed of at the Mine Waste Repository: _____



Butte-Silver Bow Public Works Department

CHECKLIST:

- ☐ 1. Copy of Storm Water Permit, If Applicable.
- ☐ 2. \$10 Processing Fee (No Application is Considered Without Payment).
- ☐ 3. Detailed Site Plan and Project Details.
- ☐ 4. Read and Understand Excavation and Dirt Moving Protocols

ACKNOWLEDGMENT CERTIFICATE

I certify I am the Owner or Owner's authorized agent. If acting as an authorized agent, I further certify I am authorized to act as the Owner's agent regarding the property at the above-referenced address for the purpose of filing applications for decisions, permits, or review under the Butte-Silver Bow Excavation and Dirt Moving Ordinance and have full power and authority to perform on behalf of the Owners all acts required to enable the City to process and review such applications.

I certify the information on this application is true and correct and understand that I shall not start this project until this application is approved. I shall comply with the laws of the State of Montana and the ordinances of Butte-Silver Bow and that any excavation will be in full compliance with any and all protocols associated with this permit, including granting the city-county to enter the property to inspect the site, take samples of excavated materials and monitor excavation and back-filling activities.

Owner or Authorized Agent

Date

FOR OFFICE USE ONLY

The remainder of this application is for office use only.

APPLICATION REVIEW

Application Received By: _____ Date: _____

Fee Paid: _____ Check No.: _____ Receipt No.: _____

Approved By: _____ Date: _____

SOIL SAMPLING RESULTS

Soil Inspection Completed By: _____

Sample System: ☐ XRF Analysis ☐ Lab Sample ☐ Internal Data

Results:

Above Action Levels Below Action Levels

Lead:	☐	☐
Arsenic:	☐	☐
Mercury:	☐	☐

COST SHARE REQUEST

☐ Cost Share Requested

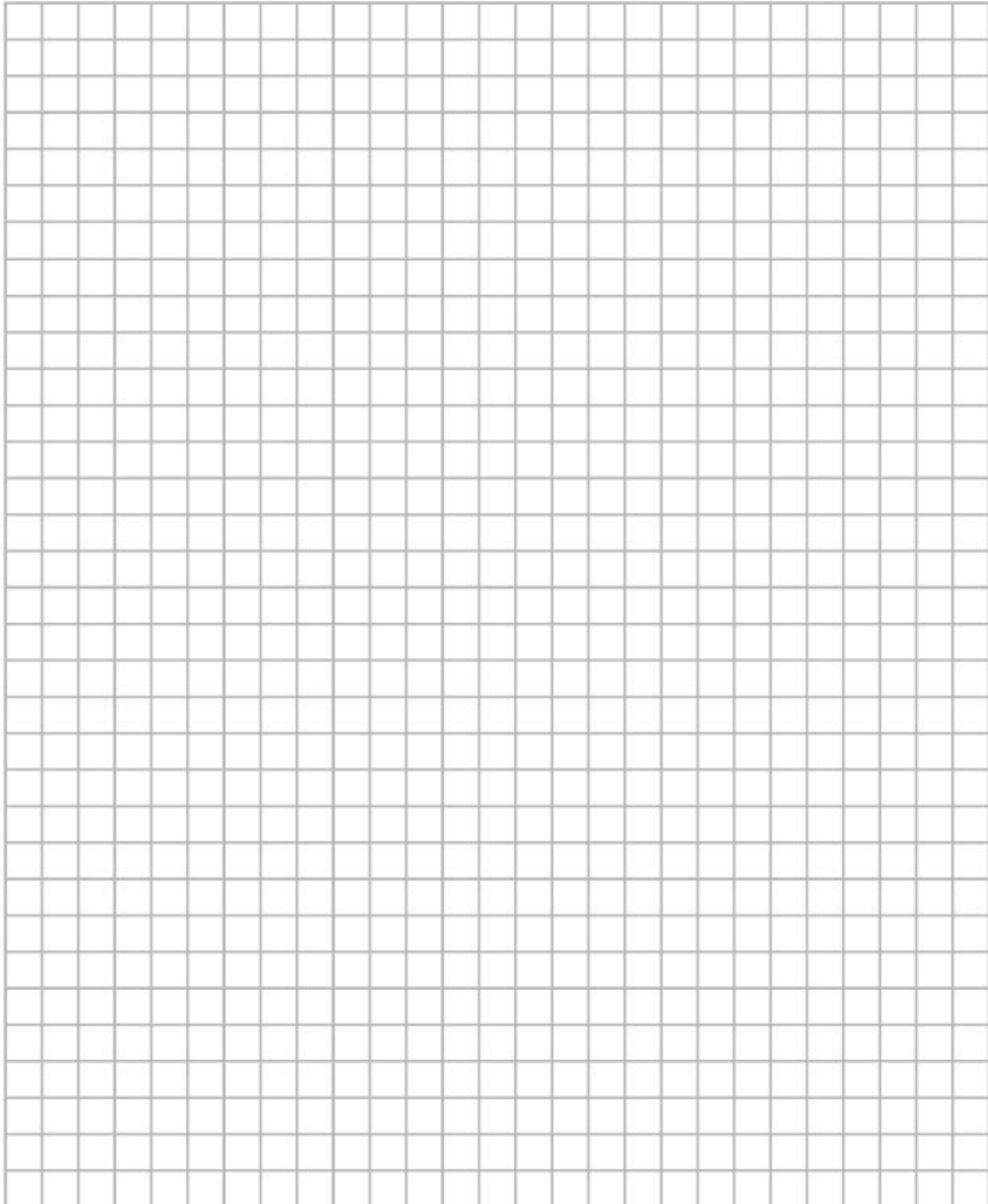
_____ Cubic Yards Moved

_____ Cubic Yards Backfill Requested



Butte-Silver Bow Public Works Department

SITE PLAN





Butte-Silver Bow Public Works Department

FORM#4—VARIANCE FOR STORM WATER PERMIT APPLICATION

Storm Water
Ordinance 10-13

NOTE: An approved variance form takes the place of Forms #1, #2a, and #2b. Form #3 may be required.

CONTACT INFORMATION

Project Owner

Contact Person: _____

Company: _____

Mailing Address: _____

State: _____ Zip: _____

Phone: _____

Email: _____

Engineer

Contact Person: _____

Company: _____

Mailing Address: _____

State: _____ Zip: _____

Phone: _____

Email: _____

PROJECT INFORMATION

Project Address: _____

Legal Description: _____

Lot Number: _____

Subdivision (If Applicable): _____

A variance from the requirement to construct permanent storm water infrastructure may be granted by the BSB Public Works Department if:

- The project increases the impervious surface less than or equal to 1,500 ft², if located in a regulated area¹.
- The project increases the impervious surface less than or equal to 2,500 ft², if located in a non-regulated area².

If the project is within 1,000 ft of surface water, a variance will not be granted.

Note: BSB Department of Public Works—Metro Sewer Maintenance Division will be consulted on any known storm water conveyance or control problems near the parcel prior to granting the variance. Provide a site plan with the proposed project area.

¹ A regulated area is located within the Butte Urban Limit Boundary and is not within 1,000 ft of surface water

² A non-regulated area is located outside the Butte Urban Limit Boundary and is not within 1,000 ft of surface water.

All projects must install temporary Best Management Practices (e.g. silt fences, fiber rolls, storm drain inlet protection) to keep site sediments/pollutants from discharging from the construction site. Please call the BSB Department of Public Works at (406) 497-6515 prior to the start of construction. BSB may inspect the construction site at any time to ensure that Best Management Practices (BMPs) are being implemented.

Applicant Signature: _____

Date: _____

Print Applicant Name: _____

Company: _____

BSB Public Works

Representative Name: _____

Date: _____



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Pollutants Present at the Time of the Inspection:

Soils

- ☐ Areas of Shallow Grade (3:1 or less)
- ☐ Areas of Steep Grade (3:1 or greater)
- ☐ Slopes
- ☐ Ditch
- ☐ Stockpiles
- ☐ Contaminated Soils
- ☐ Import & Export Operations
- ☐ Entrance/Exit Locations
- ☐ Other: _____

Materials

- ☐ Loading & Unloading Operations
- ☐ Storage of Building Materials
- ☐ Storage of Chemicals
- ☐ Portable Toilets
- ☐ Concrete Batch Plant
- ☐ Asphalt Batch Plant
- ☐ Worker Trash
- ☐ Demolition Materials/Debris
- ☐ Other: _____

Activities

- ☐ Concrete Truck Washout
- ☐ Masonry—Stone/Brick/Concrete
- ☐ Spray/Wand Applications
- ☐ Finish Work—Drywall/Painting
- ☐ Equipment Washing
- ☐ Washing of Buildings
- ☐ Maintenance of Equipment
- ☐ Refueling Operations
- ☐ Application of Herbicides, Pesticides, Fertilizers
- ☐ Application of Solvents or Detergents
- ☐ Construction Dewatering
- ☐ Other: _____

BMPs Present at the Time of the Inspection:

Erosion Control BMPs

- ☐ Surface Roughening
- ☐ Diversion Ditches
- ☐ Velocity Checks/Check Dams
- ☐ Preservations of Existing Vegetation
- ☐ Minimizing Ground Disturbance
- ☐ Mulch—Straw/Compost
- ☐ Tackifiers/Soil Binders
- ☐ Temporary Seeding
- ☐ Erosion Control Blankets
- ☐ Rough Cut Street Controls/Water Bars
- ☐ Channel Liner
- ☐ Stream Crossing
- ☐ Terracing
- ☐ Culvert
- ☐ Outfall/Outlet Protection (Rip Rap)
- ☐ Other: _____

Administrative Controls

- ☐ Concrete and Liquid Waste Washouts
- ☐ Worker Toilets
- ☐ Construction Fencing
- ☐ Dust Control
- ☐ Secondary Containment
- ☐ Dumpsters/ Waste Receptacles
- ☐ Stabilized Staging Area
- ☐ Material Storage and Stockpile Area
- ☐ Paving and Painting Controls
- ☐ Saw Cutting and Grinding Controls
- ☐ Spill Prevention and Response Procedures
- ☐ Traffic Control
- ☐ Back Charging/Penalties
- ☐ Other: _____

Run On/Runoff Control BMPs

- ☐ Temporary Slope Drain
- ☐ Rock Run Down
- ☐ Clean Water Diversion
- ☐ Drainage Swales
- ☐ Other: _____

Sediment Control BMPs

- ☐ Silt Fence
- ☐ Straw Wattles
- ☐ Rock Wattles/Rock Socks
- ☐ Curb Socks
- ☐ Straw Bales
- ☐ Earthen Berms
- ☐ Vegetative Buffers
- ☐ Drainage Ditch/Ditch Berm
- ☐ Gravel Pack
- ☐ Tarps, Plastic, Visqueen
- ☐ Compost Socks
- ☐ Brush Barrier
- ☐ Sandbag Barrier
- ☐ Inlet Protection
- ☐ Vehicle Tracking Control Pad
- ☐ Stabilization Vehicle Entrance
- ☐ Stabilization Parking Area
- ☐ Stabilization Construction Roadway
- ☐ Street Sweeping
- ☐ Sediment Trap
- ☐ Sediment Basin
- ☐ Other: _____

Post Construction BMPs

- ☐ Detention Pond(s)
- ☐ Retention Pond(s)
- ☐ Drainage Swales
- ☐ Infiltration System(s)
- ☐ Dry Well(s)
- ☐ Other: _____



Butte-Silver Bow Public Works Department

BMP MAINTENANCE AND CORRECTIVE ACTIONS

BMP Requiring Maintenance and/or Corrective Actions and Location of BMP	Maintenance Needed?	Corrective Action Required?	Date When Maintenance or Corrective Action(s) are Completed	Description of Corrective Action
	☐ Yes ☐ No	☐ Yes ☐ No		
	☐ Yes ☐ No	☐ Yes ☐ No		
	☐ Yes ☐ No	☐ Yes ☐ No		
	☐ Yes ☐ No	☐ Yes ☐ No		

DISCHARGE OF SEDIMENT OR OTHER POLLUTANT AND UPDATES

Were discharges of sediment or other pollutants observed during inspection? ☐ Yes ☐ No If yes, is the discharge to an impaired waterbody? ☒ Yes ☐ No

If discharge is observed, please explain. Include locations of discharges and a description and dates of completed corrective actions: _____

PROJECT CONTACT COMMUNICATION

Name/Position: _____ Date: _____

Summary: _____



Butte-Silver Bow Public Works Department

FORM #6a—CONSTRUCTION SITE STORM WATER INSPECTION FREQUENCY DETERMINATION PROTOCOL FOR SITES **GREATER THAN OR EQUAL TO 1-ACRE** (CONSTRUCTION)

BSB Permit
No.: _____

Name of Project: _____

Total Project Acres: _____ Address: _____

Total Disturbed Acres: _____ City/State: _____ Zip: _____

Contractor: _____ Address: _____

Phone: _____ City/State: _____ Zip: _____

Date of Frequency Analysis: _____

Frequency Analysis Conducted By: _____

CONSTRUCTION SITE RATING TABLE

Fill out Construction Site Rating Table and Add up the applied ratings. Then utilize the Inspection Frequency Determination Table to determine the inspection priority for the site.

Criteria	Rating System	Rating Value	Applied Rating for Each Criteria
Project Size	Less Than 2 Acres	1	
	2 to 10 Acres	2	
	10+ Acres	3	
Proximity to Storm Water Infrastructure	100+ Feet From MS4	1	
	20 to 100 Feet From MS4	2	
	Less Than 20 Feet From MS4	3	
Proximity to Impaired Water Body	1,500+ Feet	1	
	200 to 1,500 Feet	2	
	Less than 200 Feet	3	
Project Site Slopes	Generally Level	1	
	Site Slopes Predominately 8-15%	2	
	Site Slopes Predominately >15%	3	
Quality of Permit Application	No Corrections Required	1	
	One Rejection of Permit Application	2	
	Two Rejections of Permit Application	3	
Past History of Operator Compliance	No History of Non-Compliance	1	
	Received a Notice of Violation Within the Last Two Years	2	
	Received Two or More Notices of Violations or One Stop Work Order Within the Last Two Years	3	

Total ÷ 6



Butte-Silver Bow Public Works Department

INSPECTION FREQUENCY DETERMINATION TABLE

The total of all the ratings will indicate the priority of the inspection for this construction site. The following is a suggested template which could be used to define inspection frequency based on site priority:

Average Value	Priority	Inspection Frequency
1 to 1.5	Low	1. Once a Month
		2. Once Within 48 Hours After One Rain Event of 1" or Greater
		3. Once at the Conclusion of the Project Before Finalization
1.5 to 2	Medium	1. Once a Month
		2. Once Within 48 Hours After One Rain Event of 0.5" or More
		3. Once at the Conclusion of the Project Before Finalization
2 to 3	High	1. Once a Month
		2. Once at Commencement of Construction after BMPs Have Been Implemented
		3. Once Within 48 Hours After One Rain Event of 0.25" or Greater
		4. Once Within 48 Hours After Each Snowmelt Due to Thawing Conditions that Cause Visible Surface Erosion on Site
		5. Once at the Conclusion of the Project Prior to Finalization

Site Priority: _____



Butte-Silver Bow Public Works Department

FORM #6b—CONSTRUCTION SITE STORM WATER INSPECTION FREQUENCY DETERMINATION PROTOCOL FOR SITES **LESS THAN OR EQUAL TO 1-ACRE** (CONSTRUCTION)

BSB Permit
No.: _____

Name of Project: _____

Address: _____ City/State: _____ Zip: _____

Contractor: _____ Phone: _____

Address: _____ City/State: _____ Zip: _____

Date of Frequency Analysis: _____

Frequency Analysis Conducted By: _____

CONSTRUCTION SITE RATING TABLE

Fill out Construction Site Rating Table and Add up the applied ratings. Then utilize the Inspection Frequency Determination Table to determine the inspection priority for the site.

Criteria	Rating System	Rating Value	Applied Rating for Each Criteria
Project Size	Less Than 0.4 Acres	1	
	0.4 to 0.8 Acres	2	
	0.8-0.99 Acres	3	
Proximity to Storm Water Infrastructure	100+ Feet From MS4	1	
	20 to 100 Feet From MS4	2	
	Less Than 20 Feet From MS4	3	
Proximity to Impaired Water Body	1,500+ Feet	1	
	200 to 1,500 Feet	2	
	Less than 200 Feet	3	
Project Site Slopes	Generally Level	1	
	Site Slopes Predominately 8-15%	2	
	Site Slopes Predominately >15%	3	
Quality of Permit Application	No Corrections Required	1	
	One Rejection of Permit Application	2	
	Two Rejections of Permit Application	3	
Past History of Operator Compliance	No History of Non-Compliance	1	
	Received a Notice of Violation Within the Last Two Years	2	
	Received Two or More Notices of Violations or One Stop Work Order Within the Last Two Years	3	

Total ÷ 6



Butte-Silver Bow Public Works Department

INSPECTION FREQUENCY DETERMINATION TABLE

The total of all the ratings will indicate the priority of the inspection for this construction site. The following is a suggested template which could be used to define inspection frequency based on site priority:

Average Value	Priority	Inspection Frequency
1 to 1.5	Low	1. 20% Chance of Being Inspected Per Month
1.5 to 2	Medium	1. 50% Chance Inspection Per Month
		2. Once Within 48 Hours After One Rain Event of 0.5" or More
		3. Once at the Conclusion of the Project Before Finalization
2 to 3	High	1. Once a Month
		2. Once at Commencement of Construction after BMPs Have Been Implemented
		3. Once Within 48 Hours After One Rain Event of 0.25" or Greater
		4. Once Within 48 Hours After Each Snowmelt Due to Thawing Conditions that Cause Visible Surface Erosion on Site
		5. Once at the Conclusion of the Project Prior to Finalization

Site Priority: _____

APPENDIX C

BUTTE HILL SAMPLE SEED MIX

BUTTE HILL SAMPLE SEED MIX

Common Name	Species	% mix	Desired Seeds/SF	Seeds/lb.	lbs PLS/acre
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	30%	30	117,500	11.12
Idaho fescue	<i>Festuca idahoensis</i>	37%	37	450,000	3.58
Rough fescue	<i>Festuca scabrella</i>	9%	9	200,000	1.96
Prairie junegrass	<i>Koeleria macrantha</i>	9%	9	2,300,000	0.17
Sandberg bluegrass	<i>Poa sandbergii</i>	10%	10	925,000	0.47
Quick guard (sterile triticale)	<i>Triticale</i>	3%	3	22,700	5.76
Blue flax	<i>Linum lewisii</i>	1%	1	233,750	0.19
Rubber rabbitbrush	<i>Ericameria nauseosa</i>	1%	1	693,000	0.06
Grand Totals		100%	100		23.3

Note- Quick guard is an excellent cover crop that will give a quick green up and cover but will not reproduce and will fall out of the mix within a year or so.

Appendix G
Post Construction Inspections



Butte-Silver Bow Public Works Department

FORM #5—CONSTRUCTION SITE VISIT STORM WATER INSPECTION FORM (CONSTRUCTION)

GENERAL INFORMATION

MTR 108105

Project Name: Iron Mtn Storage Location: 1750 Motor View Rd
Date of Inspection: 12/14/2022 Start/End Time: 1500/1510
Inspector's Name(s): OL, KW Inspector's Title(s): _____
Inspector's Phone: _____ Phase of Construction: Post

Type of Inspection:

- ☐ Beginning of Construction ☐ Pre-Storm Event ☐ During Rain Event ☐ Post-Rain Event
☐ Routine ☐ Random ☒ Conclusion of Project ☐ Response to Violation or Complaint

Weather Conditions at Time of the Inspection:

- ☐ Clear ☐ Cloudy ☐ Rain ☐ Sleet ☐ Fog ☒ Snowing ☐ High Winds
☐ Other: _____ Temperature: 25°F

Is a Storm Water Discharge Occurring? ☐ Yes ☒ No Observations: _____

If Yes, is the Discharge to an Impaired Waterbody? ☐ Yes ☐ No

INSPECTION FINDINGS

Major Construction Activities at the Time of the Inspection: _____

Construction ended
winter conditions on site. Silt Fence in NW
corner of site needs to be removed.



Butte-Silver Bow Public Works Department

Pollutants Present at the Time of the Inspection:

Soils

- ☐ Areas of Shallow Grade (3:1 or less)
- ☐ Areas of Steep Grade (3:1 or greater)
- ☐ Slopes
- ☐ Ditch
- ☐ Stockpiles
- ☐ Contaminated Soils
- ☐ Import & Export Operations
- ☐ Entrance/Exit Locations
- ☐ Other: _____

Materials

- ☐ Loading & Unloading Operations
- ☐ Storage of Building Materials
- ☐ Storage of Chemicals
- ☐ Portable Toilets
- ☐ Concrete Batch Plant
- ☐ Asphalt Batch Plant
- ☐ Worker Trash
- ☐ Demolition Materials/Debris
- ☐ Other: _____

Activities

- ☐ Concrete Truck Washout
- ☐ Masonry—Stone/Brick/Concrete
- ☐ Spray/Wand Applications
- ☐ Finish Work—Drywall/Painting
- ☐ Equipment Washing
- ☐ Washing of Buildings
- ☐ Maintenance of Equipment
- ☐ Refueling Operations
- ☐ Application of Herbicides, Pesticides, Fertilizers
- ☐ Application of Solvents or Detergents
- ☐ Construction Dewatering
- ☐ Other: _____

BMPs Present at the Time of the Inspection:

Erosion Control BMPs

- ☐ Surface Roughening
- ☐ Diversion Ditches
- ☐ Velocity Checks/Check Dams
- ☐ Preservations of Existing Vegetation
- ☐ Minimizing Ground Disturbance
- ☐ Mulch—Straw/Compost
- ☐ Tackifiers/Soil Binders
- ☐ Temporary Seeding
- ☐ Erosion Control Blankets
- ☐ Rough Cut Street Controls/Water Bars
- ☐ Channel Liner
- ☐ Stream Crossing
- ☐ Terracing
- ☐ Culvert
- ☐ Outfall/Outlet Protection (Rip Rap)
- ☐ Other: _____

Administrative Controls

- ☐ Concrete and Liquid Waste Washouts
- ☐ Worker Toilets
- ☐ Construction Fencing
- ☐ Dust Control
- ☐ Secondary Containment
- ☐ Dumpsters/ Waste Receptacles
- ☐ Stabilized Staging Area
- ☐ Material Storage and Stockpile Area
- ☐ Paving and Painting Controls
- ☐ Saw Cutting and Grinding Controls
- ☐ Spill Prevention and Response Procedures
- ☐ Traffic Control
- ☐ Back Charging/Penalties
- ☐ Other: _____

Run On/Runoff Control BMPs

- ☐ Temporary Slope Drain
- ☐ Rock Run Down
- ☐ Clean Water Diversion
- ☐ Drainage Swales
- ☐ Other: _____

Sediment Control BMPs

- ☒ Silt Fence
- ☐ Straw Wattles
- ☐ Rock Wattles/Rock Socks
- ☐ Curb Socks
- ☐ Straw Bales
- ☐ Earthen Berms
- ☐ Vegetative Buffers
- ☐ Drainage Ditch/Ditch Berm
- ☐ Gravel Pack
- ☐ Tarps, Plastic, Visqueen
- ☐ Compost Socks
- ☐ Brush Barrier
- ☐ Sandbag Barrier
- ☐ Inlet Protection
- ☐ Vehicle Tracking Control Pad
- ☐ Stabilization Vehicle Entrance
- ☐ Stabilization Parking Area
- ☐ Stabilization Construction Roadway
- ☐ Street Sweeping
- ☐ Sediment Trap
- ☐ Sediment Basin
- ☐ Other: _____

Post Construction BMPs

- ☐ Detention Pond(s)
- ☐ Retention Pond(s)
- ☐ Drainage Swales
- ☐ Infiltration System(s)
- ☐ Dry Well(s)
- ☐ Other: _____



Butte-Silver Bow Public Works Department

BMP MAINTENANCE AND CORRECTIVE ACTIONS

BMP Requiring Maintenance and/or Corrective Actions and Location of BMP	Maintenance Needed?	Corrective Action Required?	Date When Maintenance or Corrective Action(s) are Completed	Description of Corrective Action
Remove silt fence in NW corner	☐ Yes ☐ No	☒ Yes ☐ No		
	☐ Yes ☐ No	☐ Yes ☐ No		
	☐ Yes ☐ No	☐ Yes ☐ No		
	☐ Yes ☐ No	☐ Yes ☐ No		

DISCHARGE OF SEDIMENT OR OTHER POLLUTANT AND UPDATES

Were discharges of sediment or other pollutants observed during inspection? ☐ Yes ☒ No If yes, is the discharge to an impaired waterbody? ☒ Yes ☐ No

If discharge is observed, please explain. Include locations of discharges and a description and dates of completed corrective actions: _____

PROJECT CONTACT COMMUNICATION

Name/Position: _____ Date: _____

Summary: _____

Appendix H
Standard Operating Procedures



Butte-Silver Bow MS4 Program Standard Operating Practices (SOP) 2023

ID	Division	SOP
SOP #1	MS4	Construction and post-construction inspections
SOP #2	MS4	Sampling (MS4 Permit Part IV Monitoring)
SOP #3	MS4	Annual review of Storm Water Management Plan (SWMP)
SOP #4	MS4	Annual review of existing SOPs / BMPs
SOP #5	MS4	Inform new BSB employees about BSB storm water
SOP #6	Operations	Outfall Inspections
SOP #7	Operations	Inlet/catch basin & storm drain system cleaning
SOP #8	Operations	Sanitary Sewer Overflow (SSO's)
SOP #9	Road Dept	Track-out management
SOP #10	Road Dept	Snow removal / Storage
SOP #11	Road Dept	Chip / Crack sealing & pothole patching and Paving & milling / Overlay procedures
SOP #22	Road Dept	Equipment Fueling
SOP #29	Road Dept	Salt Storage
SOP #30	Road Dept	Street Sweeping & Flushing
SOP #31	Road Dept	Parking lot maintenance (Municipal Building)
SOP #12	Maintenance Center	Metals recycling
SOP #13	Maintenance Center	Oil cleanup procedure (minor spills)
SOP #14	Maintenance Center	Oil filter recycling
SOP #15	Park & Rec	Mowing procedures / Grass disposal
SOP #16	Park & Rec	Swimming pool drain-down
SOP #17	Park & Rec	Pool chlorine storage & handling
SOP #22	Park & Rec	Equipment Fueling
SOP #25	Park & Rec	Fertilizer storage, handling, application, & cleanup
SOP #27	Park & Rec	Pet waste management
SOP #28	Park & Rec	Irrigation
SOP #26	Park & Rec	Herbicide storage, handlind, application, & cleanup
SOP #18	Water Dept	Hydrant flushing/Blowoff flushing
SOP #19	Water Dept	Materials management / Chemical storage
SOP #20	Water Dept	Water Main Breaks & Repairs
SOP #22	Water Dept	Equipment Fueling
SOP #23	Water Dept	Materials Management
SOP #21	Fire/Operations	Illicit Discharge Detection & Elimination
SOP #22	Metro	Equipment Fueling
SOP #23	Metro	Materials Management
SOP #24	Metro	Outfall / Pond Maintenance
SOP #32	Metro	Root Killer (foam) application and management



THE CITY-COUNTY OF Butte-Silver Bow

SOP #01
Public Works
Metro Sewer MS4 Program
Construction & Post-Construction Inspections

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Construction and post-construction projects conducted with in the MS4 must be inspected to ensure compliance with storm water regulations.
Operating Best Management Practices (BMPs) needed:	1. Follow construction and post-construction inspection protocols. 2. Use a photo log and inspection form to document findings. 3. Enforcement follow-up recommendations as appropriate. 4. Supervisor reviews documentation. 5. Distribute report to responsible parties.
Administrative BMPs needed:	1. Establish notification chain-of-command if issues are present.
Safety:	1. PPE (boots, high-visibility clothing, gloves) 2. Traffic & equipment awareness
Responsible Staff:	Supervisor
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>

SOP #01
Public Works
Metro Sewer MS4 Program
Construction & Post-Construction Inspections

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

SOP #01
Public Works
Metro Sewer MS4 Program
Construction & Post-Construction Inspections

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

MS4 Technician

(406) 497 – 6563



THE CITY-COUNTY OF Butte-Silver Bow

SOP #02
Public Works
Metro Sewer MS4 Program
Sampling

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Outfalls to the municipal storm water system need to be sampled during a storm water event twice yearly.
Operating Best Management Practices (BMPs) needed:	1. Use an equipment checklist and Outfall Location Map. 2. Follow MS4 Permit Part IV Monitoring, Recording and Reporting Requirements (pages 42-49 of 63). 3. Package and ship samples.
Administrative BMPs needed:	1. Training on proper sampling techniques. 2. Implement proper sample storage techniques. 3. Document results; share with SWMP Team.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves, respirator may be needed for dust). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Surface water safety/awareness.
Responsible Staff:	Technician
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

WET Project Manager (P. Hamblock)

(406) 723 – 1525



THE CITY-COUNTY OF Butte-Silver Bow

SOP #03
Public Works
Metro Sewer MS4 Program
Annual Review of Storm Water Management Plan

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	The Storm Water Management Plan (SWMP) needs to be reviewed on an annual basis for accuracy and relevancy.
Operating Best Management Practices (BMPs) needed:	1. Review SWMP and revise, if needed. 2. Distribute updated copies when requested. 3. Track/document: Revision Number, Effective Date, and Significant Changes in the "Revision History" section of the SOP form.
Administrative BMPs needed:	1. Schedule reviews to be conducted annually.
Safety:	Not Applicable
Responsible Staff:	Supervisor, Technician
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

MS4 Technician

(406) 497 – 6563



THE CITY-COUNTY OF Butte-Silver Bow

SOP #04
Public Works
Metro Sewer MS4 Program
Annual Review of Existing SOPs/BMPs

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	The Standard Operating Procedures (SOPs) need to be reviewed on an annual basis for accuracy and relevancy.
Operating Best Management Practices (BMPs) needed:	1. Distribute current copies of existing SOPs to Supervisors. 2. Supervisors review SOP for accuracy and relevancy, then revise. 3. Revised draft copies will be returned to Public Works Operations Supervisor to be finalized. 4. Public Works distribute revised copies. 5. Track/document: Revision Number, Effective Date, and Significant Changes in the "Revision History" section of the SOP form.
Administrative BMPs needed:	1. Schedule reviews to be conducted annually.
Safety:	Not Applicable
Responsible Staff:	Environmental Services Personnel
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

SOP #04
Public Works
Metro Sewer MS4 Program
Annual Review of Existing SOPs/BMPs

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

MS4 Technician

(406) 497 – 6563



THE CITY-COUNTY OF Butte-Silver Bow

SOP #05
Public Works
Metro Sewer MS4 Program
New BSB Employee Training

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Conduct storm water awareness training, at a minimum, during 1 st and 4 th years of permit term for all appropriate permittee field staff (and pretreatment inspection staff) and staff who work at permittee facilities. The training must provide education regarding storm water impacts, the MS4 permit, the detection and elimination of illicit discharges and the implementation of the ERP, and specifically address BMPs necessary to minimize discharges of pollutants during permit activities or the operation of permittee facilities. Appropriate new field staff and staff who work at permittee facilities must receive the equivalent amount of training within 90 days of the hire date.
Operating Best Management Practices (BMPs) needed:	1. BSB Human Resource Department will include STORM WATER IN BUTTE SILVER BOW in new-hire packets.
Administrative BMPs needed:	1. Review annually.
Safety:	Not-Applicable
Responsible Staff:	BSB Human Resource Department
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>

Attachment:

STORM WATER IN BUTTE SILVER BOW

References:

BSB Storm Water Management Program (SWMP)

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

H.R. Personnel

(406) 497 – 6433



THE CITY-COUNTY OF Butte-Silver Bow

STORM WATER IN BUTTE-SILVER BOW

Regulatory Background

The City and County of Butte-Silver Bow (BSB) is covered by a *General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)*. In 1972 the Clean Water Act established the National Pollutant Discharge Elimination System (NPDES) permit that determined urban runoff was impacting national waterways. In 1990 medium and large cities >100,000 population (like New York City) were required to manage their storm water. Then in 1999, small urban areas >10,000 population had to follow suit. The Environmental Protection Agency (EPA) authorized the Montana Department of Environmental Quality (MDEQ) to administer the MS4 program in our state. Butte, along with 6 other cities (Billings, Missoula, Kalispell, Great Falls, Helena, Bozeman), 3 counties (Yellowstone Co, Cascade Co, Missoula Co) and 3 untraditional permittees (Malmstrom Air Force Base, Montana State University, and the University of Montana) are required to manage their storm water.

Receiving Waters

Butte-Silver Bow has identified the following streams (defined as "receiving waters" in the MS4 permit) within its permit boundary:

- 1.) Silver Bow Creek
- 2.) Blacktail Creek
- 3.) Sand Creek
- 4.) Basin Creek
- 5.) Grove Gulch Creek

All identified receiving waters receive storm water from the BSB storm sewer system; as a result, they must be protected from potential storm water pollutants.

MS4 Program Goals

The overall goal of the MS4 program is to *"...reduce the discharge of pollutants from the permitted Small MS4s to the maximum extent practicable (MEP) to protect water quality..."* Butte complied with this goal by developing a Storm Water Management Program (SWMP). BSB's SWMP works to reduce pollutants in storm water by addressing six Control Measures:

1. Public Education & Outreach on Storm Water Impacts
2. Public Involvement/Participation
3. Illicit Discharge Detection and Elimination (IDDE)



THE CITY-COUNTY OF Butte-Silver Bow

4. Construction Site Storm Water Runoff Control
5. Post-Construction Site Storm Water Runoff Control
6. Pollution Prevention/Good Housekeeping for Municipal Operations

Legal Authority

BSB has legal authority to manage their storm water because in May 2011 the Ordinance No. 10-13 was passed by the BSB Council of Commissioners.

Ordinance highlights include:

- Objectives & definitions provide BSB with the legal authority to require storm water controls.
This is important because it provides a way to make the offenders address pollutant discharges.
- Lists permit requirements and defines review times.
This is important because all development projects are required to follow the same set of rules.
- Establishes Engineering Standards.
This is important because engineers need to know what rules to follow.
- Prohibits illegal discharges/illicit connections.
This is important because we do not want wastewater, paint, motor-oil, antifreeze, or concrete wash-out to comeingle with stormwater.
- Established a Storm Water Utility Fund.
This is important because it costs money for infrastructure to ensure our waterways are clean. BSB residents are charged a flat fee of \$15/year per parcel. Commercial and industrial sites are charged a per square-foot fee.

Employee Responsibilities

As a new BSB employee what do you need to know and understand about storm water?

1. Stormwater runoff is transported through the BSB storm sewer system and discharges **untreated** into area receiving waters.
2. If sediment (dirt, soil, road sand, etc.) or pollutants (paint, motor-oil, antifreeze, concrete wash-out) enter the storm system they discharge **directly** into area receiving waters.



THE CITY-COUNTY OF Butte-Silver Bow

3. When streets are flushed without covering the storm inlet, sediment and garbage is transported through BSB storm sewer systems and discharges **untreated** storm water into area receiving waters.
4. When drain inlets are paved over without covering, asphalt accumulates in the bottom of the inlet and makes maintenance difficult, allowing storm water to commingle with the asphalt and discharges **directly** into area receiving waters.
5. When water leaks are fixed without containing the discharge water, sediment laden water is transported through BSB storm sewer system and discharges **untreated** storm water into area receiving waters.
6. When a construction project disturbs soil and storm water controls and BMP's are not used, sediment laden water gets into the storm drain and discharges **directly** into area receiving waters.

As a new employee of BSB, you are now part of the STORMWATER TEAM. If you have a storm water concern, idea for improvement in your daily work tasks, or if you observe illegal discharges/illicit connection, please contact: Matt Moore at (406) 497-6563.

Help us protect our \$1 Billion (\$1,000,000,000) investment in the restoration of Silver-Bow/Clark Fork corridor.

CITY OF BUTTE

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 1: Background Data

Subwatershed:		Outfall ID:	
Today's date:		Time (Military):	
Investigators:		Form completed by:	
Temperature (°F):	Rainfall (in.):	Last 24 hours:	Last 48 hours:
Latitude:	Longitude:	GPS Unit:	GPS LMK #:
Camera:		Photo #s:	
Land Use in Drainage Area (Check all that apply): ☐ Industrial ☐ Ultra-Urban Residential (High Density) ☐ Suburban Residential ☐ Commercial ☐ Open Space ☐ Institutional ☐ Golf Course Other: _____ Known Industries: _____			
Notes (e.g., origin of outfall, if known):			

Section 2: Outfall Description

LOCATION	MATERIAL	SHAPE	DIMENSIONS (IN.)	SUBMERGED
☐ Pipe	☐ RCP ☐ CMP ☐ PVC ☐ HDPE ☐ Steel ☐ Other: _____	☐ Circular ☐ Single ☐ Elliptical ☐ Double ☐ Box ☐ Triple ☐ Other: _____ ☐ Other: _____	Diameter/Dimensions: _____ _____	In Water: ☐ No ☐ Partially ☐ Fully With Sediment: ☐ No ☐ Partially ☐ Fully
☐ Open drainage	☐ Concrete ☐ Earthen ☐ rip-rap ☐ Other: _____	☐ Trapezoid ☐ Parabolic ☐ Other: _____	Depth: _____ Top Width: _____ Bottom Width: _____	
☐ In-Stream	(applicable when collecting samples)			
Flow Present?	☐ Yes ☐ No <i>If No, Skip to Section 5</i>			
Flow Description (If present)	☐ Trickle ☐ Moderate ☐ Substantial			

Section 3: Quantitative Characterization

FIELD DATA FOR FLOWING OUTFALLS				
PARAMETER	RESULT	UNIT	EQUIPMENT	
☐ Flow #1	Volume	Liter	Bottle	
	Time to fill	Sec		
☐ Flow #2	Flow depth	In	Tape measure	
	Flow width	Ft, In	Tape measure	
	Measured length	Ft, In	Tape measure	
	Time of travel	S	Stop watch	
Temperature		°F	Thermometer	
pH		pH Units	Test strip/Probe	
Conductivity		EC	Probe	
Ammonia		mg/L	Test strip	

CITY OF BUTTE

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

Section 4: Physical Indicators for Flowing Outfalls Only

Are Any Physical Indicators Present in the flow? ☐ Yes ☐ No (If No, Skip to Section 5)

INDICATOR	CHECK if Present	DESCRIPTION	RELATIVE SEVERITY INDEX (1-3)		
Odor	☐	☐ Sewage ☐ Rancid/sour ☐ Petroleum/gas ☐ Sulfide ☐ Other:	☐ 1 – Faint	☐ 2 – Easily detected	☐ 3 – Noticeable from a distance
Color	☐	☐ Clear ☐ Brown ☐ Gray ☐ Yellow ☐ Green ☐ Orange ☐ Red ☐ Other:	☐ 1 – Faint colors in sample bottle	☐ 2 – Clearly visible in sample bottle	☐ 3 – Clearly visible in outfall flow
Turbidity	☐	See severity	☐ 1 – Slight cloudiness	☐ 2 – Cloudy	☐ 3 – Opaque
Floatables -Does Not Include Trash!!	☐	☐ Sewage (Toilet Paper, etc.) ☐ Suds ☐ Petroleum (oil sheen) ☐ Other:	☐ 1 – Few/slight; origin not obvious	☐ 2 – Some; indications of origin (e.g., possible suds or oil sheen)	☐ 3 – Some; origin clear (e.g., obvious oil sheen, suds, or floating sanitary materials)

Section 5: Physical Indicators for Both Flowing and Non-Flowing Outfalls

Are physical indicators that are not related to flow present? ☐ Yes ☐ No (If No, Skip to Section 6)

INDICATOR	CHECK if Present	DESCRIPTION	COMMENTS
Outfall Damage	☐	☐ Spalling, Cracking or Chipping ☐ Peeling Paint ☐ Corrosion	
Deposits/Stains	☐	☐ Oily ☐ Flow Line ☐ Paint ☐ Other:	
Abnormal Vegetation	☐	☐ Excessive ☐ Inhibited	
Poor pool quality	☐	☐ Odors ☐ Colors ☐ Floatables ☐ Oil Sheen ☐ Suds ☐ Excessive Algae ☐ Other:	
Pipe benthic growth	☐	☐ Brown ☐ Orange ☐ Green ☐ Other:	

Section 6: Overall Outfall Characterization

☐ Unlikely ☐ Potential (presence of two or more indicators) ☐ Suspect (one or more indicators with a severity of 3) ☐ Obvious

Section 7: Data Collection

1. Sample for the lab?	☐ Yes ☐ No
2. If yes, collected from:	☐ Flow ☐ Pool
3. Intermittent flow trap set?	☐ Yes ☐ No If Yes, type: ☐ OBM ☐ Caulk dam

Section 8: Any Non-Illicit Discharge Concerns (e.g., trash or needed infrastructure repairs)?

Adapted from the Illicit Discharge Detection and Tracking Guide: Outfall Reconnaissance Inventory Form, by the Center for Watershed Protection



THE CITY-COUNTY OF Butte-Silver Bow

SOP #06
Public Works
Metro Sewer MS4 Program
Outfall Inspections

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Outfalls to the municipal storm water system need to be inspected during dry weather conditions to ensure illicit discharges are not evident/present.
Operating Best Management Practices (BMPs) needed:	1. Use an inspection checklist and document with photographs. 2. If flow is present, use inspection form to document details; collect lab sample as appropriate. 3. Determine enforcement response if an illicit source is present. 4. Initiate an IDDE investigation as appropriate.
Administrative BMPs needed:	1. Schedule inspection during dry-weather conditions. 2. Establish notification chain-of-command (emergency vs. non-emergency) if illicit discharge is present. 3. Coordinate an enforcement response plan (ERP) with involved agencies/jurisdictions.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves, high visibility clothing). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Hepatitis A (2 doses 6 months apart), Hepatitis B (series of 3 doses, dose 1 and 2, 1 month apart; doses 2 and 3, 6 months apart), and Tetanus/Diphtheria/Pertussis (one shot) 4. Surface water safety/awareness.
Responsible Staff:	Public Works
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

SOP #06
Public Works
Metro Sewer MS4 Program
Outfall Inspections

Attachment:

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

References:

MS4 Outfall Inspection Plan
Enforcement Response Plan (ERP)

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

SOP #06
Public Works
Metro Sewer MS4 Program
Outfall Inspections

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Crew Foreman

(406) 497 – 6550



THE CITY-COUNTY OF Butte-Silver Bow

SOP #07
Public Works

Metro Sewer MS4 Program
Inlet/Catch Basin & Storm Drain System Cleaning

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Inlet/catch basin and storm drain system cleaning projects have the potential to add pollutants to storm water.
Operating Best Management Practices (BMPs) needed:	1. Vacuum trucks are used for inlet/catch basin and storm drain system cleaning. 2. Transfer sediment/sludge to disposal area without spillage. 3. If spillage occurs during transfer, ensure material does not enter storm water controls (i.e., storm inlets). 4. Collect debris/trash and dispose at BSB Landfill. 5. Sweep streets after project completion if sediment is present.
Administrative BMPs needed:	1. Training on proper/safe vacuum truck operation. 2. Storm drain system cleaning (inlet/catch basin) is completed as schedules allow. 3. Progress is documented. 4. Arrange for sediment/trash/debris disposal at BSB Landfill.
Safety:	1. PPE (safety glasses, hard hat, field gloves, high visibility clothing). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Equipment (vacuum truck) awareness.
Responsible Staff:	Supervisor, Operator, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u>

SOP #07
Public Works
Metro Sewer MS4 Program
Inlet/Catch Basin & Storm Drain System Cleaning

Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>
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Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Crew Foreman

(406) 497 – 6550



THE CITY-COUNTY OF Butte-Silver Bow

SOP #08
Public Works
Metro Sewer MS4 Program
Sanitary Sewer Overflow (SSO's)

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction: ¹ https://www.epa.gov/npdes/sanitary-sewer-overflows-ssos	Sanitary sewer overflow (SSOs) causes include blockages, line breaks, sewer defects that allow storm water and groundwater to overload the system, power failures, improper sewer design, and vandalism ¹ . SSO contains pollutants harmful to humans and the environment and must be separated from the storm water system.
Operating Best Management Practices (BMPs) needed:	1. Conduct routine sanitary system cleaning and maintenance to reduce frequency of SSO's. 2. Limit fats, oils and grease (FOG) present in the sanitary system. 3. Educate the public on how FOG and certain household products impact the sanitary system. 4. Reasonable containment methods may include: vacuuming with combination cleaner, building a dike/berm, sandbagging, or bypass pumping to another sanitary sewer main. 5. Hydraulic (combination cleaner) equipment will be used to relieve pipe blockage. 6. Spillage will be raked or vacuumed to ensure material does not enter storm water controls (i.e., storm inlets).
Administrative BMPs needed:	1. Establish notification chain-of-command if SSO is present. 2. Supervisor will determine staffing and equipment needs. 3. Sanitary sewer overflow locations are documented by Waste Water treatment Plant Supervisor (see attached).
Safety:	1. PPE (ear protection, safety glasses, hard hat, field gloves, high visibility clothing). 2. Hepatitis B shot. 3. Traffic awareness. Be aware of any vehicles entering/exiting the area. 4. Equipment awareness.
Responsible Staff:	Supervisor, Operator, Laborer

SOP #08
Public Works
Metro Sewer MS4 Program
Sanitary Sewer Overflow (SSO's)

Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

Attachment:
SSO's for 2017 & 2018

References:

SSO general information (links to *Overview, Additional Resources, & Frequent Questions*)
<https://www.epa.gov/npdes/sanitary-sewer-overflows-ssos>

Revision History:

Revision Number	Effective Date	Significant Changes

SOP #08
Public Works
Metro Sewer MS4 Program
Sanitary Sewer Overflow (SSO's)

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Crew Foreman

(406) 497 – 6550



THE CITY-COUNTY OF Butte-Silver Bow

SOP #09
Public Works
Metro Sewer MS4 Program
Track-Out Management

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Track-out management consists of cleaning the sediment that is tracked onto adjacent roadways; sediments have the potential to impact the storm water system.
Operating Best Management Practices (BMPs) needed:	1. Avoid sweeping sediment into storm inlets, or protect inlets with inlet protection device. 2. Install track pad if warranted.
Administrative BMPs needed:	1. Schedule seasonal routine (daily, twice weekly, weekly, and/or post-storm event). 2. Establish notification chain-of-command when tracking is observed. 3. Arrange for proper sediment disposal per MDEQ requirements (see * attached).
Safety:	1. PPE (ear protection, safety glasses, hard hat, field gloves, respirator may be needed for dust). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Equipment awareness.
Responsible Staff:	Laborer
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity Oil and Grease
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Crew Foreman

(406) 497 – 6567

**Montana DEQ
Solid Waste Program**

Memo

To: Rick Thompson

From: Mary Louise Hendrickson

Date: August 17, 2009

Re: Street Sweepings – Reuse Policy

The Solid Waste Program (SWP) classifies street sweepings as solid waste subject to regulation in accordance with the Montana Solid Waste Management Act. Prior to the development of a reuse policy, the options for street sweepings management have been limited to either disposal or use as cover material at a licensed Class II landfill.

The SWP has developed this policy to provide an alternative to municipalities and other governmental entities that manage street sweepings. This policy makes it possible for these entities to manage street sweepings in an environmentally sound manner with a minimum of paperwork and expense, relative to prior management options.

For the purpose of this policy, “street sweepings” are those solid materials that are removed, at regular intervals, from city streets, parking lots, and other public ways in order to prevent these materials from being washed into storm sewers and surface waters. The term does not include material generated during the clean up of a spill or material from other structures associated with a road way such as catch basins. Street sweepings are typically composed of sand, salt, leaves and other debris and may contain trace amounts of metals and chemical pollutants associated with motorized traffic. Street sweepings are considered a solid waste that must be managed at a licensed facility unless chemical analysis supports the reuse of these materials. This policy will allow for the reuse of street sweepings as traction sand during icy and/or snowy conditions under the following provisions:

- Prior to reuse, street sweepings shall be sampled at a rate of one composite sample per every 500 yd³.
- Street sweepings shall be analyzed for the following parameters:
 - TCLP Metals
 - Common salts – saturated paste extraction: Calcium, Magnesium, Potassium, Sodium, Sulfate, Chloride
 - Extractable petroleum hydrocarbons (EPH)
 - Volatile petroleum hydrocarbons (VPH)
 - Asbestos
- Prior to reuse, street sweepings shall be screened to remove all trash, leaves, and other debris. The materials screened from the sweepings must be disposed of at a licensed facility.
- Street sweepings shall be stored in a manner protective of human health and the environment:
 - The sweepings shall be protected from wind and precipitation to the extent necessary to prevent dust, erosion, and off-site migration.
 - The sweepings shall not be stored in (1) a wetland, (2) within a 100-year floodplain, or (3) within 500-feet of a drinking water supply.
 - Storage shall incorporate best management practices and shall not result in the creation of a public nuisance.
 - Storage must be temporary. Street sweepings shall be used within one-year of collection unless the Department's Solid Waste Program approves an extension. The generator must request an extension and must demonstrate that all storage conditions will continue to be satisfied and the stored sweepings will be put to the specific identified use prior to the expiration of the extension period.
- The generator/user shall submit an annual report to the Solid Waste Program, by April 1 of each year, on a form provided by the Department that includes the following information:
 - Volume/tonnage of street sweepings reused
 - Analytical results of street sweepings prior to reuse
 - Disposition of solid waste resulting from the approved end use (location, date, etc...)



THE CITY-COUNTY OF Butte-Silver Bow

SOP#10
Public Works
Metro Sewer MS4 Program
Snow Removal/Storage

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Snow piles accumulate debris and pollutants which have the potential to impact the environment.
Operating Best Management Practices (BMPs) needed:	1. Remove and store snow to minimize the transport of pollutants from snowmelt into surface waters. 2. Store snow away from stormwater controls (i.e., storm inlets, drainage ditches) and surface waters. 3. Snow storage locations must allow for removal of accumulated debris, sand, road dirt, trash, and salts. 4. The Road Department snow storage locations are shown on Figure 1.
Administrative BMPs needed:	1. Training on proper snow handling, storage and safety procedures.
Safety:	1. PPE (ear protection, safety glasses, hard hat, field gloves). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Equipment awareness.
Responsible Staff:	Teamster, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> Nutrients: Phosphorus, Nitrogen <u>Metals</u> Bacteria Salinity <u>Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>

Attachment:

References:
BPSOU Snow Removal Plan

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

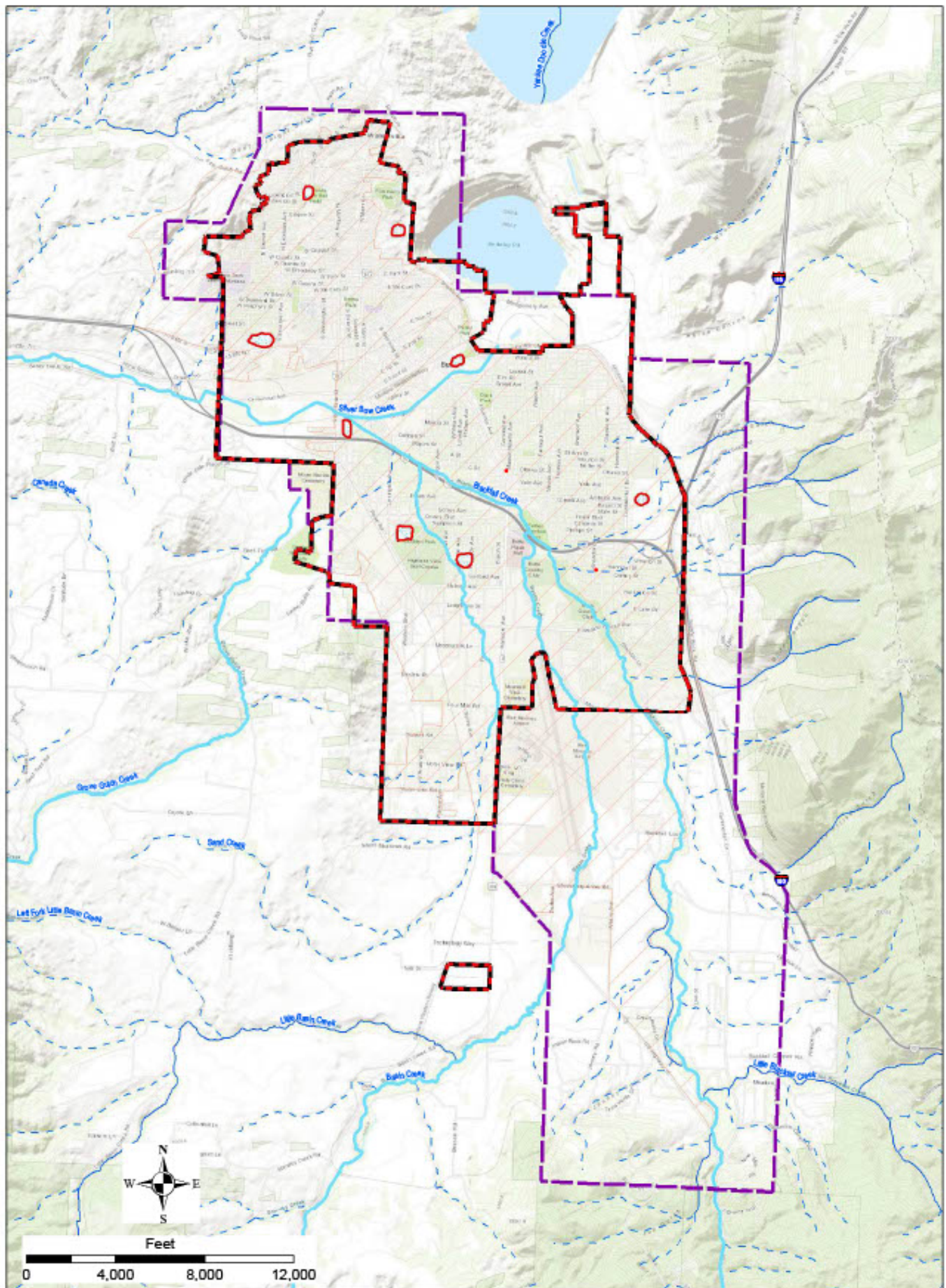
Phone:

MS4 Coordinator

(406) 497 – 6563

Crew Foreman

(406) 497 – 6567



Legend	
--- Sewer District Boundary (MS4 Boundary)	Receiving Waters
--- Urban Limit Boundary	--- Basin Creek
--- Census Urban Area	--- Blackfoot Creek
○ Snow Storage Sites	--- Grove Gulch Creek
--- Perennial Stream	--- Sand Creek
--- Intermittent Stream	--- Silver Bow Creek
--- Canal Ditch	



MS4- SOP SNOW STORAGE

City of Burne-Silver Bow County

Job#: BSBPWW41 T5

Date: 10/29/2018

Pub: BSBPWW41 (MS4- SOP) Figure 1, MS4 Boundary map, Silver Bow County

FIGURE 1



THE CITY-COUNTY OF Butte-Silver Bow

SOP #11
Public Works
Metro Sewer MS4 Program
Chip/Crack Sealing, Pothole Patching, Paving & Milling

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Chip/crack sealing, pothole patching, paving & milling/overlay projects have the potential to add pollutants to storm water.
Operating Best Management Practices (BMPs) needed:	1. Install inlet protection devices (i.e., filter bags) to ensure foreign material does not enter storm inlets. 2. Sweep streets after project completion if sediment is present. 3. Remove inlet protection devices when project is complete.
Administrative BMPs needed:	1. Establish notification chain-of-command if tracking is observed. 2. Supervisor will determine staffing and equipment needs. 3. Training on proper equipment operation/maintenance/safety procedures. 4. Training on proper BMP installation/maintenance procedures. 5. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves, high visibility clothing). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Equipment awareness.
Responsible Staff:	Supervisor, Operator & Laborer
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

SOP #11
Public Works
Metro Sewer MS4 Program
Chip/Crack Sealing, Pothole Patching, Paving & Milling

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Crew Foreman

(406) 497 – 6567



THE CITY-COUNTY OF Butte-Silver Bow

SOP #12
Public Works
Metro Sewer MS4 Program
Metals Recycling

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Stockpiles of metals, waiting to be recycled, have the potential to contribute pollutants to the storm water system.
Operating Best Management Practices (BMPs) needed:	1. Locate collection containers in an area protected from storm events (i.e., inside or outside under a roof). 2. Store metal to be recycled in a closed container (i.e., 15/30 cyd bins) away from any storm water controls (i.e., storm inlets).
Administrative BMPs needed:	1. Schedule frequent transfers to recycler so metal stockpile is limited in size. 2. Schedule routine inspections of bins/containers (i.e. leakage, structural damage).
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves).
Responsible Staff:	Laborer, Foreman
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen <u>Metals</u> Bacteria Salinity <u>Oil and Grease</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Maintenance Foreman

(406) 497 – 6569



THE CITY-COUNTY OF Butte-Silver Bow

SOP #13
Public Works
Metro Sewer MS4 Program
Oil Cleanup Procedure (Minor Spills)

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Oil, when mixed with stormwater, adds pollutants to the environment.
Operating Best Management Practices (BMPs) needed:	1. Determine size of spill (minor = less than 25 gallons; major = greater than 25 gallons). 2. Minor spills, which occur near a storm inlet, need inlet protection. 3. Minor spills (greater than 25 gallons), call 911 and MDEQ (800-457-0568).
Administrative BMPs needed:	1. Training on proper cleanup and safety procedures. 2. For a minor spill (25 gallons or less), apply floor dry to spill, sweep & dispose. 3. For a major spill (greater than 25 gallons), call 911 and MDEQ (800-457-0568). MDEQ must be notified of releases of greater than 25 gallons of any petroleum product such as: crude oil, gasoline, diesel fuel, aviation fuel, asphalt, road oil, & kerosene. 4. If a major spill occurs, notify personnel following chain-of-command. 5. Spill kits are located near the west overhead garage door in the Maintenance Building.
Safety:	1. PPE (steel toe boots, safety glasses, hard hat, field gloves, long sleeve shirt).
Responsible Staff:	Operator, Laborer
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen <u>Metals-Waste Oil</u> Bacteria Salinity

SOP #13
Public Works
Metro Sewer MS4 Program
Oil Cleanup Procedure (Minor Spills)

Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>
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Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Maintenance Foreman

(406) 497 – 6569



Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Stockpiles of oil filters, waiting to be recycled, have the potential to contribute pollutants to the environment.
Operating Best Management Practices (BMPs) needed:	1. Locate collection container indoors. 2. Locate collection container (i.e., 55-gallon drum) away from storm water controls (i.e., storm inlets, drainage ditches). 3. Label oil filter collection container. 4. Do not overfill collection container. 5. Provide secondary containment; sized to hold 1.5 times the storage capacity of oil filter collection container.
Administrative BMPs needed:	1. Schedule frequent transfers to recycler so oil filter collection is limited in size. 2. Schedule inspection routine to ensure collection container (i.e., 55-gallon drum) are structurally sound (i.e., without cracks, leaks, degradation).
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves).
Responsible Staff:	Laborer, other
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen <u>Metals</u> Bacteria

Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>
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Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Maintenance Foreman

(406) 497 – 6569



THE CITY-COUNTY OF Butte-Silver Bow

SOP #15
Public Works
Metro Sewer MS4 Program
Mowing Procedures/Grass Disposal

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Grass clippings have the potential to add pollutants to the environment. It is critical to ensure no grass clippings are directed towards the storm water system.
Operating Best Management Practices (BMPs) needed:	1. Mulching mowers are used. 2. Keep grass clippings off streets, sidewalks, driveways, and away from storm water controls (i.e., storm inlets). 3. Avoid having equipment wash water enter storm water controls (i.e., storm inlets).
Administrative BMPs needed:	1. Training on proper mowing/grass disposal and safety procedures. 2. Personnel are directed to call 911 in case of an emergency.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Equipment awareness (i.e., mower blades).
Responsible Staff:	Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> Metals Bacteria Salinity Oil and Grease Chlorine Oil and Grease
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

SOP #15
Public Works
Metro Sewer MS4 Program
Mowing Procedures/Grass Disposal

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:	Phone:
<u>MS4 Coordinator</u>	<u>(406) 497 – 6563</u>
<u>Park & Rec Director</u>	<u>(406) 497 – 6571</u>



THE CITY-COUNTY OF Butte-Silver Bow

SOP #16
Public Works
Metro Sewer MS4 Program
Swimming Pool Drain-down

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Proper procedures for draining the swimming pool are critical. Ensure all water is properly drained to the sanitary sewer with no leakage, as chlorine has the potential to impact the storm water system. Outdoor pools are located at Stodden Park, Clark Park (Splash), and Chester Steele Park (Wading Pool).
Operating Best Management Practices (BMPs) needed:	1. Outdoor pools are drained after Labor Day weekend
Administrative BMPs needed:	1. Stodden Pool has two outlets for pool water: a) to pond on golf course where water is re-used for irrigation after natural (exposure to air) de-chlorination process is complete, b) gravity fed to a holding tank and pumped to the sanitary sewer with treatment at the Butte-Silver Bow Waste Water Treatment Plant.
Safety:	1. PPE (boots, high-visibility clothing, gloves) 2. Hepatitis B shot 3. Traffic awareness
Responsible Staff:	Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Park & Rec Director

(406) 497 – 6571

CHLORINE : Lung Damaging Agent

CAS #: 7782-50-5

Common Names:

RTECS #: FO2100000

- Molecular chlorine

UN #: 1017 (Guide 124)

Agent Characteristics

- **APPEARANCE:** Greenish-yellow gas at room temperature; clear, amber-colored liquid under increased pressure or at temperatures below -30°F (-34°C).
- **DESCRIPTION:** Chlorine is a toxic gas with corrosive properties. It is widely used as bleach in the manufacture of paper and cloth and in manufacturing solvents, pesticides, synthetic rubber, and refrigerants. Chlorine has also been used as a chemical warfare choking agent. The lowest level at which humans can smell chlorine and notice its irritant properties generally provides sufficient warning of exposure; however, chronic exposure to chlorine causes adaptation of the sense of smell (olfactory fatigue) and tolerance to its irritant effects. Because of this, persons with a history of prolonged exposure lose the ability to identify when they are being exposed to chlorine. Chlorine is usually shipped in steel cylinders as a compressed liquefied gas.
- **METHODS OF DISSEMINATION:**
 - Indoor Air: Chlorine can be released into indoor air as a gas.
 - Water: Chlorine can be used to contaminate water.
 - Food: Food is an unlikely route of dissemination.
 - Outdoor Air: Chlorine can be released into outdoor air as a gas.
 - Agricultural: If chlorine is released as a gas, it is highly unlikely to contaminate agricultural products.
- **ROUTES OF EXPOSURE:** Inhalation is the main route of chlorine gas exposure. Contact with the escaping gas may cause frost bite. Compressed liquid can cause frostbite and/or chemical burns to the eyes and skin. Significant skin absorption or ingestion is unlikely. Chlorine is a gas at room temperature, making ingestion an unlikely route of exposure.

Personal Protective Equipment

- **GENERAL INFORMATION:** First Responders should use a NIOSH-certified Chemical, Biological, Radiological, Nuclear (CBRN) Self Contained Breathing Apparatus (SCBA) with a Level A protective suit when entering an area with an unknown contaminant or when entering an area where the concentration of the contaminant is unknown. Level A protection should be used until monitoring results confirm the contaminant and the concentration of the contaminant.
NOTE: Safe use of protective clothing and equipment requires specific skills developed through training and experience.
- **LEVEL A: (RED ZONE):** Select when the greatest level of skin, respiratory, and eye protection is required. This is the maximum protection for workers in danger of exposure to unknown chemical hazards or levels above the IDLH or greater than the AEGL-2.
 - A NIOSH-certified CBRN full-face-piece SCBA operated in a pressure-demand mode or a pressure-demand supplied air hose respirator with an auxiliary escape bottle.
 - A Totally-Encapsulating Chemical Protective (TECP) suit that provides protection against CBRN agents.
 - Chemical-resistant gloves (outer).
 - Chemical-resistant gloves (inner).
 - Chemical-resistant boots with a steel toe and shank.
 - Coveralls, long underwear, and a hard hat worn under the TECP suit are optional items.
- **LEVEL B: (RED ZONE):** Select when the highest level of respiratory protection is necessary but a lesser level of skin protection is required. This is the minimum protection for workers in danger of exposure to unknown chemical hazards or levels above the IDLH or greater than AEGL-2. It differs from Level A in that it incorporates a non-encapsulating, splash-protective, chemical-resistant splash suit that provides Level A protection against liquids but is not airtight.
 - A NIOSH-certified CBRN full-face-piece SCBA operated in a pressure-demand mode or a pressure-demand supplied air hose respirator with an auxiliary escape bottle.
 - A hooded chemical-resistant suit that provides protection against CBRN agents.
 - Chemical-resistant gloves (outer).
 - Chemical-resistant gloves (inner).
 - Chemical-resistant boots with a steel toe and shank.
 - Coveralls, long underwear, a hard hat worn under the chemical-resistant suit, and chemical-resistant disposable boot-covers worn over the chemical-resistant suit are optional items.
- **LEVEL C: (YELLOW ZONE):** Select when the contaminant and concentration of the contaminant are known and the respiratory protection criteria factors for using Air Purifying Respirators (APR) or Powered Air Purifying Respirators (PAPR) are met. This level is appropriate when decontaminating patient/victims.
 - A NIOSH-certified CBRN tight-fitting APR with a canister-type gas mask or CBRN PAPR for air levels greater than AEGL-2.
 - A NIOSH-certified CBRN PAPR with a loose-fitting face-piece, hood, or helmet and a filter or a combination organic vapor, acid gas, and particulate cartridge/filter combination or a continuous flow respirator for air levels greater than AEGL-1.
 - A hooded chemical-resistant suit that provides protection against CBRN agents.
 - Chemical-resistant gloves (outer).
 - Chemical-resistant gloves (inner).
 - Chemical-resistant boots with a steel toe and shank.
 - Escape mask, face shield, coveralls, long underwear, a hard hat worn under the chemical-resistant suit, and chemical-resistant disposable boot-covers worn over the chemical-resistant suit are optional items.

- **LEVEL D: (GREEN ZONE):** Select when the contaminant and concentration of the contaminant are known and the concentration is below the appropriate occupational exposure limit or less than AEGL-1 for the stated duration times.
 - Limited to coveralls or other work clothes, boots, and gloves.

Emergency Response

- **CHEMICAL DANGERS:**

- In water, chlorine is a strong acid, corrosive, and an oxidizer.
- In water, it forms hydrochloric acid (HCl) and hypochlorous acid (ClHO).
- Chlorine attacks plastic, rubber, coatings, and many metals in the presence of water.
- Chlorine reacts violently with bases, many organic compounds, ammonia, hydrogen, and many finely divided metals.
- Chlorine forms halides with all elements except helium, neon, and argon.

- **EXPLOSION HAZARDS:**

- Chlorine reacts explosively or forms explosive compounds with many common substances including, acetylene, ether, turpentine, ammonia, fuel gas, hydrogen, fluorine, and finely divided metals.
- Chlorine reacts with most combustibles posing a fire and explosion risk.
- Chlorine is not combustible.
- Containers may explode when heated.
- Ruptured cylinders may rocket.

- **FIRE FIGHTING INFORMATION:**

- Chlorine is not combustible, but it enhances the combustion of other substances.
- Chlorine reacts violently with many organic compounds, ammonia, hydrogen, and finely divided metals, causing fire and explosion hazards.
- The agent may ignite combustibles (wood, paper, oil, clothing, etc.).
- Fire will produce irritating, corrosive, and/or toxic gases.
- For small fires, use water only; do not use dry chemical, carbon dioxide, or Halon™. Contain the fire and let it burn. If the fire must be fought, water spray or fog is recommended. Do not get water inside containers. Move containers from the fire area if it is possible to do so without risk to personnel. Damaged cylinders should be handled only by specialists.
- For fire involving tanks, fight the fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at the source of the leak or at safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tanks. Always stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from the area and let the fire burn.
- Run-off from fire control may cause pollution.
- If the situation allows, control and properly dispose of run-off (effluent).

- **INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES:**

- If a tank, rail car, or tank truck is involved in a fire, isolate it for 0.5 mi (800 m) in all directions; also consider initial evacuation for 0.5 mi (800 m) in all directions.
- Small spills (involving the release of approximately 52.83 gallons (200 liters) or less)
- First isolate in all directions: 100 ft (30 m).

- Then protect persons downwind during the day: 0.2 mi (0.2 km).
- Then protect persons downwind during the night: 0.8 mi (1.2 km).
- Large spills (involving quantities greater than 52.83 gallons (200 liters))
- First isolate in all directions: 800 ft (240 m).
- Then protect persons downwind during the day: 1.5 mi (2.4 km).
- Then protect persons downwind during the night: 4.6 mi (7.4 km).
- **PHYSICAL DANGERS:**
 - Vapors are heavier than air. They will spread along the ground and collect and stay in poorly-ventilated, low-lying, or confined areas (e.g., sewers, basements, and tanks).
 - Hazardous concentrations may develop quickly in enclosed, poorly-ventilated, or low-lying areas. Keep out of these areas. Stay upwind.

- **NFPA 704 Signal:**

- Health: 4
- Flammability: 0
- Reactivity: 0
- Special: OX



- **SAMPLING AND ANALYSIS:**

- OSHA: ID101, ID126SGX
- NIOSH: 6011

- **ADDITIONAL SAMPLING AND ANALYSIS INFORMATION:**

References are provided for the convenience of the reader and do not imply endorsement by NIOSH.

- AIR MATRIX

EPA [1996]. SW-846 Method 0050: [PDF Format 188 KB] Isokinetic HCl/Cl₂ emission sampling train. Washington, DC: U.S. Environmental Protection Agency.

EPA [1996]. SW-846 Method 0051: [PDF Format 115 KB] Midget impinger HCl/Cl₂ emission sampling train. Washington, DC: U.S. Environmental Protection Agency.

EPA [1996]. SW-846 Method 9057: [PDF Format 44 KB] Determination of chloride from HCl/Cl₂ emission sampling train (Methods 0050 and 0051) by anion chromatography. Washington, DC: U.S. Environmental Protection Agency.

NIOSH [1994]. NMAN Method 6011: Chlorine and bromine. In: NIOSH manual of analytical methods. 4th ed. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 94-113.

OSHA [1990]. Chlorine; OSHA Method ID-101; fully validated. Salt Lake City, UT: U.S. Department of Labor, Occupational Safety and Health Administration, Organic Methods Evaluation Branch, OSHA Analytical Laboratory.

OSHA [1990]. Chlorine; OSHA Method ID-126SGX; partially validated. Salt Lake City, UT: U.S. Department of Labor, Occupational Safety and Health Administration, Organic Methods Evaluation Branch, OSHA Analytical Laboratory.

- OTHER

No references were identified for this sampling matrix for this agent.

- SOIL MATRIX

Blackwell PA, Cave MR, Davis AE, Malik SA [1997]. Determination of chlorine and bromine in rocks by alkaline fusion with ion chromatography detection. J Chromatog A 770(1-2):93-98.

- SURFACES

No references were identified for this sampling matrix for this agent.

- WATER

EPA [1994]. SW-846 Method 9056: [PDF Format 217 KB] Determination of inorganic anions by ion chromatography. Washington, DC: U.S. Environmental Protection Agency.

EPA [1996]. SW-846 Method 9212: [PDF Format 69 KB] Potentiometric determination of chloride in aqueous samples with ion-selective electrode. Washington, DC: U.S. Environmental Protection Agency.

Greenburg AE, Trussell RR, Clesceri LS, eds. [1985]. Chlorine (Residual), Chapter 408. In: Standard methods for the examination of water and wastewater. 16th ed. Washington, DC: American Public Health Association.

Russell RA [1983]. Accurate chlorine analysis. J Water Pollut Control Fed 55(11):1316.

Sullivan J, Douek M [1998]. Determination of inorganic chlorine species in kraft mill bleach effluents by ion chromatography. J Chromatog A 804(1-2):113-121.

Signs/Symptoms

- **TIME COURSE:** Respiratory symptoms may be immediate or delayed for several hours or days after exposure to chlorine. Symptoms generally resolve within 6 hours after mild exposures, but may continue for several days after severe exposures. Deterioration may continue for several hours.

- **EFFECTS OF SHORT-TERM (LESS THAN 8-HOURS) EXPOSURE:** Chlorine gas is highly soluble in water; therefore, it is severely irritating on contact with moist tissues, such as the eyes, skin, nose, throat, and upper respiratory tract. At low concentrations, chlorine can cause eye and nose irritation, sore throat, and cough. At high exposure levels, irritation of the upper respiratory tract and accumulation of fluid in the lungs (pulmonary edema) contribute to a sensation of choking. Suffocation is the characteristic initial complaint of patient/victims exposed to chlorine. The majority of deaths occur within 24 hours and are due to respiratory failure.
- **EYE EXPOSURE:**
 - Mild to moderate: Burning discomfort, spasmodic blinking (blepharospasm) or involuntary closing of the eyelids, redness, inflammation of the eye's membranes (conjunctivitis), and tear production (lacrimation).
 - Severe: Corneal burns leading to cell death (necrosis) and tissue damage (ulceration).
 - Exposure to escaping liquid chlorine may result in frostbite injury and/or chemical burns.
- **INGESTION EXPOSURE:**
 - Chlorine is present as a gas at room temperature, so ingestion is unlikely.
- **INHALATION EXPOSURE:**
 - Lung injury may progress over hours to days; lung collapse may occur.
 - Mild to moderate: Rapid onset of eye, nose, and throat irritation; immediate coughing spasms and choking sensation; retching and vomiting (emesis) of stomach contents that may smell like chlorine; hoarseness or complete loss of voice (aphonia) often seen; high-pitched sounds caused by narrowing of the upper airway (stridor); severe chest discomfort; narrowing of the lower airways is an early and prominent effect of exposure; patient/victim describes the sensation of feeling smothered (suffocation); symptoms and signs of accumulation of fluid in the lung (pulmonary edema) may appear within 2 to 4 hours.
 - Severe: Sudden death can occur due to critical narrowing of the upper airway; severe difficulty breathing or shortness of breath (dyspnea), so prominent that the patient/victim may refuse to move; copious secretions from nose and mouth (nasopharynx) and airways (tracheobronchial tree) (up to 1 L per hour); pulmonary edema may appear within 30 to 60 minutes.
- **SKIN EXPOSURE:**
 - Mild to moderate: Irritation, burning pain, inflammation, and blisters (vesication).
 - Severe: Severe chemical burns leading to cell death (necrosis) and tissue damage (ulceration).
 - Exposure to liquefied (compressed) chlorine can result in frostbite injury and/or chemical burns.

Decontamination

- **INTRODUCTION:** The purpose of decontamination is to make an individual and/or their equipment safe by physically removing toxic substances quickly and effectively. Care should be taken during decontamination, because absorbed agent can be released from clothing and skin as a gas. Your Incident Commander will provide you with decontaminants specific for the agent released or the agent believed to have been released.
- **DECONTAMINATION CORRIDOR:** The following are recommendations to protect the first responders from the release area:
 - Position the decontamination corridor upwind and uphill of the hot zone. The warm zone should include two decontamination corridors. One decontamination corridor is used to enter the warm zone and the other for exiting the warm zone into the cold zone. The decontamination zone for exiting should be upwind and uphill from the zone used to enter.
 - Decontamination area workers should wear appropriate PPE. See the PPE section of this card for detailed information.
 - A solution of detergent and water (which should have a pH value of at least 8 but should not exceed a pH value of 10.5) should be available for use in decontamination procedures. Soft brushes should be available to remove contamination from the PPE. Labeled, durable 6-mil polyethylene bags should be available for disposal of

contaminated PPE.

- **INDIVIDUAL DECONTAMINATION:** The following methods can be used to decontaminate an individual:
 - Decontamination of First Responder:
 - Begin washing PPE of the first responder using soap and water solution and a soft brush. Always move in a downward motion (from head to toe). Make sure to get into all areas, especially folds in the clothing. Wash and rinse (using cold or warm water) until the contaminant is thoroughly removed.
 - Remove PPE by rolling downward (from head to toe) and avoid pulling PPE off over the head. Remove the SCBA after other PPE has been removed.
 - Place all PPE in labeled durable 6-mil polyethylene bags.
 - Decontamination of Patient/Victim:
 - Remove the patient/victim from the contaminated area and into the decontamination corridor.
 - Remove all clothing (at least down to their undergarments) and place the clothing in a labeled durable 6-mil polyethylene bag.
 - Thoroughly wash and rinse (using cold or warm water) the contaminated skin of the patient/victim using a soap and water solution. Be careful not to break the patient/victim's skin during the decontamination process, and cover all open wounds.
 - Cover the patient/victim to prevent shock and loss of body heat.
 - Move the patient/victim to an area where emergency medical treatment can be provided.

First Aid

- **GENERAL INFORMATION:** Initial treatment is primarily supportive. There is no post-exposure therapy specifically for chlorine inhalation.
- **ANTIDOTE:** There is no antidote for chlorine toxicity.
- **EYE:**
 - Immediately remove the patient/victim from the source of exposure.
 - Immediately decontaminate eyes with large amounts of tepid water for at least 15 minutes.
 - Seek medical attention immediately.
- **INGESTION:**
 - Immediately remove the patient/victim from the source of exposure.
 - Seek medical attention immediately.
- **INHALATION:**
 - Immediately remove the patient/victim from the source of exposure.
 - Evaluate respiratory function and pulse.
 - Ensure that the patient/victim has an unobstructed airway.
 - If shortness of breath occurs or breathing is difficult (dyspnea), administer oxygen.
 - Assist ventilation as required. Always use a barrier or bag-valve-mask device.
 - If breathing has ceased (apnea), provide artificial respiration.
 - Monitor for respiratory distress.
 - Examine the moist lining of body passages and cavities (mucous membranes) for corrosive effects.
 - Manage the airway aggressively in patient/victims with evidence of upper airway burns or fluid accumulation (edema).

- Monitor for and treat spasmodic narrowing of the large airways (bronchospasm) if it occurs.
- Seek medical attention immediately.
- **SKIN:**
 - Immediately remove the patient/victim from the source of exposure.
 - See the Decontamination section for patient/victim decontamination procedures.
 - Treat any chemical burns with standard burn therapy.
 - In case of frostbite, protect the injured area from further injury until sustained rewarming can be initiated.
 - Seek medical attention immediately.

See ATSDR Medical Management Guidelines for Acute Chemical Exposures, Chlorine, <https://www.atsdr.cdc.gov/MHMI/mmg172.pdf>, for detailed recommendations.

Long-Term Implications

- **MEDICAL TREATMENT:** All patient/victims who have a suspected significant exposure or who have eye burns or serious skin burns should be observed in a hospital setting. Patient/victims suffering frostbite should be evaluated by a physician. An ophthalmologist should be immediately consulted for patient/victims who have injury to the cornea. Symptomatic patient/victims complaining of persistent difficulty breathing or shortness of breath (dyspnea), severe cough, or chest tightness should be admitted to the hospital and observed until symptom-free. Pulmonary injury may progress for several hours and accumulation of fluid in the lungs (pulmonary edema) may be delayed up to 24 hours.
- **DELAYED EFFECTS OF EXPOSURE:** For previously healthy individuals with an acute exposure to chlorine, pulmonary function usually returns to pre-exposure levels within 7 to 14 days. Individuals who survive a single, acute exposure usually have no long-term adverse health effects, although persistent effects have been reported. For example, exposure to chlorine may cause reactive airways dysfunction syndrome (RADS), a chemical irritant-induced type of asthma. For exposed individuals who have underlying cardiopulmonary disease or for those who suffer complications (for example, pneumonia) during therapy, the risk for developing chronic airway inflammation is increased.
- **EFFECTS OF CHRONIC OR REPEATED EXPOSURE:** Chlorine is not classifiable for carcinogenic effects. Data about developmental toxicity and reproductive toxicity are inconclusive. Chronic exposure to chlorine, usually in the workplace, may cause erosion of the teeth. Multiple exposures to chlorine have produced flu-like symptoms and a high risk of developing reactive airways dysfunction syndrome (RADS). Chlorine exposure may result in chronic inflammation of the large airways (bronchitis).

On-Site Fatalities

- **INCIDENT SITE:**
 - Consult with the Incident Commander regarding the agent dispersed, dissemination method, level of PPE required, location, geographic complications (if any), and the approximate number of remains.
 - Coordinate responsibilities and prepare to enter the scene as part of the evaluation team along with the FBI HazMat Technician, local law enforcement evidence technician, and other relevant personnel.
 - Begin tracking remains using waterproof tags.
- **RECOVERY AND ON-SITE MORGUE:**
 - Wear PPE until all remains are deemed free of contamination.
 - Establish a preliminary (holding) morgue.

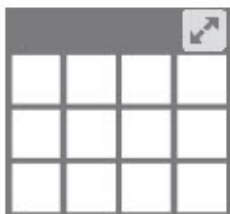
- Gather evidence, and place it in a clearly labeled impervious container. Hand any evidence over to the FBI.
- Remove and tag personal effects.
- Perform a thorough external evaluation and a preliminary identification check.
- See the Decontamination section for decontamination procedures.
- Decontaminate remains before they are removed from the incident site.

See Guidelines for Mass Fatality Management During Terrorist Incidents Involving Chemical Agents, U.S. Army Soldier and Biological Chemical Command (SBCCOM), November, 2001 for detailed recommendations.

Occupational Exposure Limits

- **NIOSH REL:**
 - Ceiling (15-minute): 0.5 ppm (1.45 mg/m³)
- **OSHA PEL:**
 - Ceiling: 1 ppm (3 mg/m³)
- **ACGIH TLV:**
 - TWA: 0.5 ppm (1.5 mg/m³)
 - STEL: 1 ppm (2.9 mg/m³)
- **NIOSH IDLH:** 10 ppm
- **DOE TEEL:**
 - TEEL-0: 1.45 mg/m³
 - TEEL-1: 1.45 mg/m³
 - TEEL-2: 6 mg/m³
 - TEEL-3: 58 mg/m³
- **AIHA ERPG:**
 - ERPG-1: 1 ppm
 - ERPG-2: 3 ppm
 - ERPG-3: 20 ppm

Acute Exposure Guidelines



	10 min	30 min	60 min	4 hr	8 hr
AEGL 1 (discomfort, non-disabling) - ppm	0.50 ppm	0.50 ppm	0.50 ppm	0.50 ppm	0.50 ppm
AEGL 2 (irreversible or other serious, long-lasting effects or impaired ability to escape) - ppm	2.8 ppm	2.8 ppm	2.0 ppm	1.0 ppm	0.71 ppm
AEGL 3 (life-threatening effects or death) - ppm	50 ppm	28 ppm	20 ppm	10 ppm	7.1 ppm

Technical Support Document (<https://www.epa.gov/oppt/aegl/pubs/tsd56.pdf>)

Decontamination (Environment and Equipment)

- **ENVIRONMENT/SPILLAGE DISPOSAL:** The following methods can be used to decontaminate the environment/spillage disposal:
 - Do not touch or walk through the spilled agent if at all possible. However, if you must, personnel should wear the appropriate PPE during environmental decontamination. See the PPE section of this card for detailed information.
 - Keep combustibles (e.g., wood, paper, and oil) away from the spilled agent. Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact the spilled agent.
 - Do not direct water at the spill or the source of the leak.
 - Stop the leak if it is possible to do so without risk to personnel, and turn leaking containers so that gas rather than liquid escapes.
 - Prevent entry into waterways, sewers, basements, or confined areas.
 - Isolate the area until gas has dispersed.
 - Ventilate the area.
- **EQUIPMENT:** Agents can seep into the crevices of equipment making it dangerous to handle. The following methods can be used to decontaminate equipment:
 - Not established/determined

Agent Properties

- **Chemical Formula:**
Cl₂
- **Aqueous solubility:**
Soluble
- **Boiling Point:**
-29.3°F (-34.05°C)
- **Density:**
Gas: 2.48 (air = 1)
Liquid: 1.4085 at 68°F (20°C), 6.864 atm
Liquid: 1.5649 at -31°F (-35°C), 0.9949 atm
- **Flammability:**
Chlorine is not flammable, but it reacts explosively or forms explosive compounds with many common substances.
- **Flashpoint:**
Chlorine is not combustible, but it enhances combustion of other substances.
- **Ionization potential:**
11.48 eV
- **Log K_{benzene-water}:**
Not established/determined
- **Log K_{ow} (estimated):**
0.85
- **Melting Point:**
-150°F (-101°C)
- **Molecular Mass:**
70.9
- **Soluble In:**
Bases, chlorides, and alcohols
- **Specific Gravity:**
1.56
- **Vapor Pressure:**
5,168 mm Hg at 68°F (20°C)
- **Volatility:**
Not applicable, because chlorine is a gas above its boiling point of 93.2°F (34°C).

Hazardous Materials Warning Labels/Placards

- **Shipping Name:**
Chlorine

- **Identification Number:**
1017 (Guide 124)
- **Hazardous Class or Division:**
2.3

- **Subsidiary Hazardous Class or Division:**
8

- **Label:**
Poison, Inhalation Hazard
Corrosive
Toxic Gas

- **Placard Image:**



Trade Names and Other Synonyms

- Bertholite
- Chloor (Dutch)
- Chlor (German)
- Chlore (French)
- Chlorine gas
- Chlorine mol.
- Cloro (Italian, Spanish)
- Dichlorine

Who to Contact in an Emergency

In the event of a poison emergency, call the poison center immediately at 1-800-222-1222. If the person who is poisoned cannot wake up, has a hard time breathing, or has convulsions, call 911 emergency services.

For information on who to contact in an emergency, see the CDC website at emergency.cdc.gov (<https://emergency.cdc.gov/>) or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY).

Important Notice

The user should verify compliance of the cards with the relevant STATE or TERRITORY legislation before use. NIOSH, CDC 2003.

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THE CITY-COUNTY OF Butte-Silver Bow

SOP #17
Public Works
Metro Sewer MS4 Program
Chlorine Storage & Handling

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Chlorine is a pollutant which is harmful to the humans and the environment. The Stodden Park pool uses liquid chlorine (stored in two 300-gallon containers), Splash Park uses liquid chlorine (stored in totes), and the Wading Pool uses chlorine pellets.
Operating Best Management Practices (BMPs) needed:	1. Store/handle chlorine in a dry area away from stormwater controls (i.e., storm inlets, drainage ditches). 2. Store chlorine in a locked/labeled dry area; use original labeled containers. Secondary containment is, sized to hold 1.5 times the storage capacity of the container, is required. 3. Avoid accidental exposure to applicators and/or bystanders by following manufacturer's directions for handling and safety. 4. Post chlorine safety procedures (see CDC-Chlorine-NIOSH Information).
Administrative BMPs needed:	1. Training on proper chlorine handling and safety procedures (see CDC-Chlorine-NIOSH Information) is conducted. 2. Chlorine levels in the pool are tested and documented every 4 hours by the pool manager or qualified staff. 3. Chlorine levels are monitored via automation; alarms are sent to the pool manager. 4. Pool manager and qualified staff are Certified Pool operators (CPOs). 5. Personnel are directed to call 911 in case of an emergency. 6. Establish notification chain-of-command if an emergency occurs. 7. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.
Safety:	1. PPE (long-sleeved shirt, long pants, socks, close-toed shoes, safety glasses, chemical-resistant gloves such as nitrile or butyl). 2. Eye flush materials. 3. Consult and post chlorine safety procedures (see CDC-Chlorine-NIOSH Information).
Responsible Staff:	Operator

SOP #17
Public Works
Metro Sewer MS4 Program
Chlorine Storage & Handling

Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine</u>
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

Attachment:

References:

CDC- Chlorine -NIOSH Information

https://www.cdc.gov/niosh/ersbdb/emergencyresponsecard_29750024.html

General Chlorine gas information, pool page 8, (EPA)

https://www3.epa.gov/pesticides/chem_search/reg_actions/reregistration/fs_PC-020501_1-Feb-99.pdf

General dechlorination information focuses on wastewater (EPA)

<https://www3.epa.gov/npdes/pubs/dechlorination.pdf>

Revision History:

Revision Number	Effective Date	Significant Changes

SOP #17
Public Works
Metro Sewer MS4 Program
Chlorine Storage & Handling

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Park & Rec Director

(406) 497 – 6571



R.E.D. FACTS

SOP#17

Pesticide Reregistration

Chlorine gas

All pesticides sold or distributed in the United States must be registered by EPA, based on scientific studies showing that they can be used without posing unreasonable risks to people or the environment. Because of advances in scientific knowledge, the law requires that pesticides which were first registered years ago be reregistered to ensure that they meet today's more stringent standards.

In evaluating pesticides for reregistration, EPA obtains and reviews a complete set of studies from pesticide producers, describing the human health and environmental effects of each pesticide. The Agency imposes any regulatory controls that are needed to effectively manage each pesticide's risks. EPA then reregisters pesticides that can be used without posing unreasonable risks to human health or the environment.

When a pesticide is eligible for reregistration, EPA announces this and explains why in a Reregistration Eligibility Decision (RED) document. This fact sheet summarizes the information in the RED document for reregistration Case 4022, chlorine gas.

Use Profile

Chlorine gas is used in water treatment to disinfect drinking water, swimming pools, ornamental ponds and aquaria, sewage and wastewater, and other types of water reservoirs. Chlorine gas also is used as a disinfectant, microbistat/microbicide and algicide in food processing systems, pulp and paper mill systems, and commercial and industrial water cooling systems. It is used in washing meat, fresh produce and seeds to control decay-causing microorganisms.

Chlorine is formulated as a pressurized gas and distributed in large stationary containers such as tank cars or trucks and 150-pound to 1-ton cylinders. It is intended for use only by trained, experienced personnel, under the supervision of the registrant and in accordance with state and municipal regulatory requirements.

Regulatory History

Chlorine gas was first registered in the U.S. in 1948, as a disinfectant for use in swimming pools, drinking water, cooling towers and sewage systems. In 1976, chlorine gas was classified for general use based on the premise that industrial users already were adequately trained in its use. Chlorine gas was declared exempt from the requirement of a tolerance when used in solution on raw agricultural commodities in 1991 because measurable residues are not expected. EPA required additional generic data in a Data Call-In notice issued in November 1993. Currently, 97 pesticide products containing the active ingredient chlorine gas are registered.

The Food and Drug Administration (FDA) regulates the use of chlorine gas in solution as a food contact surface sanitizer. EPA's Office of Water regulates its use in potable water systems.

Human Health Assessment

Toxicity

In human poisoning incidents involving accidental ingestion of household bleach, chlorine has caused a burning sensation in the mouth and throat, irritation to the digestive tract and stomach, and vomiting. Exposure to chlorine gas causes effects ranging from bronchitis, asthma and swelling of the lungs, to headaches, heart disease and meningitis. Acute exposure causes more severe respiratory and lung effects, and can result in fatalities. More often, however, the effects are not permanent; complete and rapid recovery generally occurs with treatment.

Chlorine disinfectants have been shown to cause occupational dermatitis or irritation of the skin. People who are asthmatic or allergic to chlorine may be at high risk for adverse reactions after inhaling or ingesting chlorine, for example, after drinking treated water.

Technical grade chlorine (gas and liquid) and its byproducts, hypochlorous acid and hypochlorite ions, are highly toxic and corrosive, and have been placed in Toxicity Category I (indicating the highest degree of acute toxicity) for oral, dermal, eye and inhalation effects. EPA waived several acute toxicity studies and all subchronic toxicity studies for chlorine due to its known acute toxicity and corrosiveness.

Review of a 2-year chronic inhalation study showed effects consistent with previous findings. Even the lowest exposures resulted in measurable cell destruction, primarily as pulmonary lesions. Additional long-term testing is not necessary since the likelihood of additional effects being identified for chlorine *per se* is remote.

Diverse results have been reported for chronic exposure to chlorine in drinking water. EPA has classified chlorine as a Group D carcinogen (not classifiable as to human carcinogenicity), based on a 1990 National Toxicology Program (NTP) study. That study showed equivocal evidence of cancer in female rats (increased leukemia) and no evidence in male rats or in male and

female mice. The International Agency for Research on Cancer (IARC) also determined in 1991 that chlorinated drinking water is not classifiable as to human carcinogenicity. Chlorine has not been shown to cause reproductive, developmental or mutagenic effects.

Dietary Exposure

Pursuant to 40 CFR 180.1095, Chlorine gas is exempt from the requirement of a tolerance when used pre- or postharvest on all raw agricultural commodities. Use of chlorine in food processing water systems to prevent decay of raw agricultural commodities may result in residues on treated produce; however, finite residues or residues above naturally occurring background levels are not expected. Similarly, if livestock ingest chlorine-treated water, finite residues or residues above background levels are not expected to occur in meat, milk or eggs.

Chlorine gas used as a food contact surface sanitizer on food, meat or poultry processing premises and equipment is under FDA's regulatory purview. EPA regulates contaminants in drinking water under the Safe Drinking Water Act (SDWA). The Office of Drinking Water has recently established a Maximum Residual Disinfectant Level (MRDL) of 4 mg/L for chlorine. An MRDL is an enforceable Federal Standard.

Occupational and Residential Exposure

Chlorine gas is metered into water through closed systems in manufacturing processes or from large stationary containers such as tank cars, tank trucks and cylinders. Given current use patterns of chlorine gas, there is potential for dermal and inhalation exposure to applicators and other people exposed to chlorinated water including swimmers, bystanders and workers in food processing plants and water/sewage treatment plants.

Occupational exposure guidelines have been established by OSHA and other domestic and foreign sources. Post-application exposure to chlorine while swimming in treated pools is not believed to be significant, if label requirements are followed.

A significant number of accidents and injuries resulting from the use of chlorine gas as a pesticide have been reported by the American Association of Poison Control Centers, the Chlorine Institute, the California Pesticide Illness Surveillance Program and others. In California, most accidents involved maintenance or equipment failure of chlorinator systems. The most common FIFRA use-related exposures occurred at food processing plants. A significant number of the incidents reported were attributed to application error. While there were some residential pool incidents, most occurred in connection with public/commercial pool chlorinator systems. In Florida, four applicators have died as a result of incorrectly applying chlorine gas.

Human Risk Assessment

Risk to the public is not anticipated from consuming food or water treated with chlorine. Although residues may remain on fruits and vegetables as a result of their treatment with chlorine solution, these residues are exempt from tolerance requirements and are not believed to pose risks. Residues above background levels are not expected in meat, milk or eggs as a result of chlorine use in drinking water. Use of chlorine to sanitize food contact surfaces and food processing equipment presumably does not result in residues of concern in foods (this use is under FDA's jurisdiction). EPA's Office of Drinking Water regulates chlorine in drinking water supplies under the SDWA.

The Agency has concluded that there is a need to better characterize the reproductive and developmental risks associated with drinking water in order to assure that children, infants and fetuses not face unreasonable risk from chronic exposure to drinking water byproducts. Because of the high levels of exposure, both in terms of population (greater than 200,000,000) and individual consumption of chlorinated drinking water, it is necessary to assess the associated risks with greater certainty.

Three water treatment byproducts in particular have been identified for which the health effects need to be better characterized. Bromodichloromethane, dichloroacetic acid, and dibromoacetic acid have been identified as having health effects in laboratory studies. Because these compounds are the most common toxicologically significant halogenated hydrocarbons that have not been completely characterized, additional testing on these compounds will improve the Agency's ability to assess chronic risks from drinking water exposure.

EPA has significant concerns about applicator and post-application exposure to chlorine gas because it is highly toxic for all routes of exposure. The greatest risk of poisoning accidents from chlorine is to applicators and bystanders from accidental exposures resulting from use of chlorine gas in public/commercial swimming pools, and to applicators and workers in industrial food settings. Two other uses, pulp/paper mills and cooling towers, also pose a significant risk because of chlorinator system failure and maintenance operations. The reported poisoning incidents strongly suggest that the use of chlorine gas in these situations presents a significant risk of acute toxicity to applicators, other workers and bystanders. To mitigate this risk, EPA is requiring Restricted Use Pesticide classification for the use of chlorine gas in food processing plants, public/commercial swimming pools, pulp/paper mills and cooling towers so that in the future these uses will be limited to trained, certified applicators. In addition, EPA is requiring significant revisions to product labeling through the RED, so labels will contain sufficient specific use information. The labeling improvements are expected to

adequately address the risks associated with water/sewage treatment and residential pool use, which will still be classified as general use.

Environmental Assessment

Environmental Fate

Chlorine hydrolyses in water to form hypochlorite and hypochlorous acid. Hypochlorous acid is an oxidizing agent—it has a sanitizing effect on organic and inorganic contaminants. Disinfection by chlorination is achieved by maintaining a "free residual chlorine" concentration in solution.

When treated effluent is released into receiving waters, free residual chlorine dissipates rapidly (it has a half-life of 1.3 to 5 hours). The ultimate fate of chlorine-containing effluent is site specific, and depends on factors such as the chemical constituents of the receiving waters, their temperature, the dilution ratio and the intensity of sunlight.

Ecological Effects

Studies on lithium hypochlorite were used to satisfy the data requirements for chlorine used as an industrial biocide, since both form hypochlorous acid when dissolved in water.

Lithium hypochlorite is practically non-toxic to birds on a subacute dietary basis. However, chlorine is very highly toxic to fish and freshwater invertebrates.

Ecological Effects Risk Assessment

In receiving waters from facilities using chlorine, if acute levels of concern are exceeded, a significant risk to aquatic organisms and endangered aquatic organisms can be expected. Levels of concern (equaling one-half of the EC_{50}) are 0.009 ppm for aquatic invertebrates, 0.023 ppm for freshwater fish, and 0.013 ppm for estuarine organisms. Levels of concern for endangered species (equaling one twentieth of the EC_{50}) are 0.85 ppb for aquatic invertebrates, 2.3 ppb for freshwater fish, and 1.3 ppb for estuarine invertebrates.

Uses of chlorine that are **not** regulated under the NPDES permit program, including swimming pool, aquaria and indoor use patterns (fruit and vegetable rinsing and food processing), should produce only intermittent discharges of minimal concentration into lakes or streams, resulting in minimal environmental exposure.

Other chlorine uses, including water cooling tower, sewage treatment plant, and pulp and paper mill uses, are included in the NPDES permit programs administered by EPA's Office of Water. Effluent discharges containing chlorine are regulated under NPDES permits to reduce the impact

on water bodies. The maximum concentration of chlorine allowed in each effluent stream is set on a site-specific and use-specific basis, to achieve the lowest possible concentrations of chlorine in each receiving stream. No significant adverse effects to aquatic organisms are anticipated from discharges of chlorine under the NPDES permitting system.

Endangered Species

If acute levels of concern are exceeded in receiving waters from facilities using chlorine, a significant risk to endangered aquatic organisms can be expected. EPA is working with the U.S. Fish and Wildlife Service to develop a program to avoid jeopardizing the continued existence of identified species by the use of pesticides. When this program goes into effect, endangered species labeling may be required.

Additional Data Required

The generic data base for chlorine is substantially complete to characterize acute risks. For the majority of exposure scenarios, enough data exists to adequately characterize chronic risks, also. Regarding the drinking water treatment use, although the quality of data is sufficient to reregister this public health use, there is some uncertainty regarding the health effects of halogenated byproducts that may be present. The Agency will be requiring the submission of reproductive and developmental studies on bromidichloromethane, dichloroacetic acid, and dibromoacetic acid. The Agency also is requiring product-specific data, including product chemistry, as well as revised Confidential Statements of Formula (CSF) and revised labeling for reregistration.

Product Labeling Changes Required

All end-use products containing chlorine must comply with EPA's current regulations and labeling requirements. The table containing the specific labeling requirements is included in the RED document and as a supplement to this Fact Sheet. It specifies detailed labeling requirements and guidance, covering the following areas:

- ! Use Directions** - The end use label must indicate specific intended uses, and must provide specific directions for each use. Products must be labeled for restricted use sites or general use sites, not both. The standard Precautionary Statements and Statement of Practical Treatment have been reworded (please see the RED).
- ! Standard Labeling for Chlorine Products** - Please see the RED for exact label language pertaining to:
 - The Restricted Use Pesticide legend and usage paragraphs;
 - Statement of Practical Treatment/First Aid;

-
- Precautionary Statements/Hazards to Humans and Domestic Animals (includes Personal Protective Equipment requirements);
 - Environmental Hazards;
 - Chemical and Physical Hazards;
 - Directions for Use;
 - Spill and Leak Procedures;
 - Storage and Disposal;
 - Disposal of Container.

! Guidance for Specific Directions for Use - See the RED for guidance and sample directions, including:

- What specific directions for use should include;
- Use directions for swimming pool water treatment products;
- Directions for treating sewage and waste water;
- Directions for control of microbiological slimes in cooling towers or pulp and paper mill process water systems;
- Directions for treatment of municipal water supplies;
- Directions for treating raw fruits and vegetables;
- Directions for various methods used for sanitization of hard, nonporous food contact surfaces;
- Directions for treatment of other hard surfaces.

! Effluent Discharge Statement - All end-use (or manufacturing use) products that may be contained in an effluent discharged to the waters of the U.S. or municipal sewer systems must bear the following statement:

"Do not use in facilities discharging directly or indirectly to the estuarine or marine environment."

To reduce environmental risk from chlorinated water discharge and disposal, product labels must include the statements pertaining to effluent discharge under the NPDES permitting system (refer to PR Notice 93-10) and disposal under any applicable federal laws after the above statement.

Regulatory Conclusion

All currently registered pesticide products containing chlorine can be used without causing unreasonable adverse effects to humans or the environment, in accordance with the revised labeling specified in this RED. Therefore, all chlorine products and uses are eligible for reregistration.

Chlorine products registered for use in non-residential swimming pools, pulp and paper mill processes, and industrial food processing plants are being reclassified as Restricted Use Pesticides due to chlorine's extreme acute

toxicity plus many associated human poisoning incidents. These products must bear Restricted Use Pesticide labeling no sooner than October 1, 2000, and no later than April 1, 2001.

Chlorine products registered for drinking water, sewage and wastewater treatment uses and residential pool use will remain classified for general use because few related accidents or incidents have been reported. Additionally for water treatment, applicators already are trained and certified by the states to perform these uses.

Products containing chlorine as the sole active ingredient will be reregistered once the required product-specific data, CSF and revised labeling are received and accepted by EPA. Products containing other active ingredients will be reregistered only after the other active ingredients also are determined to be eligible for reregistration.

For More Information

EPA is requesting public comments on the Reregistration Eligibility Decision (RED) document for Chlorine Gas, during a 60-day time period, as announced in a Notice of Availability published in the Federal Register. To obtain a copy of the RED document or to submit written comments, please contact the Pesticide Docket, Information and Record Integrity Branch, Information Resources Services Division (7502C), Office of Pesticide Programs (OPP), US EPA, Washington, DC 20460, telephone 703-305-5805.

Electronic copies of the RED and this fact sheet are available on the internet. See <http://www.epa.gov/REDs>.

Printed copies of the RED and fact sheet can be obtained from EPA's National Center for Environmental Publications and Information (EPA/NCEPI), PO Box 42419, Cincinnati, OH 45242-0419, telephone 513-489-8190, fax 513-489-8695.

Following the comment period, the Chlorine Gas RED document also will be available from the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, telephone 703-605-6000 or 800-553-6847.

For more information about EPA's pesticide reregistration program, the Chlorine Gas RED, or reregistration of individual products containing chlorine gas, please contact the Special Review and Reregistration Division (7508W), OPP, US EPA, Washington, DC 20460, telephone 703-308-8000.

For information about the health effects of pesticides, or for assistance in recognizing and managing pesticide poisoning symptoms, please contact the National Pesticides Telecommunications Network (NPTN). Call toll-free 1-800-858-7378, between 9:30 am and 7:30 pm Eastern Standard Time, Monday through Friday.

Chlorine Gas RED Fact Sheet Attachment

Table 1: Summary of Required Labeling Changes for Chlorine Gas		
Description	Required Labeling	Placement on Label
Manufacturing Use Products (MUPs)		
Front Panel Labeling (all MUPs)	[Place brand name here if desired] “CHLORINE LIQUEFIED GAS UNDER PRESSURE ACTIVE INGREDIENT: Chlorine..... % INERT INGREDIENTS:..... % KEEP OUT OF REACH OF CHILDREN DANGER [Place skull-and-crossbones close to the word POISON.] POISON” [“POISON” must be in red, on a background of distinctly contrasting color.] “FATAL IF INHALED. LIQUID CAUSES SEVERE BURNS EPA Reg. No. _____ EPA Est. No.” [Company name and address:] _____ _____ _____ “NET CONTENTS: _____”	Front panel
Heading: Precautionary Statement (all MUPs)	“PRECAUTIONARY STATEMENTS”	Place directly below “Net Contents: _____” Note: If some precautionary statements appear on other panels, the heading “Precautionary Statements” must also be placed above those statements.

Description	Required Labeling	Placement on Label
First Aid or Statement of Practical Treatment or (either heading is acceptable) (all MUPs)	“ FIRST AID:” or “ STATEMENT OF PRACTICAL TREATMENT” “IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention. IF IN EYES: Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention. IF ON SKIN: Wash with plenty of soap and water while removing contaminated clothing and shoes. Get medical attention.” [If remaining precautionary statements (Hazards to Humans & Domestic Animals, Personal Protective Equipment, Environmental Hazards, and Chemical & Physical Hazards) are not placed on front panel, the following statement is also required.] “See back panel for additional precautions.”	Front Panel below the heading “Precautionary Statements”
Hazards to Humans and Domestic Animals (all MUPs)	“HAZARDS TO HUMANS AND DOMESTIC ANIMALS: DANGER. Fatal if inhaled or absorbed through skin. Corrosive. Causes irreversible eye damage and skin burns. Do not breathe vapors or get in eyes, on skin or clothing. Wear goggles, protective clothing and rubber gloves as discussed below. Wash hands thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Remove contaminated clothing and wash clothing before reuse. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.”	Front panel directly below the First Aid Statements or on other panels of the label.
PPE Requirements (all MUPs)	“PERSONAL PROTECTIVE EQUIPMENT: Handlers must wear long-sleeved shirts, long pants, shoes, and socks. In Case of Spill or Leakage: Under normal use-conditions, no protective eyewear, respirator, or gloves are required. However, in case of a spill or leak, handlers must wear chemical-resistant gloves (such as nitrile or butyl) and a full-face canister-style (gas mask) respirator with a canister approved for chlorine (MSHA/NIOSH approval number prefix TC-14G) OR a self-contained breathing apparatus (SCBA) (MSHA/NIOSH approval number prefix TC-13F). Since there is always the possibility of a spill or leak, gloves and a respirator of a type specified above must be available and are required for anyone entering into an affected area in the event of a leak or spill.”	Directly below the Hazards to Humans and Domestic Animals Statement
Environmental Hazards (all MUPs)	“ENVIRONMENTAL HAZARDS: This pesticide is toxic or highly toxic to fish and aquatic invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA.	Directly below/after the Personal Protective Equipment Statement
Physical and Chemical Hazards (all MUPs)	“PHYSICAL & CHEMICAL HAZARDS: Chlorine is a non-flammable gas, liquefied, under pressure. Do not drop container. Do not heat container. Keep away from intense heat or open sunlight. Corrosive to most metals in the presence of moisture.”	Directly below/after the Environmental Hazard Statement

Description	Required Labeling	Placement on Label
Directions for use (all MUPs)	“DIRECTIONS FOR USE It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Refer to [state the name of the manual being used] for instructions on the required product use and safety procedures. Before working with this product, handlers must be trained how to appropriately use respirators that conform to OSHA requirements (described in 29 CFR Part 1910.134) and how to appropriately handle and use chlorine. This product, including dispensing equipment, must be handled and used in accordance with the practices specified by all applicable product labeling and the [state the name of the manual being used]." Use only in well ventilated areas. Only for formulation into an" [fill blank with Sanitizer, Disinfectant, or the applicable term which describes the type of pesticide uses(s)] "for the following uses(s):" [fill blank only with those uses that are being supported by MP registrant]. [Additional optional statement may be placed here as specified above under "Labeling Requirements for Manufacturing-Use Products."] [Note that directions for specific uses are not permitted on MP labels. A product must be labeled as EP or MP, not both.]	Directly below the PRECAUTIONARY STATEMENTS section.
Storage & Disposal (all MUPs)	“STORAGE & DISPOSAL STORAGE: Store cylinders and ton containers in a dry area away from sources of heat and protected from direct sunlight and precipitation. Do not store in excessive heat. Segregate chlorine containers from other compressed gases, and never store near hydrocarbons, finely divided metals, turpentine, ether, anhydrous ammonia, or other flammable materials. All storage containers and cylinders must have a weather resistant label and must not be accessible to the general public. Do not drop container. If container is damaged or leaking, refer to procedures in the [state the name of the manual being used] and/or notify supplier immediately. Do not contaminate water, food, or feed by storage or disposal. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law.”	

Description	Required Labeling	Placement on Label
Storage & Disposal (Continued) (all MUPs)	“LEAK PROCEDURES: Make daily inspections for leaks. Stop a leak at once, since it will become worse with time. In case of a leak, evacuate everyone from the immediate area. For entry into the affected area to correct problem, wear personal protective equipment (including prescribed respirators) specified in the Hazards to Humans section of this labeling. When possible, move leaking or damaged cylinders outdoors or to an isolated location. Observe strict safety precautions. Work upwind, if possible. Allow any liquid chlorine to evaporate. Only correctly trained and Personal Protective Equipment (PPE)-equipped handlers are permitted to perform such cleanup. Do not permit entry into the leak area by any other person until the chlorine has completely dispersed. DISPOSAL OF CONTAINER: Container is returnable and must be properly identified with return tag and returned as promptly as possible to supplier according to prescribed instructions and practices in the” [state the name of the manual being used]. “All valves must be closed tight and closures or caps secured. It is illegal to ship a leaking chlorine container.”	Place in Storage & Disposal box with Storage statement
End Use Products Intended for Occupational/Commercial Use		
Restricted Use Pesticide (RUP) Statement [required on all RUP products (products used on non-residential swimming pools, industrial food use settings, cooling water towers, and pulp and paper mill process water systems)]	“RESTRICTED USE PESTICIDE DUE TO HIGH ACUTE TOXICITY For retail sale to and use only by Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.”	Top of Front Panel and Beginning of Directions for Use
User Statement [required for non-RUP products only (water and sewage treatment, and residential swimming pools)]	“For Use Only By Trained Commercial Applicators”	Top of Front Panel
Brand Name and Chlorine Identification Statement (required for all End Use Products)	[Place brand name here if desired] “CHLORINE LIQUEFIED GAS UNDER PRESSURE”	Below/after the RUP or Trained Applicator Statement
Usage Statement (required for all bulk containers such as tank cars, tank trucks, and 1-ton and 150-pound cylinders)	“For use as a” [indicate whichever kind(s) of antimicrobial activity and specific uses(s) your product is registered for, e.g., disinfectant in swimming pools, or as a sanitizer for wash water treatment of food handling premises and equipment (fruit, vegetable, meat, poultry or seafood), or as an algicide and slimicide for use in recirculating cooling towers and pulp and papermill process water systems.] “The registrant is solely responsible for the safety of the servicing equipment used with this pesticide, and for the repackaging of this gas from larger containers into portable cylinders. Each repackager must obtain his own EPA Registration Number for this pesticide for this use, and his own EPA Establishment Number from the EPA. Repackers may only dispense this product to portable containers that are appropriately labeled.”	Directly below/after the “Chlorine Identification Statement”

Description	Required Labeling	Placement on Label
Usage Statement for portable containers used by service companies in treating swimming pools or wash water for raw agricultural commodities	"For use as a" [indicate whichever use(s) your product is registered for: disinfectant and algicide] "in" [indicate use, either "servicing swimming pools" or "wash water for raw agricultural commodities"].	Directly below/after the "Chlorine Identification Statement"
Front Panel Labeling (required on all End Use Products)	"ACTIVE INGREDIENT: Chlorine.... % INERT INGREDIENTS:..... % KEEP OUT OF REACH OF CHILDREN DANGER [Place skull-and-crossbones close to the word POISON.] POISON" ["POISON" must be in red, on a background of distinctly contrasting color.] "FATAL IF INHALED. LIQUID CAUSES SEVERE BURNS EPA Reg. No. _____ EPA Est. No. _____" [Company name and address:] _____ _____ _____ "NET CONTENTS: _____"	Front Panel directly below/after Usage Statement
Precautionary Statements Heading required on all End Use Products	"PRECAUTIONARY STATEMENTS"	Front Panel directly below "Net Contents:_" "Place directly below "Net Contents: _" Note: If some precautionary statements appear on other panels, the heading "Precautionary Statements" must also be placed above those statements.

Description	Required Labeling	Placement on Label
First Aid Heading and Statements (required on all End Use Products)	"FIRST AID:" "IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. Get medical attention. IF IN EYES: Hold eyelids open and flush with a steady, gentle stream of water for 15 minutes. Get medical attention. IF ON SKIN: Wash with plenty of soap and water while removing contaminated clothing and shoes. Get medical attention." [If remaining precautionary statements (Hazard to Humans & Domestic Animals, Personal Protective Equipment, Environmental Hazards, and Chemical & Physical Hazards) are not placed on front panel, the following statement is also required.] "See back panel for additional precautions."	Place directly below the heading "PRECAUTIONARY STATEMENTS" on Front Panel.
Precautionary Statements (required on all End Use Products)	"Precautionary Statement" [and signal word] "Danger" "HAZARDS TO HUMANS AND DOMESTIC ANIMALS: DANGER. Fatal if inhaled or absorbed through skin. Corrosive. Causes irreversible eye damage and skin burns. Do not breathe vapors or get in eyes, on skin or clothing. Wear goggles, protective clothing and rubber gloves as discussed below. Wash hands thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Remove contaminated clothing and wash clothing before reuse. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals."	May appear on front panel (below the First Aid Statements) or other panels of the label.
PPE Requirements (required on all End Use Products)	"Personal Protective Equipment: Applicators and other handlers must wear long-sleeved shirts, long pants, shoes, and socks".	Directly below the Hazards to Humans and Domestic Animals Statement.
Leakage Personal Protective Equipment (required for bulk containers)	"IN CASE OF LEAKAGE Under normal use-conditions, no protective eyewear, respirator, or gloves are required. However, in case of a leak, handlers must wear chemical-resistant gloves (such as nitrile or butyl) and a full-face canister-style (gas mask) respirator with a canister approved for chlorine (MSHA/NIOSH approval number prefix TC-14G) OR a self-contained breathing apparatus (SCBA) (MSHA/NIOSH approval number prefix TC-13F). Since there is always the possibility of a leak, gloves and a respirator of a type specified above must be available. Gloves and a respirator are required for anyone entering into an affected area in the event of a leak."	Directly below the PERSONAL PROTECTIVE EQUIPMENT Statement.

Description	Required Labeling	Placement on Label
Leakage Personal Protective Equipment (required for portable cylinders or containers)	"In Case of Leakage: Under normal use-conditions, no protective eyewear, respirator, or gloves are required. However, in case of a leak, handlers must wear chemical-resistant gloves (such as any waterproof material) and a full-face canister-style (gas mask) respirator with a canister approved for chlorine (MSHA/NIOSH approval number prefix TC-14G). Since there is always the possibility of a leak, gloves and a respirator of a type specified above must be available. Gloves and a respirator are required for anyone entering into an affected area in the event of a leak."	Directly below/following Personal Protective Equipment Statement.
Environmental Hazards	"ENVIRONMENTAL HAZARDS: This pesticide is toxic or highly toxic to fish and aquatic invertebrates. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance contact your State Water Board or Regional Office of the EPA."	Directly below/following Spillage Personal Protective Equipment Statement.
Physical & Chemical Hazards	"PHYSICAL & CHEMICAL HAZARDS: Chlorine is a non-flammable gas, liquefied, under pressure. Do not drop container. Do not heat container. Keep away from intense heat or open sunlight. Corrosive to most metals in the presence of moisture."	Directly below/following Environmental Hazards statement.
General Directions for Use (required for all End Use Products)	"DIRECTIONS FOR USE It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Refer to [state the name of the manual being used] for instructions on the required product use and safety procedures. Before using this product, handlers must be trained how to appropriately use respirators that conform to OSHA requirements (described in 29 CFR Part 1910.134) and how to appropriately handle and use chlorine. This product, including dispensing equipment, must be handled and used in accordance with the practices specified by all applicable product labeling and the [state the name of the manual being used]." Use only in well ventilated areas."	Directly below/following the PRECAUTIONARY STATEMENTS section.
Specific Directions for Use (required for all End Use Products)	Specific Directions for Use. The following information must appear on the label or be referred to in supplemental labeling. ! An instruction to test the chlorinated water with a test kit to ensure adequate concentration (ppm) of available chlorine or chlorine residual. ! Identification of the type of water, object, or surface to be treated, and the type of area or establishment in which the product is to be used. ! For surface treatments, an instruction for thorough pre-cleaning should be included. ! The recommended concentration (ppm) available chlorine or chlorine residual, and how to prepare it.	Directly below/following the General Directions for Use statement or attached as supplemental labeling

Description	Required Labeling	Placement on Label
Specific Directions for Use (required for all End Use Products) (continued)	! The method of application (e.g., wipe, rinse, immerse, spray), if not already understood (as in water treatment applications). For surface treatments, the reader must understand that all surfaces must be thoroughly wetted. ! The contact time necessary for effectiveness. For surfaces, also indicate any necessary information on a final rinse, and if and how the product should be removed from the surface after the recommended contact time. ! For some water treatment applications, a follow-up dosage(s) should be indicated. ! For surface treatments, an instruction regarding limitations on re-use of the solution (e.g., whether it may be re-used if it has not become diluted or soiled, and for how many batches or how many days). ! Additional instructions or information may be appropriate, or required on a case-by-case basis.	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for all products registered for swimming pool water treatment)	(a) The proper range in the concentration (ppm) of chlorine or residual (e.g., available chlorine) and pH to be maintained at all times. The directions should advise users to test the water with test kits to maintain pH and the proper concentration of principle active ingredient or residual. (b) The frequency of treatment required for the maintenance of the desired concentration of chlorine is dependent on bather load, and the concentration should be checked frequently with a test kit. (c) How the product is to be added to the pool (e.g., automatic metering device). (d) The maximum concentration of chlorine or residual allowable in the pool water, following application of the product, before swimmers are allowed to re-enter the pool. (e) Any water quality conditions essential to effective use of the product as a disinfectant (e.g., alkalinity). (f) Treatment procedure(s) for newly filled pools.	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for all products registered for Industrial Water Treatment Systems)	(a) <u>General</u>. This section provides labeling guidance for chlorine products intended for control of algal, bacterial, and/or fungal slime in industrial cooling water systems, pulp and paper mills and similar water treatment systems. (b) <u>Label Claims</u>. Broad label claims such as "microbicide", "microbistat", "slimicide" and "microorganism control" should not be used unless they are modified by: ! The names of the types of organisms (algae, bacteria, fungi) for which control is intended. Terms such as "biocide" or "biostat" are generally not acceptable when only microorganism control is intended.	Directly below/following the General Directions for Use statement or attached as supplemental labeling

Description	Required Labeling	Placement on Label
Specific Directions for Use (required for all products registered for Industrial Water Treatment Systems) (continued)	! An identification of the industrial or commercial recirculating water cooling systems (e.g., industrial and/or commercial recirculating cooling water towers, air washers, and/or evaporative condensers) in which the product is intended for use. ! An accurate description of the level of activity claimed for each use stated on the label. An acceptable statement for a microbicide would be: "Microbicide for use in industrial recirculating cooling water towers to reduce the number of living algae, bacteria and fungi." An acceptable statement for a "microbistat" would be: "A microbistat (microorganism control) for use in industrial recirculating cooling towers to control the growth of algae, bacteria, and fungi." (c) <u>Special Directions for Use.</u> Directions for general microbial control must include, but are not limited to, the following: ! <u>Site of Use.</u> Directions should state where in the system the product is to be applied (e.g., at a point in the system where the product will be uniformly mixed). ! <u>Time of Use.</u> Directions should specify when the product should be applied (e.g., when the system is in danger of becoming impaired or after cleaning a system whose efficiency is already impaired). ! <u>Dosage.</u> The dosage rate or amount should be specified as volume or weight of chlorine per unit volume of water. The product weight per gallon must be shown on the label, whether the dosage is given as volume or weight. ! <u>Method of Application.</u> The method of application or pattern of use must appear on the label and should conform to the instructions provided below for the intermittent or "slug method", the modified intermittent method, or the continuous feed method. • <u>Intermittent or Slug Method.</u> The directions should state an initial dosage range of relatively high product concentration to obtain control of obvious microbial contamination. When microbial control is evident, a subsequent dosage regimen of relatively lower product concentration should be stated. The label should state the usual time interval between doses, or include the phrase "as needed to maintain control", or both. The label should not claim maintenance of any particular pesticide concentration. The following is an example of acceptable directions or use: <u>Initial Dose.</u> When the system is noticeably fouled, apply ___ to ___ (volume or unit weight) of (product name or active ingredient) per ___ (unit volume) of water in the system. Repeat until control is achieved. Badly fouled systems must be cleaned before initial treatment.	Directly below/following the General Directions for Use statement or attached as supplemental labeling

Description	Required Labeling	Placement on Label
Specific Directions for Use (required for all products registered for Industrial Water Treatment Systems) (continued)	<u>Subsequent Dose.</u> When microbial control is evident, add ___ to ___ (volume or unit weight) of ___ (product name or active ingredient) per ___ (unit volume) of water in the system every ___ days (weekly), or as needed to maintain control. <u>Modified Intermittent Method.</u> This method is similar to the intermittent, or slug method, except that the interval between treatments is based on the time for a stated fraction of the system water to be lost by blowdown. This method of application may be accompanied by label claims for the maintenance of the pesticide concentration within a stated maximal and minimal limit. The following is an example of acceptable directions for use: <u>Initial Dose.</u> When the system is noticeably fouled, apply ___ to ___ (volume or unit weight) of ___ (product name or active ingredient) per ___ (unit volume) of water in the system. Apply half (or 1/3, 1/4, or 1/5) of this initial dose when half (or 1/3, 1/4, or 1/5) of the water in the system has been lost by blowdown. Badly fouled systems must be cleaned before initial treatment. <u>Subsequent Dose.</u> When control of microbial growth is evident, apply ___ to ___ (volume or unit weight) of ___ (product name or active ingredient) per ___ (unit volume) of water in the system. Apply half (or 1/3, 1/4, 1/5) of this initial dose when half (or 1/3, 1/4, 1/5) of the water in the system has been lost by blowdown. <u>Continuous Feed Method.</u> The label should specify an initial dose, based on the volume of water in the cooling system, to establish an initial product concentration. For volatile products, continuous feed is based on total makeup water. For non-volatile products, continuous feed is expressed as amount of product to be applied per stated volume of water lost by blowdown. The claim to maintain a pesticide concentration in the system may be made for this method of application. The following is an example of acceptable directions for use: <u>Initial Dose.</u> When the system is noticeably fouled, apply ___ (volume or unit weight) of ___ (product name or active ingredient) per (unit volume) of water in the system. Badly fouled systems must be cleaned before initial treatment. <u>Subsequent Dose.</u> Maintain this treatment level by starting a continuous feed of ___ (volume or unit weight) of ___ (product name or active ingredient) per ___ (unit volume) of water lost by blowdown.	Directly below/following the General Directions for Use statement or attached as supplemental labeling

Description	Required Labeling	Placement on Label
Specific Directions for Use (required for products registered for Hard Surface Disinfectants)	General or broad spectrum disinfectants may bear label claims as hard, food-contact surface disinfectants. Use directions must indicate that following the specified contact period, the product should be removed from the treated surfaces with a final sanitizing rinse which may be worded as follows: "CLEANING AND DISINFECTING FOOD PREPARATION AND PROCESSING FACILITIES AND EQUIPMENT: Cover or remove all food and packaging materials. Remove all gross soils. Saturate all surfaces with the use-solution. Scrub to loosen all soils. Allow to soak for (contact time) in a 600 ppm available chlorine solution. Thoroughly rinse all wetted and cleaned surfaces with a final sanitizing rinse solution of 200 ppm available chlorine."	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for products registered for Hard Non-Food Contact Surfaces Sanitizers)	A product intended for use on non-food contact surfaces which does not eliminate but significantly reduces the numbers of target microorganisms should be represented and qualified in labeling as being effective at the sanitizing level only. Examples of acceptable label claims are: "Sanitizes", "Significantly reduces", or "Reduces the number of bacteria by 99.9%." Products recommended for use in critical hospital or medical environments that are not effective at the sterilizing or disinfecting level should bear a label disclaimer statement such as: "This product is not a disinfectant or sterilizer."	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for products registered for Circulate-In-Place (CIP) Applications)	Label claims for CIP applications as "germicide" or "disinfecting" are not generally acceptable because these methods have not been shown to be an effective means of disinfecting surfaces in these systems. Representations for CIP applications to sanitize the surfaces of the systems are acceptable.	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for products registered for Hard Food Contact Surface Sanitizers)	(a) The major area(s) in which the product is recommended for use (e.g., restaurants, dairies, food processing plants). (b) The identification of the types of hard surfaces, or objects, intended for treatment. (c) The necessity for removal of gross food particles and soil by a pre-flush, or pre-scrape and, when necessary, pre-soak treatment. In addition, instructions must be provided for a thorough washing of the surfaces or objects with a good detergent or compatible cleaner, followed by a potable water rinse prior to application of the sanitizing solution. (d) The recommended use solution and instructions for preparing it. The units of measure (e.g., volume or weight per unit volume of water) to be employed in diluting the product must be given, and must be understandable to the user. The concentration (in parts per million) of available chlorine provided by the recommended use solution should also be given. (e) The method of application (e.g., immersion, flooding, spraying) to wet all surfaces thoroughly. Additional instructions for in-place sanitizing may be required (e.g., filling piping with the sanitizing solution). (f) A contact time of a least 1 minute.	Directly below/following the General Directions for Use statement or attached as supplemental labeling

Description	Required Labeling	Placement on Label
Specific Directions for Use (required for products registered for Hard Food Contact Surface Sanitizers) (continued)	(g) The directions should also indicate if, and how, the product is to be removed from the surfaces after the recommended contact time. Instructions to drain the use solution from the surface and allow to air dry are appropriate for products cleared for use on food contact surfaces under the Federal Food, Drug and Cosmetic Act. However, the recommendation of a potable water rinse after food-contact surfaces have been treated with a sanitizing rinse is not acceptable for products intended for use as a terminal sanitizing rinse. (h) For mechanical operations, the limitation that the prepared use solution may not be re-used for sanitizing but may be re-used for other purposes (e.g., cleaning floors, etc.). For manual operations the label should include a recommendation that a fresh sanitizing solution should be prepared at least daily or more often if the solution becomes diluted or soiled. (i) Additional instructions may be necessary for certain use patterns and/or categories of products to ensure safe and effective use of a product. Such additional instructions may be recommended by the applicant, or required by the Agency, as determined on a case-by-case basis.	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for all products registered for Human Drinking Water Treatment)	(a) <u>Public Water Supplies</u>. Municipal drinking water must meet the requirements of the Safe Drinking Water Act (42 U.S.C. 300f). Label claims and directions, as well as testing and performance requirements, must be acceptable to the Office of Drinking Water of the EPA, and appropriate documentation of such acceptance must be submitted. (b) <u>Emergency Water Supplies</u>. This section applies to emergency purification of small quantities of drinking water of questionable potability by the general public in the absence of bacteriological monitoring facilities. The special directions for use of a product intended for field or emergency disinfection of small quantities of drinking water must include the following information: ! The effective dosage. ! The water source to be treated (e.g., lake, pond, stream) and its characteristics (e.g., clear, muddy, brackish). ! The exposure time.	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Specific Directions for Use (required for all products registered for disinfectants for treatment of sewage and wastewater effluent)	The amount of chlorine delivered to treat sewage and wastewater effluent will depend on the flow rate of the water being treated, the number and placement of feed tubes and the outlet weir size opening. Specific use directions must be provided on the label or in collateral literature to enable the user to determine the amount of chlorine to satisfy treatment demands and the appropriate residue levels required for disinfection.	Directly below/following the General Directions for Use statement or attached as supplemental labeling

Description	Required Labeling	Placement on Label
Specific Directions for Use (required for products registered for Sanitizing Use for Fruit and Vegetable Wash Water Treatment must include the following information:	Specific use directions must be provided on the label or in collateral literature to enable the user to determine the amount of chlorine to satisfy treatment demands and the appropriate residual levels required for sanitization.	Directly below/following the General Directions for Use statement or attached as supplemental labeling
Storage & Disposal Heading and Statements (required for all End Use Products)	“STORAGE & DISPOSAL STORAGE: Store cylinders and ton containers in a dry area away from sources of heat and protected from direct sunlight and precipitation. Do not store in excessive heat. Segregate chlorine containers from other compressed gases, and never store near hydrocarbons, finely divided metals such as filings or granules, turpentine, ether, anhydrous ammonia, or other flammable materials. All storage containers and cylinders must have a weather resistant label and must not be accessible to the general public. Do not drop container. If container is damaged or leaking, refer to procedures in the [state the name of the manual being used] and/or notify supplier immediately. Do not contaminate water, food, or feed by storage or disposal. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal Law.” “LEAK PROCEDURES: Make daily inspections for leaks. Stop a leak at once, since it will become worse with time. In case of a leak, evacuate everyone from the immediate area. For entry into the affected area to correct problem, wear personal protective equipment (including prescribed respirators) specified in the Hazards to Humans section of this labeling. When possible, move leaking or damaged cylinders outdoors or to an isolated location. Observe strict safety precautions. Work upwind, if possible. Allow any liquid chlorine to evaporate. Only correctly trained and PPE-equipped handlers are permitted to perform such cleanup. Do not permit entry into the leak area by any other person until the chlorine has completely dispersed. DISPOSAL OF CONTAINER: Container is returnable and must be properly identified with return tag and returned as promptly as possible to supplier according to prescribed instructions and practices in the” [state the name of the manual being used] “. All valves must be closed tight and closures or caps secured. It is illegal to ship a leaking chlorine container.”	Directly below/following DIRECTIONS FOR USE statements.



Wastewater Technology Fact Sheet Dechlorination

DESCRIPTION

Dechlorination is the process of removing residual chlorine from disinfected wastewater prior to discharge into the environment. Sulfur dioxide is most commonly used for dechlorination and is the major focus of this fact sheet. Some dechlorination alternatives include carbon adsorption, sodium metabisulfite, sodium bisulfite, and hydrogen peroxide. Sodium metabisulfite and sodium bisulfite are mainly used in small facilities because these materials are more difficult to control compared to sulfur dioxide. Hydrogen peroxide is not frequently used because it is dangerous to handle (WEF, 1996).

APPLICABILITY

Chlorination has been used widely to disinfect wastewater prior to discharge since passage of the 1972 Federal Water Pollution Control Act (WPCA), (Finger et al., 1985). In the first years following the WPCA, disinfected wastewater with significant levels of residual chlorine was routinely discharged into the receiving waters. It became clear, however, that residual chlorine is toxic to many kinds of aquatic life (see, for example, Mattice and Zittel, 1976, and Brungs, 1973). Moreover, the reaction of chlorine with organic materials in the water formed carcinogenic trihalomethanes and organochlorines (WEF and ASCE, 1991). As a result, dechlorination was instituted to remove residual chlorine from wastewater prior to discharge into sensitive aquatic waters.

Dechlorination minimizes the effect of potentially toxic disinfection byproducts by removing the free

or total combined chlorine residual remaining after chlorination. Typically, dechlorination is accomplished by adding sulfur dioxide or sulfite salts (i.e., sodium sulfite, sodium bisulfite, or sodium metabisulfite). Carbon adsorption is also an effective dechlorination method, but is expensive compared to other methods. Carbon adsorption is usually implemented when total dechlorination is desired.

Specific design criteria and monitoring requirements for a particular region are determined by the state regulatory agency. Typically, the treatment plant's National Pollutant Discharge Elimination System (NPDES) permit limits effluent chlorine residual and toxicity. Currently, many permits require very low or "non-detect" chlorine residuals, making dechlorination critical.

One important alternative to dechlorination is to achieve disinfection without the use of chlorine. Other means of disinfection, such as ozone or ultraviolet disinfection, have also become increasingly prevalent (U.S. EPA, 1986; Blatchley, E.R. III, *et al.*, 1996).

ADVANTAGES AND DISADVANTAGES

Advantages

- Protects aquatic life from toxic effects of residual chlorine.
- Prevents formation of harmful chlorinated compounds in drinking water through reaction of residual chlorine with water-born organic materials.

Disadvantages

- Chemical dechlorination can be difficult to control when near zero levels of residual chlorine are required.
- Significant overdosing of sulfite can lead to sulfate formation, suppressed dissolved oxygen content, and lower pH of the finished effluent.

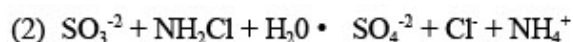
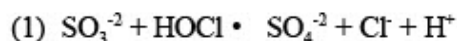
DESIGN CRITERIA

Chemistry of Dechlorination by Sulfonation

Sulfur dioxide (SO_2) is a corrosive, nonflammable gas with a characteristic pungent odor. At atmospheric temperature and pressure, it is a colorless vapor. When compressed and cooled, it forms a colorless liquid. Sulfur dioxide is supplied as liquefied gas under pressure in 100 or 150 pound containers and one-ton cylinders. As an alternative to sulfur dioxide gas, various dry chemicals are available which form sulfur dioxide in solution. These include sodium sulfite (Na_2SO_3), sodium metabisulfite ($\text{Na}_2\text{S}_2\text{O}_5$), sodium bisulfite (NaHSO_3), a 38 percent aqueous solution of sodium metabisulfite, and sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$), among others (Lind, 1995).

When dissolved in water, chlorine hydrolyzes to form hypochlorous acid (HOCl) and hypochlorite ions (OCl^-) which, taken together, are referred to as "free chlorine." (Free, uncombined chlorine, Cl_2 , is rarely found in wastewater since the conditions of formation are relatively extreme [Lind, 1995]). Once formed, the free chlorine reacts with natural organic matter in water and wastewater to form chlorinated organic compounds. The free chlorine also combines with ammonia to form mono-, di-, and trichloramines in quantities dependent on the ratio of chlorine to ammonia nitrogen (Lind, 1995).

When either sulfur dioxide or sulfite salts are dissolved in water, aqueous sulfur compounds in the +4 oxidation state are produced, often notated S(IV) (Helz and Nweke, 1995). The S(IV) species, such as the sulfite ion (SO_3^{2-}), reacts with both free and combined forms of chlorine, as illustrated in equations (1) and (2) (WEF, 1996):



Since free chlorine and inorganic chloramines react rapidly with S(IV) (Helz, 1998), a short contact time of one to five minutes is considered to be sufficient; nevertheless, complete blending at the point of application is essential for effective dechlorination (WEF and ASCE, 1992).

Proper dosage is critical to produce a non-detectable chlorine residual. On a mass basis, 0.9 parts sulfur dioxide (or 1.46 parts NaHSO_3 or 1.34 parts $\text{Na}_2\text{S}_2\text{O}_5$) is required to dechlorinate 1.0 part residual chlorine. In practice, approximately a one-to-one ratio is used (WEF, 1996). Dosing in excess must be avoided because excess sulfite can react with dissolved oxygen (four parts sulfite to one part oxygen) in the wastewater to produce sulfates, potentially leading to reduced dissolved oxygen concentrations and low pH levels in the finished effluent for high levels of overdose (WEF, 1996). Careful process control will help prevent overdosing.

Equipment for gaseous sulfonation

Equipment required for gaseous sulfonation using SO_2 is similar in design to that used for chlorination, except that the materials are chosen for their application-specific chemical resistance (WEF, 1996). The four basic components of the system include: sufficient gas supply with automatic switch-over between cylinders; a metering system, usually consisting of a vacuum regulator and a rotameter for feed rate control; one or more injectors with check valves; and a residual analyzer to measure and transmit a continuous signal proportional to the chlorine residual in the sample stream.

In small concentrations, exposure to SO_2 can cause eye and throat irritation. In high concentrations, exposure can produce a suffocating effect caused by irritation to the upper respiratory tract. Therefore, facility design should include features for safe storage, handling, and use of sulfur dioxide. The chlorine and sulfur dioxide cylinders should be located in separate rooms and stored in a well-

ventilated, temperature-controlled area so that their temperature never drops below 18 or exceeds 70 degrees Celsius. Gas leak detectors are necessary in the storage area and the sulfonator area. An emergency eyewash shower and self-contained breathing apparatus should also be provided. All personnel should receive emergency response training. Facilities with more than 1,000 pounds of SO₂ stored on-site must abide by the Process Management Safety Standard in the OSHA regulations (OSHA, 1998).

Effect of Temperature on Gas Withdrawal Rate

The room temperature where the gas supply is located should be maintained around 70 degrees F to ensure optimal gas withdrawal rates (WEF, 1996). At this temperature, the maximum safe sulfur dioxide gas withdrawal rate is approximately 2 lb/hr for a 150 lb container, or 25 lb/hr for a ton container. Higher temperatures are required to achieve higher continuous gas withdrawal rates. Strip heaters or liquid baths may be used for this purpose.

Injector Selection

Proper selection of the injector is critical for proper system operation. The injector produces a vacuum that draws sulfur dioxide gas through the sulfonator. It then mixes the gas with dilution water supply and injects the solution into the wastewater. To properly size the injector, the back pressure on the injector at the point of application and the water supply pressure required at the injector must be determined. The injector can either be installed in a pipe or an open channel. As an alternative to the typical vacuum regulator with injector system, a chemical induction system may be used to introduce the sulfur dioxide directly as a gas.

Control

At present, few options exist for reliable long-term measurement of sulfite salts or close-to-zero levels of residual chlorine in the finished effluent (ASCE and WEF, 1991). In recent practice, the only viable method for continuous residual chlorine measurement has been the amperometric technique,

but this suffers from loss of accurate calibration at low concentrations (Finger et al., 1985). Though some sources claim to have developed process control methods employing oxidation reduction potential (ORP) as an effective stand-in for direct chlorine measurement (Bossard et al., 1995), other sources assert that ORP is an inappropriate technique for this purpose (WEF, 1996). For these reasons, control of dechlorination—particularly dechlorination to zero residual—has been problematic. Treatment plant operators have had to work around this limitation using various control strategies.

One commonly used strategy is the use of a “zero-shifted” or “biased” analyzer (WEF, 1996; Nagel, 1994). In this scheme, a residual chlorine analyzer is used and a known concentration, X , of chlorine is added to the effluent sample to be analyzed. In this technique, the “zero” point is shifted by the value of X , and residual chlorine or sulfur dioxide can be inferred from the result of sample analysis.

Two types of control systems are often used for dechlorination (WEF, 1996). A “feed-back” control system can be used at treatment plants that are not required to dechlorinate their effluents to zero levels. With feed-back control, an analyzer measures the chlorine residual at a point downstream of the sulfur dioxide addition. This signal, along with flow rate data, is relayed back to the sulfonator and the dosage is automatically adjusted accordingly. Though there is a lag time between the injection point and the sample point, the lag is deemed to be minimal since the dechlorination reaction occurs almost instantaneously.

For treatment plants that must discharge a zero concentration or undetectable residual chlorine but are not equipped with biased or direct reading analyzers, feed-back control is typically not feasible (WEF, 1996). Therefore, such dechlorination systems often use a “feed-forward” control that measures the chlorine residual after disinfection but *prior to* the addition of sulfur dioxide. A mass flow signal is sent to the sulfonator from the in-line analyzer and the sulfur dioxide delivery rate is automatically calculated and adjusted to the ratio required for proper dechlorination of the effluent.

Instrumentation combining feed forward control with biased analysis may provide an effective method to dechlorinate the effluent to low-level residuals. Another useful design feature involves using an automated chlorine flush of the sample line (with sulfonator response temporarily locked). This procedure prevents the buildup of slime and algae in the sample line, thus eliminating chlorine demand in the line which can suppress residual chlorine analyzer results (Nagel, 1994).

Sample Calculation

Given: Peak flow = 20 mgd. Measured chlorine residual is approximately 1.5 mg/L.

Calculate: Maximum dosage of sulfur dioxide needed per day. Assume a 1:1 ratio of SO₂ to Cl₂.

Capacity = (flow rate) x (Cl₂ residual) x (dosage ratio) = (20 mgd) x (1.5 mg/L Cl₂) x (8.34 lb/Mgal.mg/L)x(1 mg/L SO₂ per mg/L Cl₂) = 250 lb SO₂ per day maximum.

Using Sulfite Salts

Upon dissolution, sulfite salts produce the same sulfite ion as sulfur dioxide gas (WEF, 1996). While the gas has the highest dechlorinating efficiency per net pound of the product added, many smaller facilities choose to use one of the sulfite salts because of the storage, handling, feeding, and safety problems associated with using gaseous sulfur dioxide on a large scale. Of all the sulfite salts available, sodium metabisulfite has the lowest addition rate required for dechlorination (Lind, 1995).

PERFORMANCE

Sulfonation has been widely considered effective for removal of chlorine compounds in disinfected wastewater and reduction of toxicity for aquatic life. Nevertheless, two studies have suggested that disinfected/sulfonated wastewater poses a hazard to some sensitive aquatic species (Hall *et al.*, 1982;

Rein *et al.*, 1992). Furthermore, one estimation of chlorine removal efficiency is from 87 to 98 percent (Helz and Nweke, 1995), leaving the actual residual chlorine following sulfonation above most regulatory limits.

Chloramines tend to be longer lived and less reactive than other chlorinated species in wastewater (Lind, 1995). While hydrophilic organic chloramines have been thought of as generally nontoxic, Helz and Nweke have found that the S(IV) fraction resistant to dechlorination may be composed of hydrophobic secondary amines and peptides, including chloramines, suggesting possible toxicity for aquatic organisms in receiving streams. The authors note that this fraction of S(IV)-resistant chlorine has been overlooked because the dechlorinating agent interferes with standard analytical methods for total chlorine (Helz and Nweke, 1995). Continued testing is underway to further characterize the dechlorination-resistant fraction and its effects on aquatic organisms (Helz, 1998).

OPERATION AND MAINTENANCE

Components of the pressure manifold—especially flexible connectors, valves, and the injector and solution system—are the most likely to need repair (WEF, 1996). In view of this, these components should be inspected at least every six months. Additionally, diaphragms and injector gaskets should be replaced every two years. The gasket should be replaced each time the joint is broken in a gasketed pressure connection. Asbestos fiber gaskets are not recommended because they often do not seal properly. Used gaskets should *never* be re-used. Springs should be replaced according to the manufacturer's instructions.

Spare parts—especially parts for the pressure manifold—and standby equipment, should be kept on hand to prevent significant down time in the event of equipment problems. Because sulfonators are configured with the same components as chlorinators, some plant engineers tend to treat sulfonators as standby chlorinators (WEF, 1996), but this practice should be avoided. Chlorinators and sulfonators are composed of different polymeric materials (sulfonators typically of PVC and

chlorinators of ABS plastic), each chosen for application-specific chemical resistance. Use of non-chemical resistant materials with chlorine or sulfur dioxide gases can lead to equipment failure. Moreover, equipment misuse leading to accidental mixing of chlorine and sulfur dioxide gases can lead to an exothermic chemical reaction and equipment failure.

Water can be used to clean most component surfaces. For buildup of impurities or for stains, a dilute hydrochloric (muriatic) acid solution may be necessary (WEF, 1996). Following cleaning, the components must be thoroughly dried before they are reassembled. Drying is best done using compressed dry air or nitrogen.

COSTS

Costs for a dechlorination system vary widely depending on particular site conditions. Detailed estimates are not included here because they may be misleading. One of the largest overall cost variables is whether an existing facility is being upgraded to accommodate dechlorination or whether the chlorination/ dechlorination system is a component of new plant construction. Site-specific construction costs can vary by hundreds of thousands of dollars, depending on the type of project.

Table 1 gives a cost example of a 2,800 ppd gas sulfur dioxide system installed in 1994 in Florida. Cost considerations must also include the cost of equipment, installation, labor, and operation and maintenance. The type of dechlorination agent to be used will affect both the equipment and chemical costs. For large plants, sulfur dioxide gas is typically the agent of choice because of its dechlorinating efficiency on a per pound basis. However, as previously mentioned, many smaller plants may find that storage, handling, and safety issues offset whatever gains in efficiency can be obtained by using compressed gas.

Effective process control will help prevent chemical overdosing and allow for chemical cost savings. One 40-mgd facility has reported a savings of \$7,000 per month—a greater than 1,000 pound per day reduction in SO₂ use (>50%) and a greater than

TABLE 1 COST OF A 2,800 PPD GAS SULFUR DIOXIDE SYSTEM IN 1994

Component	Cost (\$)
Sulfonator and ancillary mechanical equipment	100,000
Gas Scrubber	150,000
Ventilation System	45,000
Miscellaneous piping and valves	30,000
Building & Architectural items	250,000
Electrical	75,000
Instrumentation	30,000
<i>Subtotal</i>	<i>680,000</i>
Contractor Overhead (@6.5%)	44,200
Total (In 1993 dollars)	724,200

Source: Parsons Engineering Science, Inc., 2000.

one-third reduction in chlorine use—resulting from the purchase of a new automatic process control system (Bossard *et al.*, 1995). The savings represented a three month payback period on the new equipment.

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EPA 832-X-99-062
September 1999

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<http://www.epa.gov/owmitnet/mtbfact.htm>

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18. Water Environment Federation and the American Society of Civil Engineers, 1991. *Design of Municipal Wastewater Treatment Plants*. 2 vols. WEF Manual of Practice No. 8. Alexandria, VA: Water Environment Federation.

ADDITIONAL INFORMATION

Water Environment Federation
601 Wythe Street
Alexandria, Virginia 22314-1994

American Society of Civil Engineers
World Headquarters
1801 Alexander Bell Drive
Reston, Virginia 20191-4400

Water and Wastewater Equipment Manufacturers
Association, Inc.
Dawn Kristof, President
P.O. Box 17402
Washington, D.C. 20041

The mention of trade names or commercial
products does not constitute endorsement or
recommendation for use by the U.S. Environmental
Protection Agency.

For more information contact:

Municipal Technology Branch
U.S. EPA
Mail Code 4204
1200 Pennsylvania Avenue, NW
Washington, D.C. 20460

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Excellence in compliance through optimal technical solutions
MUNICIPAL TECHNOLOGY BRANCH





THE CITY-COUNTY OF Butte-Silver Bow

SOP #21
Public Works
Metro Sewer MS4 Program
Illicit Discharge Detection & Elimination

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Illicit discharges to the municipal storm water system (i.e., storm inlets, drainage ditches) and/or area surface waters are harmful to water quality and the environment.
Operating Best Management Practices (BMPs) needed:	1. Illicit discharge investigations include tools/methods (i.e., IDDE inspection plan, IDDE inspection form, live inspection, DVDs, photographs, dye-testing, Closed-Circuit Television-CCTV). 2. Determine enforcement response if an illicit source is present. 3. An emergency incident, as protection of life priority duties allow, includes protection storm inlets, drainage ditches from spilled material.
Administrative BMPs needed:	1. Training on safety procedures associated with illicit discharges. 2. The chain-of-command includes: First Responders, Dispatch, and Incident Control (IC) personnel if illicit discharge is present. 3. Coordinate an enforcement response plan (ERP) with involved agencies/jurisdictions.
Safety:	1. PPE (boots, high-visibility clothing, gloves) 2. Hepatitis B shot 3. Traffic awareness
Responsible Staff:	Technician
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity Oil and Grease Chlorine
Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</i>

SOP #21
Public Works
Metro Sewer MS4 Program
Illicit Discharge Detection & Elimination

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

Director/Chief

(406) 497 – 6483

MS4 Coordinator

(406) 497 – 6563



THE CITY-COUNTY OF Butte-Silver Bow

SOP #22
Public Works
Metro Sewer, Park & Recreation, Roads, and Water MS4 Program
Equipment Fueling

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Fuel has the potential to add pollutants to the environment; proper fueling procedures ensure fuel is handled properly.
Operating Best Management Practices (BMPs) needed:	1. Remain at vehicle while the fuel tank is filling. 2. Do not "top off" vehicle fuel tanks. 3. Fuel cans need to be on the ground while filling to avoid static charge. 4. Avoid fueling near storm inlets or protect inlets with inlet protection device. 5. Minor spills-apply absorbent material/pad liberally & immediately. Follow up with collection of material/pad and disposal in landfill.
Administrative BMPs needed:	1. For a major spill (greater than 25 gallons), Move away from Spill area and call 911 and MDEQ (800-457-0568). 2. MDEQ must be notified of releases of greater than 25 gallons of any petroleum product such as: crude oil, gasoline, diesel fuel, aviation fuel, asphalt, road oil, & kerosene. 3. If a major spill occurs, notify personnel following chain-of-command. 4. A spill kit is available and located in the maintenance shop.
Safety:	1. PPE (steel toe boots, safety glasses, hard hat, field gloves). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Avoid use of cell phones as there is an explosion risk when fueling.
Responsible Staff:	All Staff
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity <u>Oil and Grease</u>

Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>
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Attachment:**References:****MDEQ:**

MDEQ must be notified of releases of **greater than 25 gallons** of any petroleum product such as: crude oil, gasoline, diesel fuel, aviation fuel, asphalt, road oil, & kerosene (800-457-0568). Petroleum product releases less than 25 gallons in volume must be contained and cleaned up within 24 hours. If cleanup cannot be completed within 24 hours, owners and operators must report the release to DEQ (800-457-0568). Outside normal business hours, releases must be reported to the DES 24-hour phone number at (406) 324-4777. Releases must be reported to a live person – voice mails are not adequate notification.

Spill Report form (see attached):

<http://deq.mt.gov/DEQAdmin/ENF/spill>

Spill Management & Reporting Policy (see attached):

<http://deq.mt.gov/portals/112/deqadmin/enf/documents/Reports/SpillPolicy.pdf>

Metro**Chain-of-Command/Chain-of-Command for Fuel Spill****Name:****Phone:**MS4 Coordinator(406) 497 – 6519Crew Foreman(406) 497 – 6550**P & R****Chain-of-Command:****Name:****Phone:**MS4 Coordinator(406) 497 – 6519Park & Rec Director(406) 497 – 6571**Roads**

SOP #22
Public Works
Metro Sewer, Park & Recreation, Roads, and Water MS4 Program
Equipment Fueling

Chain-of-Command:

Name: Phone:

MS4 Coordinator (406) 497 – 6519
Crew Foreman (406) 497 – 6567

Water

Chain-of-command:

Name: Phone:

MS4 Coordinator (406) 497 – 6519
Water Manager (406) 497 – 6539

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

SOP #22
Public Works
Metro Sewer, Park & Recreation, Roads, and Water MS4 Program
Equipment Fueling

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #23
Public Works
Metro Sewer and Water MS4 Program
Material Management

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Material (i.e., sediment, liquids, trash) hauling and storing has the potential to add pollutants to storm water.
Operating Best Management Practices (BMPs) needed:	1. Transfer liquid loads to hauling vehicle away from storm water controls (i.e. storm inlets, drainage ditches). 2. Transfer to hauling vehicle without spillage. (i.e., do not overfill dump truck, assure that loader buckets are not overfilled and spilling when filling dump truck). 3. Spillage will be cleaned up to ensure material does not enter storm water controls (i.e., storm inlets). 4. Materials should be stored and covered properly to ensure the
Administrative BMPs needed:	1. Cover loads (i.e., tarp) during transport. 2. Ensure haul truck beds are structurally sound and are not overfilled so liquid loads do not leak during transport.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves, high visibility clothing). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. CDL required. 4. DOT random drug screens will be administered.
Responsible Staff:	Foreman, Teamster, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> Salinity <u>Oil and Grease</u>

SOP #23
Public Works
Metro Sewer and Water MS4 Program
Material Management

Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>
-------------------	--

Attachment:

References:

Metro

Chain-of-Command

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Crew Foreman

(406) 497 – 6550

Water

Chain-of-Command

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Water Manager

(406) 497 – 6539

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #24
Public Works
Metro Sewer MS4 Program
Outfall/Pond Maintenance

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Outfalls to the municipal storm water system and permittee owned ponds need to be maintained to accommodate storm water runoff.
Operating Best Management Practices (BMPs) needed:	1. Document with photographs and field notes. 2. Determine enforcement response if an illicit source is present. 3. An Asset Management entry is completed. 4. Initiate an IDDE investigation as appropriate.
Administrative BMPs needed:	1. Schedule inspection during dry-weather conditions. 2. Establish notification chain-of-command (emergency vs. non-emergency) if illicit discharge is present. 3. Coordinate an enforcement response plan (ERP) with involved agencies/jurisdictions.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves, high visibility clothing). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Hepatitis B shot (series of 3 doses, dose 1 and 2, 1 month apart; doses 2 and 3, 6 months apart) 4. Surface water safety/awareness.
Responsible Staff:	Public Works, Metro Sewer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u>

SOP #24
Public Works
Metro Sewer MS4 Program
Outfall/Pond Maintenance

Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>
-------------------	--

Attachment:

OUTFALL RECONNAISSANCE INVENTORY/ SAMPLE COLLECTION FIELD SHEET

References:

MS4 Outfall Inspection Plan
Enforcement Response Plan (ERP)

Metro

Chain-of-Command

Name:

Phone:

MS4 Coordinator _____

(406) 497 – 6519 _____

Crew Foreman _____

(406) 497 – 6550 _____

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #25
Public Works
Park & Recreation MS4 Program
Fertilizer Storage, Handling, Application, & Cleanup

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Fertilizer is a pollutant which can be harmful to the environment; proper storage ensures that it does not enter the storm water system.
Operating Best Management Practices (BMPs) needed:	<u>Storage</u> 1. Store fertilizer away from storm water controls (i.e., storm inlets). 2. Store in a dry enclosure separated from other chemicals. 3. Secondary containment, sized to hold at least 1.5 times the storage capacity of the container, is recommended. 4. Lock and label storage area. 5. Store upright in original labeled containers. <u>Handling</u> 6. Spill response equipment is readily available. Liquid fertilizers need absorbent materials; solid fertilizers need shovel, dustpan, broom and/or buckets. <u>Application</u> 7. Follow directions provided by manufacturer. 8. Fertilizer is applied when weather conditions are not windy. 9. Fertilizer is applied when people and/or animals (i.e., dogs) are not present. 10. If required, certification is acquired prior to application. <u>Cleanup</u> 11. Excess fertilizer is collected and/or swept from impervious surface (i.e., sidewalks, driveways).
Administrative BMPs needed:	1. Training on proper fertilizer handling and safety procedures. 2. Personnel are directed to call 911 in case of an emergency. 3. If an emergency occurs, notify personnel following the chain-of-command. 4. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.
Safety:	1. PPE (nitrile gloves, safety glasses, steel toe boots, long sleeve shirt). 2. Traffic awareness. 3. Chemical awareness.

SOP #25
Public Works
Park & Recreation MS4 Program
Fertilizer Storage, Handling, Application, & Cleanup

Responsible Staff:	Technician
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) <u>Nutrients: Phosphorus, Nitrogen</u> Metals Bacteria Salinity Oil and Grease
Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>

Attachment:

References:

P & R

Chain-of-Command:

Name:

Phone:

MS4 Coordinator
Park & Rec Director

(406) 497 – 6519
(406) 497 – 6571

Revision History:

Revision Number	Effective Date	Significant Changes

SOP #25
Public Works
Park & Recreation MS4 Program
Fertilizer Storage, Handling, Application, & Cleanup

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature



Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Herbicides and dyes if not properly handled can be harmful to the environment if they enter the storm water system.
Operating Best Management Practices (BMPs) needed:	<u>Storage</u> 1. Store away from storm water controls (i.e., storm inlets). 2. Store in a dry enclosure separated from other chemicals. 3. Secondary containment, sized to hold at least 1.5 times the storage capacity of the container, is recommended. 4. Lock and label storage area. 5. Store upright in original labeled containers. <u>Handling</u> 6. Clean-up/spill response equipment should be readily available. Liquids need absorbent materials; solids need shovel, dustpan, broom and/or buckets. <u>Application</u> 7. Follow directions provided by manufacturer. 8. Herbicides are applied when weather conditions are not windy. 9. Herbicides are applied when people and/or animals (i.e., dogs) are not present. 10. Aquatic certification is required prior to dye application. <u>Cleanup</u> 11. Excess herbicides are removed from impervious surfaces (i.e., sidewalks, driveways).
Administrative BMPs needed:	1. Training on proper herbicide handling and safety procedures. 2. Personnel are directed to call 911 in case of an emergency. 3. If an emergency occurs, notify personnel following the chain-of-command. 4. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.

SOP #26
Public Works
Park & Recreation Weed Department MS4 Program
Herbicide storage, handling, application, & cleanup

Safety:	1. PPE (nitrile gloves, long sleeve shirt, safety glasses, respirator may be needed for certain chemicals). 2. Herbicide awareness. Ensure proper handling application procedures are followed, as chemicals may enter the body through absorption and inhalation.
Responsible Staff:	Technician
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) <u>Nutrients: Phosphorus, Nitrogen</u> Metals Bacteria Salinity Oil and Grease
Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>

Attachment:

References:

P & R

Chain-of-Command

Name:

Phone:

MS4 Coordinator
Park & Rec Director
John Moody

(406) 497 – 6519
(406) 497 – 6571
(406) 497 – 6460

SOP #26
Public Works
Park & Recreation Weed Department MS4 Program
Herbicide storage, handling, application, & cleanup

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

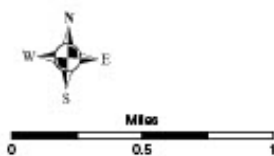
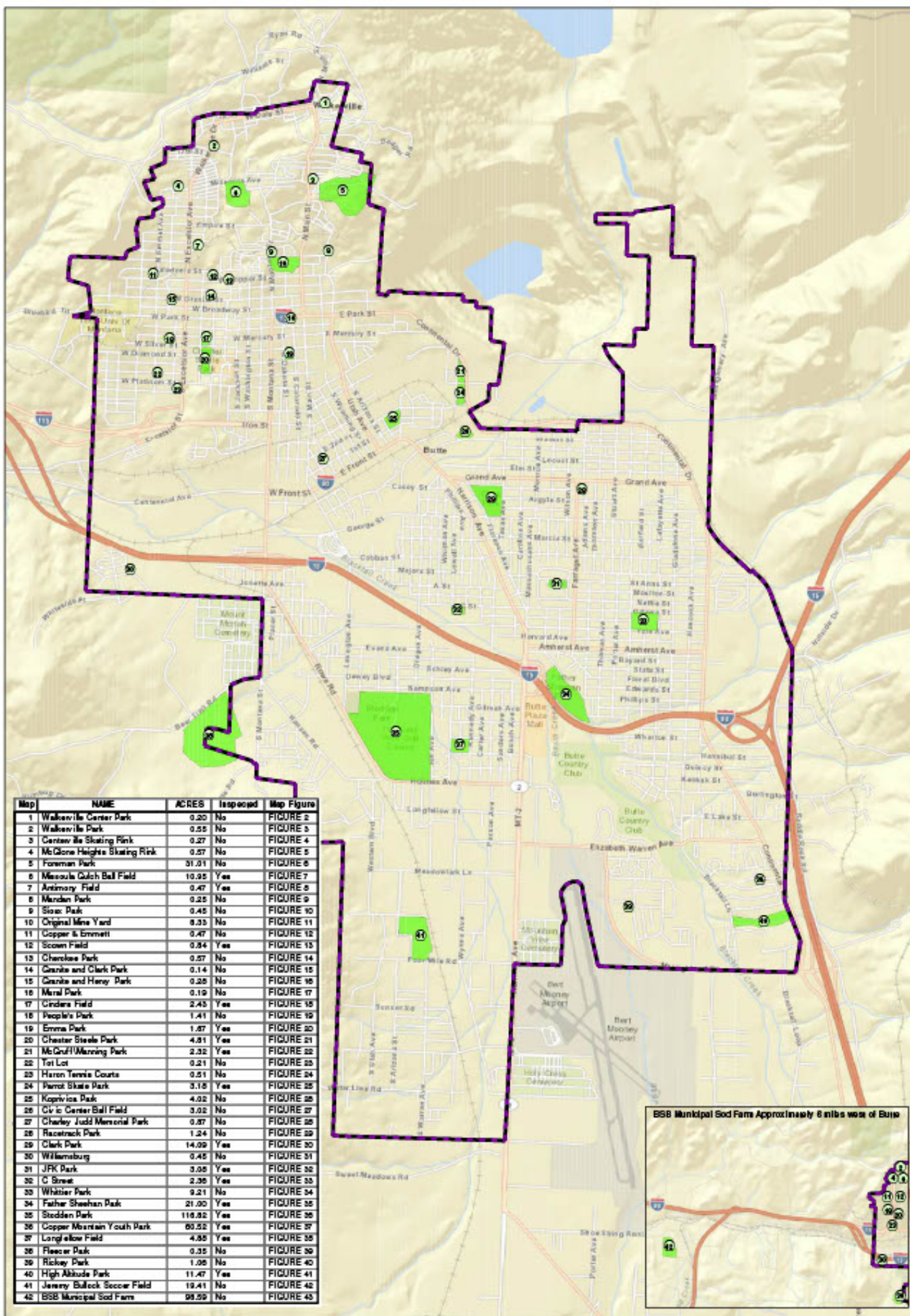
Signature

Signatures after training:

Date: _____

Name (printed)

Signature



Legend
 MS4 Boundary
 Park Location

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

PARK LOCATIONS

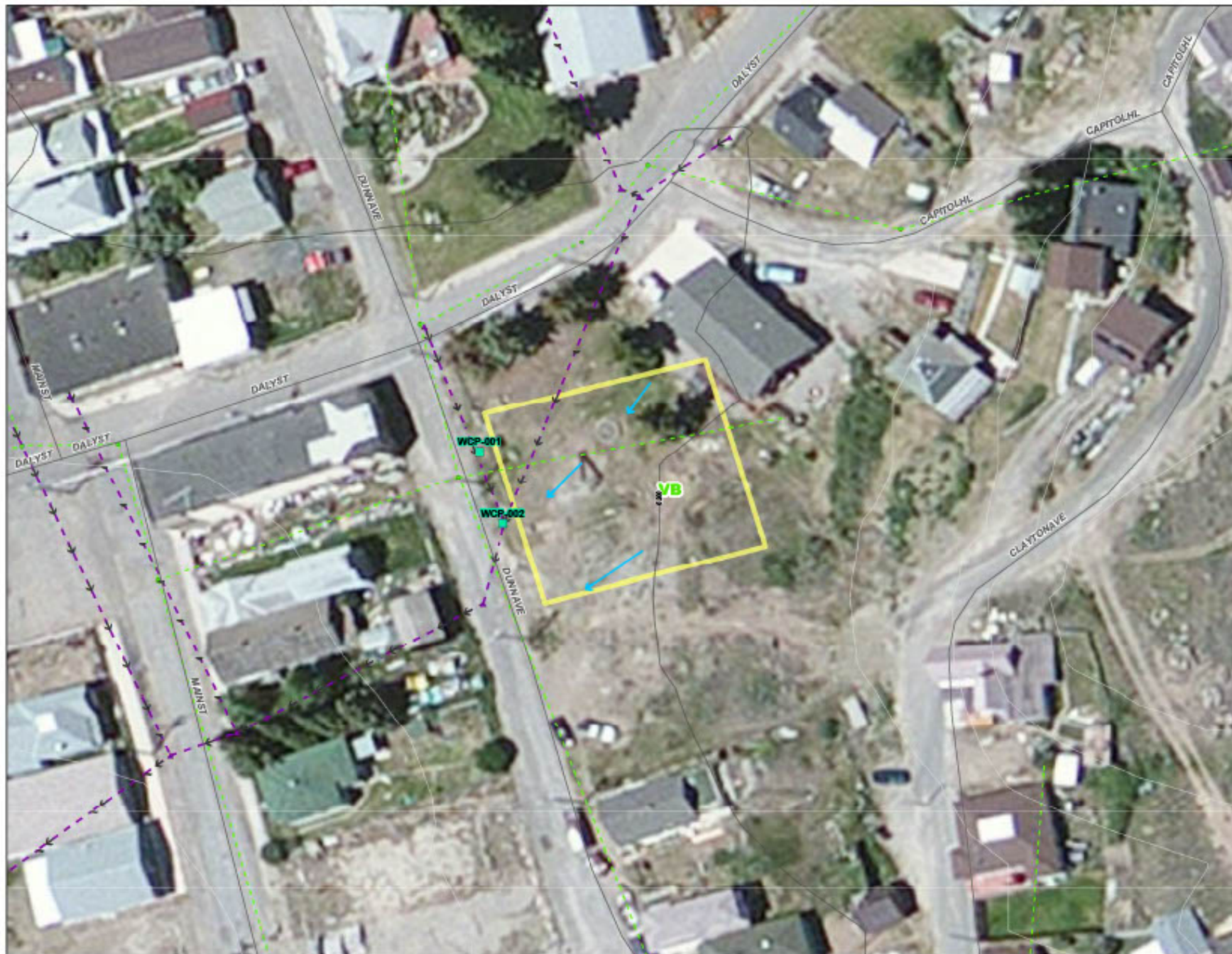
Butte-Silver Bow County, MT

Job#: 002WMT1

Date: 5/27/2014

Pub: 05/28/2014 10:41 AM / J:\Projects\002WMT1\002WMT1.dwg

FIGURE 1



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Walkerville Center Park

Butte-Silver Bow County, MT

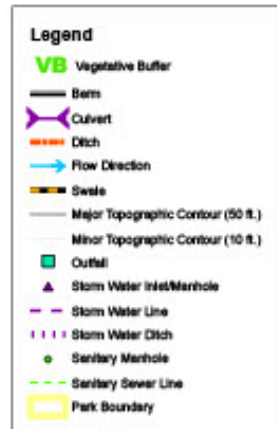
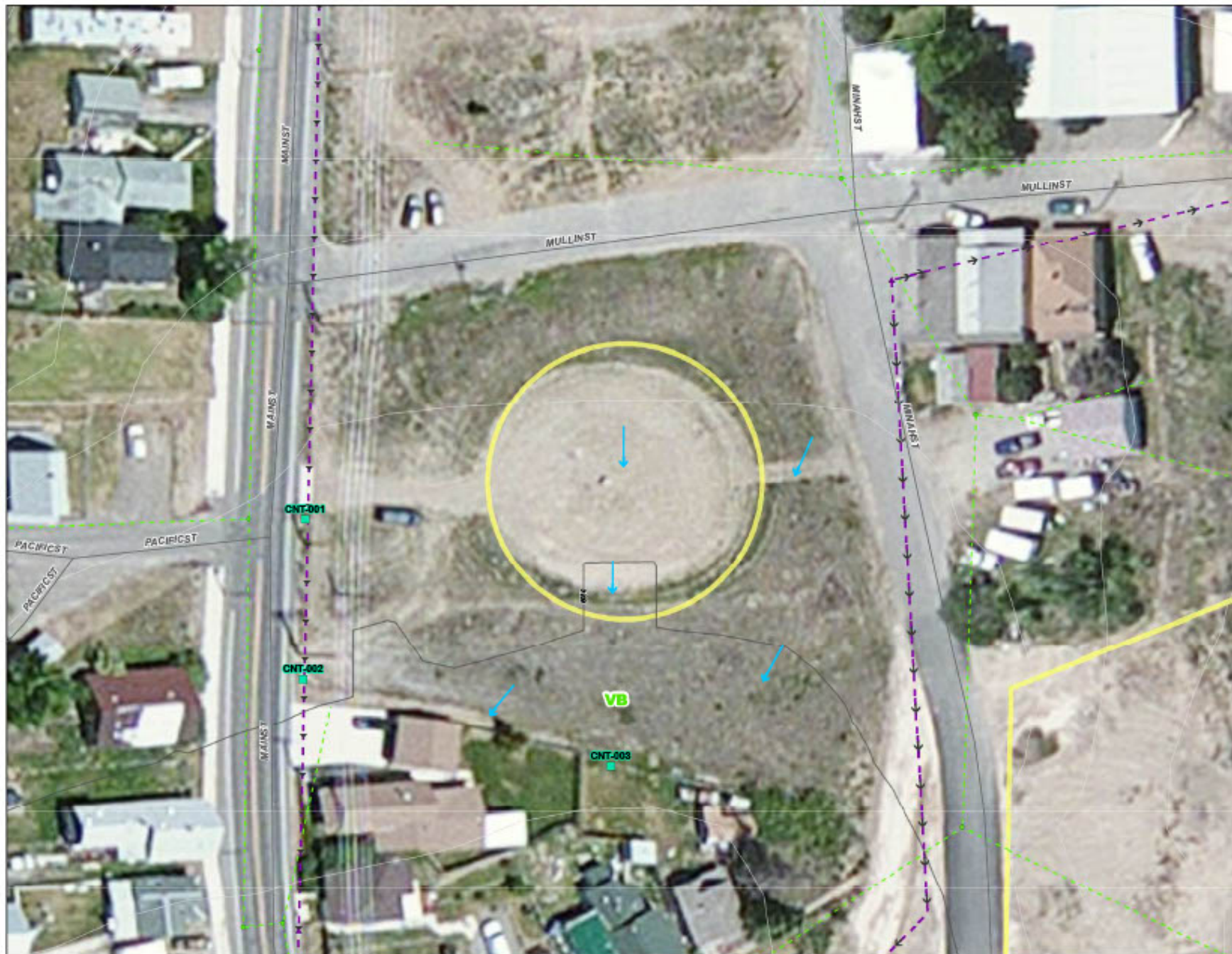
Job#: 850PWW4111

Date: 3/28/2014

FIGURE 2

File: walkerville_center_park_fig2.mxd, keller-jones





Centerville Skating Rink

Butte-Silver Bow County, MT

Job#: 850PWW4171

Date: 3/28/2014

FIGURE 4

File: watermain_bow_ditch_3dpage.mxd, color: yellow



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



McGlone Heights Skating Rink

Butte-Silver Bow County, MT

Job#: BCBPWW4111

Date: 3/28/2014

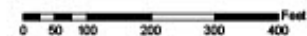
FIGURE 5

File: watermain layout.dwg, 3/28/2014, 1:10 PM, User: jayson



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Foreman Park

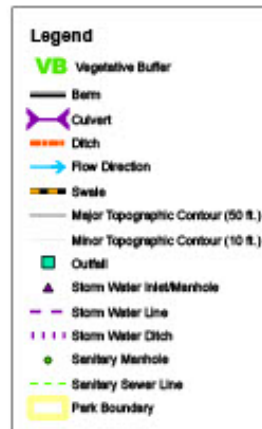
Butte-Silver Bow County, MT

Job#: BCD/PWM/111

Date: 3/27/2014

FIGURE 6

Not a standard map of Montana. All rights reserved. All other rights reserved.



Missoula Gulch Ball Field

Butte-Silver Bow County, MT

Job#: BCBPWW4171

Date: 3/28/2014

FIGURE 7

File: \\waterworks\local\BFBM_3\BFBM_3.dwg, Author: jayson



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Antimony Field

Butte-Silver Bow County, MT

Job#: BCBPWW4171

Date: 3/28/2014

FIGURE 8

File: c:\water\work\butte\Antimony\fig8.mxd, kabin.japanse



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Mandan Park

Butte-Silver Bow County, MT

Job#: BCBPWW4171

Date: 3/28/2014

FIGURE 9

File: c:\data\water\but\fig9_fig9a.mxd, keller-jp@water.com



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Sioux Park

Butte-Silver Bow County, MT

Job#: 826PWW4111

Date: 3/28/2014

FIGURE 10

File: watermain loc offset_3dpage.mxd, color: yellow



Legend

- VB** Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



0 20 40 80 120 160 Feet

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Original Mine Yard

Butte-Silver Bow County, MT

Job#: BCD/PWM/11

Date: 3/27/2014

FIGURE 11

Note: All dimensions are in feet unless otherwise specified.



Legend

- VB** Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Copper & Emmett

Butte-Silver Bow County, MT

Job#: BCDPWW4111

Date: 3/28/2014

FIGURE 12

File: watermain layout.dwg, 3/28/2014, 10:00 AM, 10:00 AM



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Granite and Henry Park

Butte-Silver Bow County, MT

Job#: BCDPWW4111

Date: 3/28/2014

FIGURE 16

File: watermain_bcdp_16page.mxd, color: yellow



- Legend**
- VB Vegetative Buffer
 - Berm
 - Culvert
 - Ditch
 - Flow Direction
 - Swale
 - Major Topographic Contour (50 ft.)
 - Minor Topographic Contour (10 ft.)
 - Outfall
 - ▲ Storm Water Inlet/Manhole
 - Storm Water Line
 - - - Storm Water Ditch
 - Sanitary Manhole
 - Sanitary Sewer Line
 - Park Boundary



0 10 20 40 60 80 Feet

WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Cinders Field

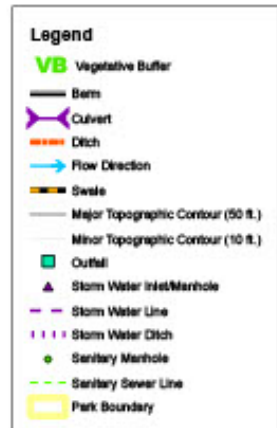
Butte-Silver Bow County, MT

Job#: 826PWW4171

Date: 3/28/2014

FIGURE 18

Not to be used without the approval of the client.



People's Park

Butte-Silver Bow County, MT

Job#: BCBPWW4111

Date: 3/28/2014

FIGURE 19

File: watermain_bat_ditch_18pages.mxd, labor pages



Legend

- VB** Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Emma Park

Butte-Silver Bow County, MT

Job#: 826PWW4111

Date: 3/28/2014

FIGURE 20

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Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary

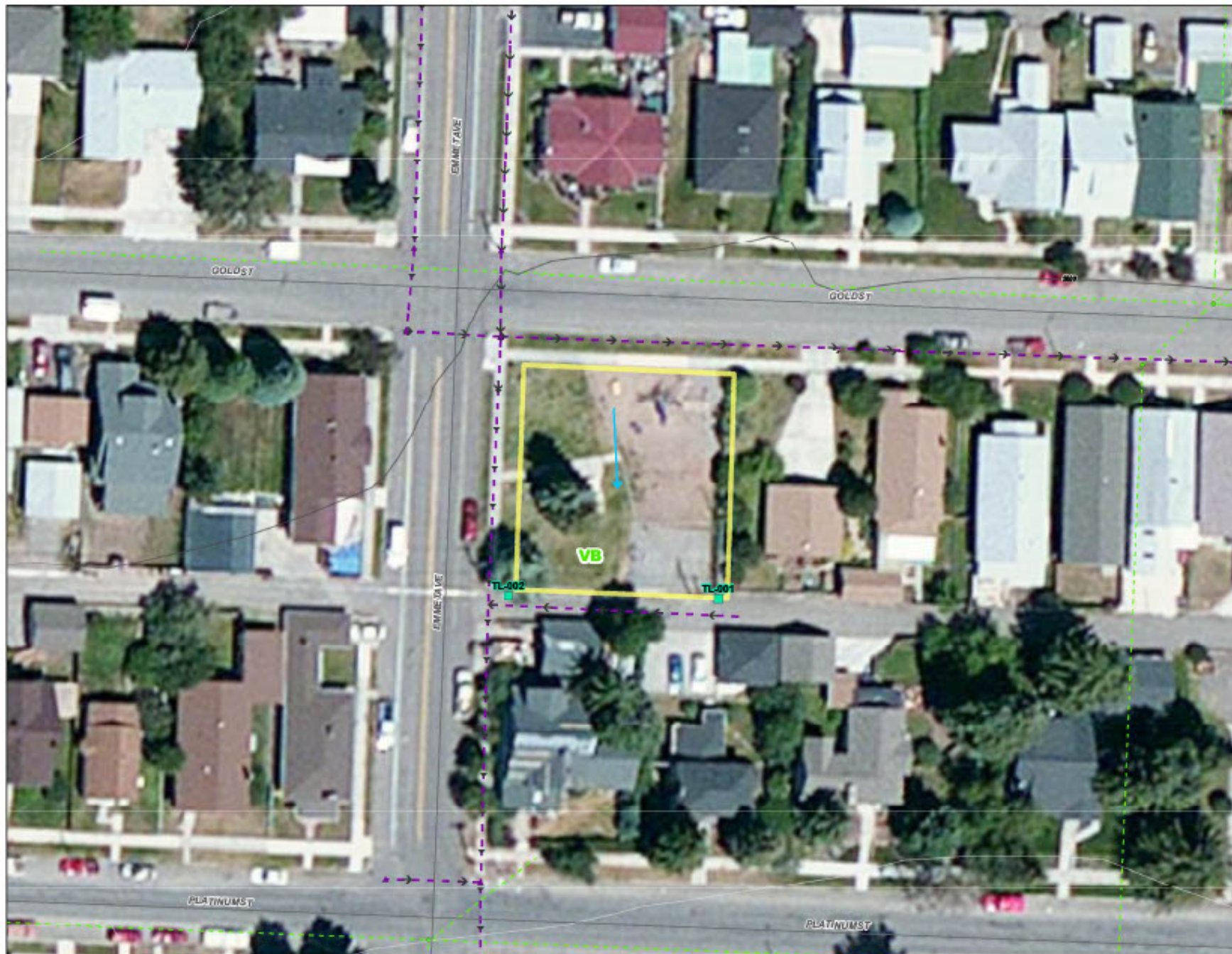


WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Chester Steele Park
 Butte-Silver Bow County, MT

Job#: BCDPWW4111
 Date: 3/28/2014
 File: watermain layout_3/28/14.mxd, color, paper

FIGURE 21



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Tot Lot

Butte-Silver Bow County, MT

Job#: BCDPWW4111
 Date: 3/28/2014

FIGURE 23

Not a standard lot ofline, it's a map of the lot.



- Legend**
- VB Vegetative Buffer
 - Berm
 - X Culvert
 - Ditch
 - Flow Direction
 - Swale
 - Major Topographic Contour (50 ft.)
 - Minor Topographic Contour (10 ft.)
 - Outfall
 - ▲ Storm Water Inlet/Manhole
 - Storm Water Line
 - Storm Water Ditch
 - Sanitary Manhole
 - Sanitary Sewer Line
 - Park Boundary



Huron Tennis Courts

Butte-Silver Bow County, MT

Job#: BCBPWH111

Date: 3/28/2014

FIGURE 24

File: w&e\water\butte-silver_bow\huron_tennis_courts\huron_tennis_courts.dwg



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- - - Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Koprivica Park

Butte-Silver Bow County, MT

Job#: 826PWW4111

Date: 3/28/2014

FIGURE 26

Not to be used without the approval of the project manager.



Legend

- VB** Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Charley Judd Memorial Park	
Butte-Silver Bow County, MT	
Job#: BCDPWW4111	FIGURE 28
Date: 3/28/2014	
File: watermain_and_storm_water_lines.dwg, color: yellow	



Legend

-  Vegetative Buffer
-  Barn
-  Culvert
-  Ditch
-  Flow Direction
-  Swale
-  Major Topographic Contour (50 ft.)
-  Minor Topographic Contour (10 ft.)
-  Outfall
-  Storm Water Inlet/Manhole
-  Storm Water Line
-  Storm Water Ditch
-  Sanitary Manhole
-  Sanitary Sewer Line
-  Park Boundary



**Water &
Environmental
Technologies, PO**

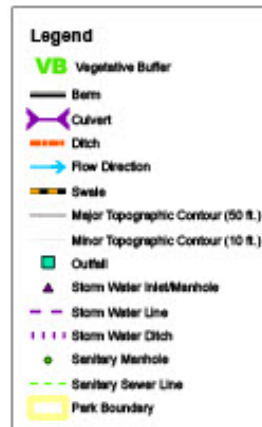
Racetrack Park

Butte-Silver Bow County, MT

Job#: BGD/PWMA/1T1

Date: 3/25/2014

FIGURE 29



WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Clark Park

Butte-Silver Bow County, MT

Job#: 826PWW4111

Date: 3/28/2014

FIGURE 30

File: 826PWW4111_Fig30.mxd, keller-jones



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Williamsburg

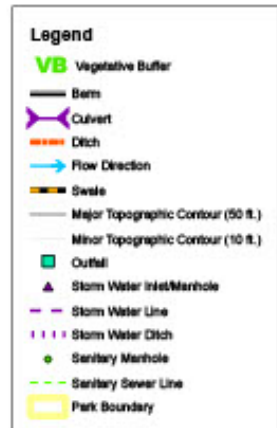
Butte-Silver Bow County, MT

Job#: BCBPWW4171

Date: 3/24/2014

FIGURE 31

File: \\server\water\land\BWP_001\BWP_001.dwg, Author: jaymiller



JFK Park

Butte-Silver Bow County, MT

Job#: 850PWW4111

Date: 3/26/2014

FIGURE 32

File: \\waterandwaste\proj\850p\figs\fig32.mxd, color: yellow



Legend

- VB** Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



C Street

Butte-Silver Bow County, MT

Job#: 856PWW4171

Date: 3/28/2014

FIGURE 33

Note: All dimensions are in feet, unless otherwise noted.



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Whittier Park

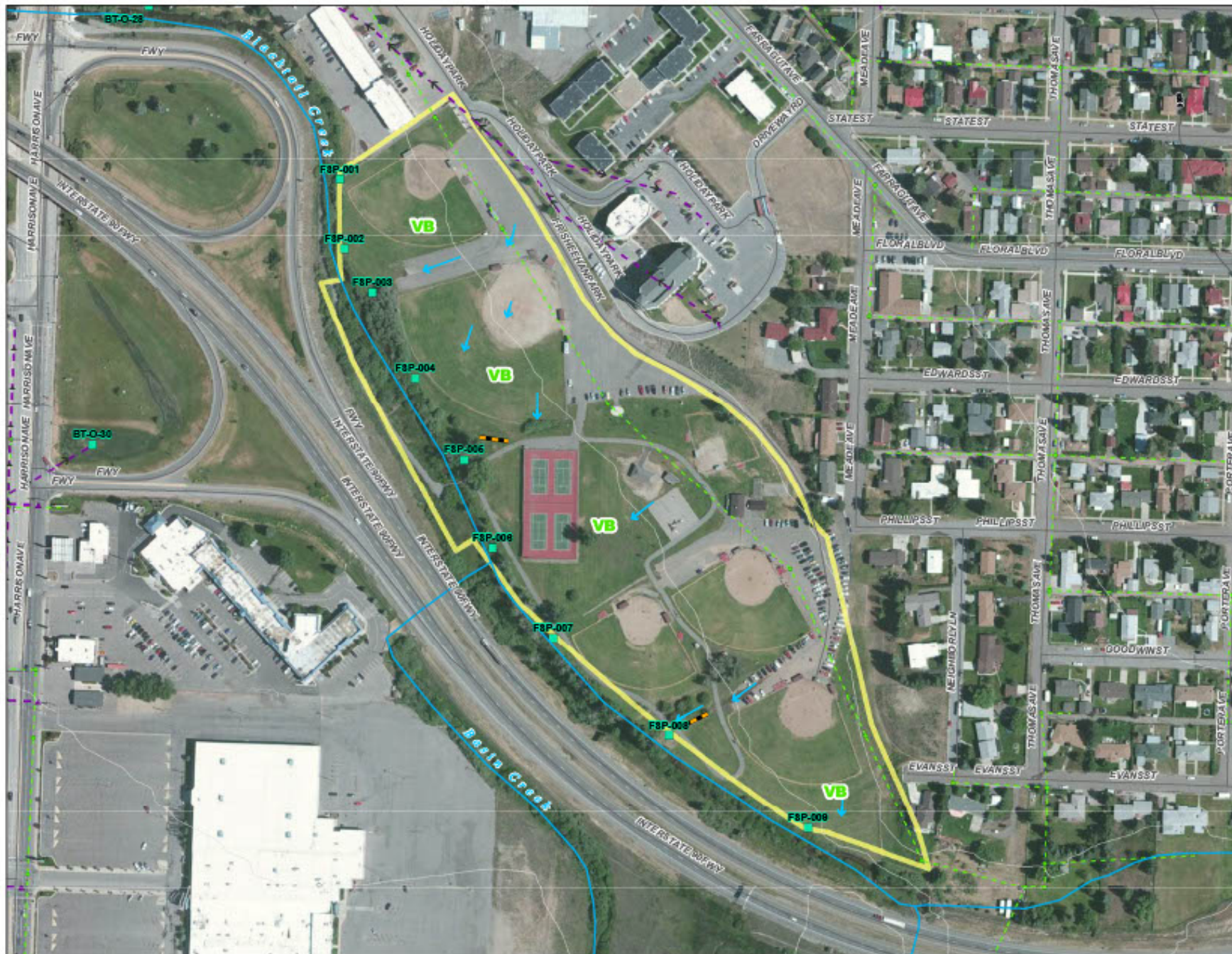
Butte-Silver Bow County, MT

Job#: 800PWW4111

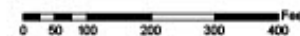
Date: 3/28/2014

FIGURE 34

Map is not to scale and is for informational purposes only.



- Legend**
- VB Vegetative Buffer
 - Barn
 - Culvert
 - Ditch
 - Flow Direction
 - Swale
 - Major Topographic Contour (50 ft.)
 - Minor Topographic Contour (10 ft.)
 - Outfall
 - ▲ Storm Water Inlet/Manhole
 - Storm Water Line
 - Storm Water Ditch
 - Sanitary Manhole
 - Sanitary Sewer Line
 - Park Boundary



WATER & ENVIRONMENTAL TECHNOLOGIES, PC

Father Sheehan Park

Butte-Silver Bow County, MT

Job#: BCBPWW4111

Date: 3/28/2014

FIGURE 35

Map is not to scale and is for informational purposes only.



Legend

- VB Vegetative Buffer
- Barn
- X Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Stodden Park

Butte-Silver Bow County, MT

Job#: 826PWW4171

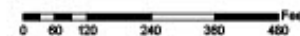
Date: 3/28/2014

FIGURE 36

File: 826PWW4171_Fig36.mxd, color: yellow



- Legend**
- VB Vegetative Buffer
 - Barn
 - Culvert
 - Ditch
 - Flow Direction
 - Swale
 - Major Topographic Contour (50 ft.)
 - Minor Topographic Contour (10 ft.)
 - Outfall
 - ▲ Storm Water Inlet/Manhole
 - Storm Water Line
 - - - Storm Water Ditch
 - Sanitary Manhole
 - Sanitary Sewer Line
 - Park Boundary



Copper Mountain Youth Park

Butte-Silver Bow County, MT

Job#: BCDP/WM/111

Date: 3/28/2014

FIGURE 37

Map is not to scale and is for informational purposes only.



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Longfellow Field

Butte-Silver Bow County, MT

Job#: BCBPWW4111

Date: 3/28/2014

FIGURE 38

File: watermain_basemap_38page.mxd, color pages



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- - - Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- ▲ Storm Water Inlet/Manhole
- Storm Water Line
- - - Storm Water Ditch
- Sanitary Manhole
- - - Sanitary Sewer Line
- Park Boundary



Rickey Park

Butte-Silver Bow County, MT

Job#: 826PWW4171

Date: 3/26/2014

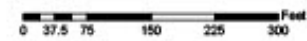
FIGURE 40

File: 826PWW4171_Fig40.mxd, keller-jones



Legend

- VB Vegetative Buffer
- Barn
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



Jeremy Bullock Soccer Field
 Butte-Silver Bow County, MT

Job#: BCBPWW4111
 Date: 3/28/2014

FIGURE 42

File: watermain_bullditch_3pages.mxd, color pages



Legend

- VB Vegetative Buffer
- Berm
- Culvert
- Ditch
- Flow Direction
- Swale
- Major Topographic Contour (50 ft.)
- Minor Topographic Contour (10 ft.)
- Outfall
- Storm Water Inlet/Manhole
- Storm Water Line
- Storm Water Ditch
- Sanitary Manhole
- Sanitary Sewer Line
- Park Boundary



BSB Municipal Sod Farm

Butte-Silver Bow County, MT

Job#: BSBPWW4171

Date: 3/28/2014

FIGURE 43

File: \\waterworks\local\BFBM_3\BFBM_3.mxd, Author: jaymiller



THE CITY-COUNTY OF Butte-Silver Bow

SOP #27
Public Works
Park & Recreation MS4 Program
Pet Waste Management

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Pet waste is a pollutant which contains bacteria and nutrients and is harmful to water quality.
Operating Best Management Practices (BMPs) needed:	1. Avoid putting pet waste in storm water controls (i.e., storm inlets, drainage ditches). 2. Sealed waste bags are disposed in waste receptacle.
Administrative BMPs needed:	1. Post signs at dog-friendly locations to "Clean up after your dog". 2. Pet waste station locations are shown in Figure. 3. Waste receptacle are checked and restocked routinely. (i.e., weekly and/or monthly).
Safety:	1. PPE (boots, gloves, safety glasses, long sleeve shirt). 2. Hepatitis B shot recommended.
Responsible Staff:	Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> Metals <u>Bacteria</u> Salinity Oil and Grease
Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <u>NOTE: City of Butte Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</u>

SOP #27
Public Works
Park & Recreation MS4 Program
Pet Waste Management

Attachment:

References:

Figure

P & R

Chain-of-Command

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Park & Rec Director

(406) 497 – 6571

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

SOP #27
Public Works
Park & Recreation MS4 Program
Pet Waste Management

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #28
Public Works
Park & Recreation MS4 Program
Irrigation

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Irrigation water that drains offsite has the potential to transport pollutants to the storm water system.
Operating Best Management Practices (BMPs) needed:	1. To ensure proper water application, monitor application to maintain appropriate volumes. 2. Dry areas apparent after irrigation, will be hand watered. 3. If irrigation water drains off-site, procedures will be changed to address the excess runoff.
Administrative BMPs needed:	1. Training on proper irrigation methods/maintenance/safety procedures. 2. An irrigation schedule is recommended.
Safety:	1. PPE (steel toe boots, safety glasses, field gloves).
Responsible Staff:	Technician, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> Metals Bacteria Salinity <u>Oil and Grease</u>
Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alterations, Sediment, & Zinc.</u></i>

Attachment:

References:

P & R

Chain-of-Command

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Park & Rec Director

(406) 497 – 6571

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #29
Public Works
Road MS4 Program
Salt Storage

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Salt prevents the bonding of ice and snow to pavement surfaces, allowing more efficient and faster removal of hazardous snow. Salt is a pollutant which is harmful to the environment and must be separated from the storm water system.
Operating Best Management Practices (BMPs) needed:	1. Install inlet protection devices (i.e., filter bags) for storm water controls (i.e., storm inlets) if located in the salt stockpile discharge path. 2. If salt is spilled transfer to hauling vehicle without spillage. 3. Clean up all spilled salt present on site. 4. Map (Figure 1) shows salt location.
Administrative BMPs needed:	1. Routinely inspect stockpiles (i.e., weekly, monthly). 2. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.
Safety:	1. PPE (steel toe boots, safety glasses, hard hat, field gloves, high visibility clothing). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. Equipment awareness.
Responsible Staff:	Technician, Laborer
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen Metals Bacteria <u>Salinity</u> Oil and Grease

SOP #29
Public Works
Road MS4 Program
Salt Storage

Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>
--------------------------	--

Attachment:

References:

Figure

Roads

Chain-of-Command

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Crew Foreman

(406) 497 – 6567

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

SOP #29
Public Works
Road MS4 Program
Salt Storage

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #30
Public Works
Road MS4 Program
Street Sweeping & Flushing

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Street Sweeping & Flushing is conducted to remove sediment, trash, and Debris.
Operating Best Management Practices (BMPs) needed:	1. Routinely clean sediment/debris/trash from storm inlets/sumps to ensure proper functioning. 2. Collect debris/trash and dispose at Landfill. 3. Install inlet protection devices (i.e., filter bags) prior to sweeping and flushing. 4. Sweep Sediment. 5. Remove inlet protection devices when sweeping and flushing is completed.
Administrative BMPs needed:	1. Spring season sweeping is to collect sanding material. 2. Primary and secondary streets are swept 12 times annually. 3. Sediment disposal at Landfill. 4. Training on proper equipment operation/maintenance/safety procedures. 5. Training on proper BMP installation/maintenance procedures.
Safety:	1. PPE (respirator for dust protection). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. 3. Equipment awareness.
Responsible Staff:	Technician, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u>

SOP #30
Public Works
Road MS4 Program
Street Sweeping and Flushing

Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>
-------------------	--

Attachment:

References:

MT DEQ Solid Waste Program – Street Sweeping Reuse Policy (2009)

Roads

Chain-of-Command

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Crew Foreman

(406) 497 – 6567

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

SOP #30
Public Works
Road MS4 Program
Street Sweeping and Flushing

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #31
Public Works
Road MS4 Program
Parking Lot Maintenance (Municipal Buildings)

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Pollutants (i.e., sediment) & trash/debris are present in parking lots and have the potential to add pollutants to storm water.
Operating Best Management Practices (BMPs) needed:	1. Routinely clean sediment/debris/trash from storm inlets/sumps to ensure proper functioning. 2. Collect debris/trash and dispose at Landfill. 3. Install inlet protection devices prior to sweeping. 4. Sweep sediment. 5. Remove inlet protection devices when sweeping is completed.
Administrative BMPs needed:	1. Schedule routine for maintaining parking lots. 2. Arrange for sediment disposal at Landfill. 3. Training on proper equipment operation/maintenance/safety procedures. 4. Training on proper BMP installation/maintenance procedures.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves, high visibility clothing, respirator for dust protection). 2. Traffic awareness. Be aware of any vehicles entering/exiting the area. Equipment awareness.
Responsible Staff:	Technician, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u>

SOP #31
Public Works
Roads MS4 Program
Parking Lot Maintenance (Municipal Building)

Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>
-------------------	--

Attachment:

References:

Roads

Chain-of-Command

Name:

Phone:

MS4 Coordinator _____

(406) 497 – 6519 _____

Crew Foreman _____

(406) 497 – 6567 _____

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

SOP #31
Public Works
Roads MS4 Program
Parking Lot Maintenance (Municipal Building)

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #32
Public Works
Metro Sewer MS4 Program
Root Killer (foam) Application and Management

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Root Killer (foam) must be handled properly to ensure it does not enter the storm water system.
Operating Best Management Practices (BMPs) needed:	<u>Storage</u> 1. Store away from storm water controls (i.e., storm inlets). 2. Store separated from other chemicals. 3. Store in a cool, dry, and well-ventilated area. 4. Secondary containment, sized to hold at least 1.5 times the storage capacity of the container, is recommended. 5. Lock and label storage area. 6. Store upright in original labeled containers. <u>Handling</u> 7. Clean-up/spill response equipment should be readily available. Liquids need absorbent materials; solids need shovel, dustpan, broom and/or buckets. <u>Application</u> 8. Follow directions provided by manufacturer. 9. Apply foam only to sanitary sewer lines, connected to wastewater treatment plant. 10. Notify downstream treatment facility prior to application. <u>Cleanup</u> 11. Root Killer (foam) follow manufactures requirements for cleanup and disposal of spilled and used containers.

SOP #32
Public Works
Metro Sewer MS4 Program
Root Killer (foam) Application and Management

Administrative BMPs needed:	1. Only Certified Applicators or persons under the directed supervision of a Certified Applicator may apply the products. 2. Training on proper handling and safety procedures. 3. Personnel are directed to call 911 in case of an emergency. 4. If an emergency occurs, notify personnel following the chain-of-command. 5. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.
Safety:	1. PPE (Chemical-resistant gauntlet-type gloves and boots, long sleeve shirt and long pants, splash resistant eye protection, safety glasses, respirator may be needed for certain chemicals). 2. Root killer (foam) awareness. Ensure proper handling application procedures are followed, as chemicals may enter the body through absorption and inhalation.
Responsible Staff:	Certified Applicators, Technician
Target pollutants this BMP helps to reduce:	Total Suspended Solids (TSS) Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity Oil and Grease
Receiving Waters:	Silver Bow Creek, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>NOTE: City of Butte Pollutants of Concern: <u>Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</u></i>

Attachment:

References:

Metro

SOP #32
Public Works
Metro Sewer MS4 Program
Root Killer (foam) Application and Management

Chain-of-Command/Chain-of-Command for Fuel Spills

Name:

Phone:

MS4 Coordinator

(406) 497 – 6519

Crew Foreman

(406) 497 – 6550

Revision History:

Revision Number	Effective Date	Significant Changes
001	09/10/19	Initial Development

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature



THE CITY-COUNTY OF Butte-Silver Bow

SOP #18
Public Works
Metro Sewer MS4 Program
Hydrant Flushing/Blowoff Flushing

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Hydrant flushing and blowoff flushing are needed to ensure serviceability in the event of an emergency, to maintain the Fire Department's protection rating, and to ensure the hydrants have adequate flow and pressure for firefighting.
Operating Best Management Practices (BMPs) needed:	1. Sweep streets prior to flushing. 2. Attach Chlorine Diffuser with dichlorination tablet to discharge line. 3. Sweep streets after project completion if sediment is present. 4. Clean out sludge from hydrant and properly dispose at the City Landfill.
Administrative BMPs needed:	1. If required, secure an MDEQ General Permit for Disinfected Water and Hydrostatic Testing (MTG770000). All conditions of this permit shall be followed and work shall not begin until permit coverage is obtained. 2. Schedule hydrants to be flushed in accordance with street sweeping schedule. 3. Arrange for sludge disposal.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves). 2. Traffic, equipment, & high-water pressure awareness.
Responsible Staff:	Operator
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity <u>Oil and Grease</u> <u>Chlorine Oil and Grease</u>

SOP #18
Public Works
Metro Sewer MS4 Program
Hydrant Flushing/Blowoff Flushing

Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>
-------------------	--

Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Water Manager

(406) 497 – 6539



THE CITY-COUNTY OF Butte-Silver Bow

SOP #19
Public Works
Metro Sewer MS4 Program
Materials Management/Chemical Storage

Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Materials and chemicals have the potential to add pollutants to the environment. It is critical to properly store and manage all chemicals to ensure no materials enter the storm water system.
Operating Best Management Practices (BMPs) needed:	1. Store materials/chemicals away from storm water controls (i.e., drain inlets). 2. Store chemicals indoors or outside under a covered structure. 3. Store upright in original labeled containers. 4. Hazardous materials - store in original containers, provide secondary containment, & store off the ground (i.e., on a spill containment pallet). 5. Liquid materials & petroleum products - store in original covered containers and provide secondary containment (sized to hold 1.5 times the storage capacity of the container). 6. Lists of materials and chemicals used are attached.
Administrative BMPs needed:	1. Training on proper materials/chemical handling and safety procedures. 2. Personnel are directed to call 911 in case of an emergency. 3. If an emergency occurs, notify personnel following the chain-of-command. 4. Safety Data Sheets (SDS) are available as per OSHA Hazard Communication Standard.
Safety:	1. PPE (nitrile gloves, safety glasses, hard hat).
Responsible Staff:	Teamster, Laborer
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> <u>Nutrients: Phosphorus, Nitrogen</u> <u>Metals</u> <u>Bacteria</u> <u>Salinity</u> <u>Oil and Grease</u> <u>Chlorine Oil and Grease</u>

SOP #19
Public Works
Metro Sewer MS4 Program
Materials Management/Chemical Storage

Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>
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Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

SOP #19
Public Works
Metro Sewer MS4 Program
Materials Management/Chemical Storage

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

(406) 497 – 6563

Water Manager

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Control Measure:

#1 Public Education and Outreach

#3 IDDE

#5 Post-Construction Site Storm Water Management

#2 Public Involvement and Participation

#4 Construction Site Storm Water Management

#6 Pollution Prevention/Good Housekeeping

Introduction:	Water main breaks occur frequently in Butte due to aging infrastructure. Potable, municipal water from the broken pipe is mixed with sediment or other pollutants present in the area and flow along the curb line to the nearest storm water control device (i.e., inlet).
Operating Best Management Practices (BMPs) needed:	1. Sweep streets routinely. 2. Install inlet protection devices (i.e., filter bags) to ensure water is filtered before entering storm system. 3. Sweep streets after project completion if sediment is present. 4. Remove inlet protection devices once project is complete
Administrative BMPs needed:	1. Stockpile inlet protection devices. 2. Include inlet protection as part of the Main Break investigation and Repair procedure. 3. Train repair personnel on proper installation and removal.
Safety:	1. PPE (steel toe boots, ear protection, safety glasses, hard hat, field gloves). 2. Traffic & equipment awareness.
Responsible Staff:	Operator
Target pollutants this BMP helps to reduce:	<u>Total Suspended Solids (TSS)</u> Nutrients: Phosphorus, Nitrogen Metals Bacteria Salinity <u>Oil and Grease</u> <u>Chlorine Oil and Grease</u>

SOP #20
Public Works
Metro Sewer MS4 Program
Water Main Breaks & Repairs

Receiving Waters:	Silver Bow Creek*, Blacktail Creek, Sand Creek, Basin Creek, & Grove Gulch Creek <i>*Pollutants of Concern: Arsenic, Cadmium, Copper, Lead, Mercury, Nitrogen Phosphorus, Habitat Alternations, Sediment, & Zinc.</i>
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Attachment:

References:

Revision History:

Revision Number	Effective Date	Significant Changes

SOP #20
Public Works
Metro Sewer MS4 Program
Water Main Breaks & Repairs

Supervisor signature/approval:

Date: _____

Name (printed)

Signature

Signatures after training:

Date: _____

Name (printed)

Signature

CHAIN-OF-COMMAND

Name:

Phone:

MS4 Coordinator

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Water Manager

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Appendix I
Trainings and Meetings



**City of Butte Municipal Separate Storm Sewer System (MS4)
Storm Water Management Team (SWMT) Meeting, Q1, 2022
March 24, 2022, 2:00-3:00
Public Works-Conference Room (3rd Floor), Butte, MT**

NAME	ORGANIZATION	Phone #	Email
JP Gallagher	BSB Chief Executive	406-497-6200	jgallagher@bsb.mt.gov
Mark Neary	BSB PW Director	406-497-6519	mneary@bsb.mt.gov
Kyle West	BSB PW Engineering	406-497-6532	kwest@bsb.mt.gov
Dylan Pipinich	BSB Planning Director	406-497-6256	dpipinich@bsb.mt.gov
John Sullivan	BSB Gov't Buildings Director	406-497-6573	jsullivan@bsb.mt.gov
Bob Lazzari	BSB P & R Director	406-497-6571	blazzari@bsb.mt.gov
Pete Schonsberg	BSB P & R Park Superintendent	406-497-6571	pschonsberg@bsb.mt.gov
Eric Hassler	BSB Reclamation & Environmental Services Director	406-497-5042	ehassler@bsb.mt.gov
Jim Dennehy	BSB Water Treatment Superintendent	406-723-9429	jdennehy@bsb.mt.gov
Tom Loggins	BSB Roads	406-497-6567	tloggins@bsb.mt.gov
Justin Thatcher	BSB Metro Maintenance	406-431-2011	jthatcher@bsb.mt.gov
Rayelynn Brandl	CFWEP	406-496-4898	rbrandl@mttech.edu
Josh Vincent	WET	406-723-1534	jvincent@waterenvtech.com
Stephen Coe	WET	406-299-9858	scoe@waterenvtech.com

- 1. 2021 Annual Report**
 - Submitted
- 2. 2022 MS4 Permit Review**
 - Review
- 3. Training**
- 4. Questions/Comments**
- 5. Next meeting – August 9, 2:00 pm BSB Public Works Conf Room**



BSB MS4 Comprehensive Training with New Permit Changes

March 24, 2022 | 2:00 pm to 3:00 pm

Name	Department
1. Mark Neary	Public Works
2. Kyle West	Public Works
3. JUSTIN THATCHER	METRO
4. Eric Hassler	Reclamation
5. Pete Schonsberg	Parks & Rec.
6. John Sullivan	Grant Budget
7. Dylan PIRNICH	PLANNING
8. Kaitlyn Brandt	CEWER - Montana Tech
9. J.P. Gallagher	J.P. Gallagher
10.	
11.	
12.	



Pre-Test - MS4 TRAINING
March 24, 2022

Name: _____

- 1. The permitting agency in charge of authorizing the General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4) in Montana is:**
 - a. Environmental Protection Agency
 - b. Montana Department of Public Health and Human Services
 - c. Montana Department of Environmental Quality
 - d. US Army Corps of Engineers

- 2. Butte is one of the seven (7) traditional MS4's, circle the other six (6):**

a. Great Falls	h. Dillon
b. Belgrade	i. Kalispell
c. Havre	j. Hardin
d. Missoula	k. Anaconda
e. Helena	l. Billings
f. Bozeman	
g. Whitefish	

- 3. The MT Department of Transportation (MDT) is one of the *non-traditional* MS4s; is the MDT, Butte Division, a co-permittee?**
 - a. Yes
 - b. No

- 4. Who is the authorized signer of the MS4 permit?**
 - a. BSB County Commissioners
 - b. J.P. Gallagher
 - c. Mark Neary
 - d. Stephen Coe

- 5. The overall goal of the permit is to keep _____ out of surface water.**
 - a. fuel (diesel, gas)
 - b. sediment
 - c. wastewater
 - d. pollutants
 - e. all of the above



6. Is sediment a pollutant?

- a. Yes
- b. No

7. Circle three pollutants present within the BSB MS4.

- | | |
|-------------------------------------|------------------|
| Gasoline, oil, grease, & lubricants | Copper |
| Wastewater | Sediment |
| Debris | Concrete Washout |
| Fertilizer | Paint |
| Pet Waste | Solvents |

8. Circle the five surface waterbodies within the BSB MS4.

- | | |
|----------------------|-------------------|
| Clark Fork | Silver Bow Creek |
| Blacktail Deer Creek | Grove Gulch Creek |
| Sand Creek | Big Hole River |
| Blacktail Creek | Basin Creek |
| Beaverhead River | |

9. Is storm water within the BSB MS4 treated at the Waste Water Treatment Plant?

- a. Yes
- b. No

10. Circle the six Control Measures addressed in the MS4 Permit.

- | | |
|---|--|
| Pollution Prevention/Good Housekeeping | Storm Water Sampling |
| Training | Total maximum Daily Load (TMDL) Monitoring |
| Public Involvement and Participation | Public Education and Outreach |
| Post-Construction Site Storm Water Management | Construction Site Storm Water Management |
| Illicit Discharge Detection & Elimination | Storm Water Management Plan (SWMP) |

11. Define an outfall: _____

12. How many outfalls are within the BSB MS4 boundary?

- a. 10-50
- b. 50-100
- c. >100

13. Name one action as a BSB employee you can do to support compliance.

14. Name one storm water issue the BSB citizens need to understand.



Water & Environmental
TECHNOLOGIES



MS4: Introduction and Review of Changes for New Permit Term

Stephen Coe P.E.





Water & Environmental
TECHNOLOGIES

MS4 Introduction

Montana Pollutant Discharge Elimination System (MPDES)
General Permit MTR040000 is a fifth generation Comprehensive
General Permit for storm water discharges associated with Small
Municipal Separate Storm Sewer Systems (MS4s).

MS4 Introduction

- Butte
 - Traditional MS4
 - Boundary encompasses the entire urban area and the sewer district area
 - 29.7 square miles
 - Large network of storm drains, catch basins, retention ponds, ditches and other conveyances
- Superfund Responsibilities
 - Maintenance of Superfund Storm water Structures (SSWS)
- Additional Permits in MS4 Boundary
 - Metro Sewer: MPDES Effluent Discharge, Multi-Sector General Permit for SW Discharge Assoc. with Industrial Activity

MS4 Introduction

- National Pollutant Discharge Elimination System
 - 1990 cities >100,000 population were required to manage storm water
 - 1999 cities >10,000 population were required to manage storm water.
 - EPA authorized MDEQ to administer MS4 program in Montana
 - 7 cities, 3 counties, 3 non-traditional permittees
- Receiving Waters of Storm Water
 - Silver Bow Creek
 - Blacktail Creek
 - Sand Creek
 - Basin Creek
 - Grove Gulch Creek

MS4 Introduction

- Program Goals
 - Public Education & Outreach on Storm Water Impacts
 - Public Involvement/Participation
 - Illicit Discharge Detection and Elimination
 - Construction Site Storm Water Runoff Control
 - Post-Construction Site Storm Water Runoff Control
 - Pollution Prevention/Good Housekeeping for Municipal Operations