



# 2017 MS4 ANNUAL REPORT

MARCH 2018

# 2017 ANNUAL REPORT

## 1. INTRODUCTION

The Butte-Silver Bow (BSB) MS4 is roughly bound by the Butte Urban Limit Boundary (see Figure1). Within this boundary, the BSB storm water system consists of a large network of infrastructure. A majority of the system was installed in the late 1800's through the mid 1900's. The system consists of approximately 340,063 feet of pipe, 249 manholes, and 2130 inlets. Other features of the storm water system include six vortex separators, three sediment basins, several thousand feet of lined ditches and one diversion to the Berkley Pit. Much of the system is located within the Butte Priority Soils Operable Units (BPSOU). This area is regulated under CERCLA law and has its own O&M program and Budget. The BSB MS4 works in conjunction with the Reclamation Division to manage the system in compliance with both CERCLA and CWA laws.

This report uses the MPDES Storm Water Small MS4 Annual Report Form as an outline and each section of the report will represent a section of the form.

## 2. STORM WATER MANAGEMENT TEAM

The BSB Storm Water Management Team was created in 2017 to fulfill requirements in the General Permit and to coordinate and discuss storm water matters as they apply to BSB. Regular meetings are conducted quarterly and continued communications are conducted via email and in development meetings. Figure 2 shows the organizational chart for the Storm Water Management Team.

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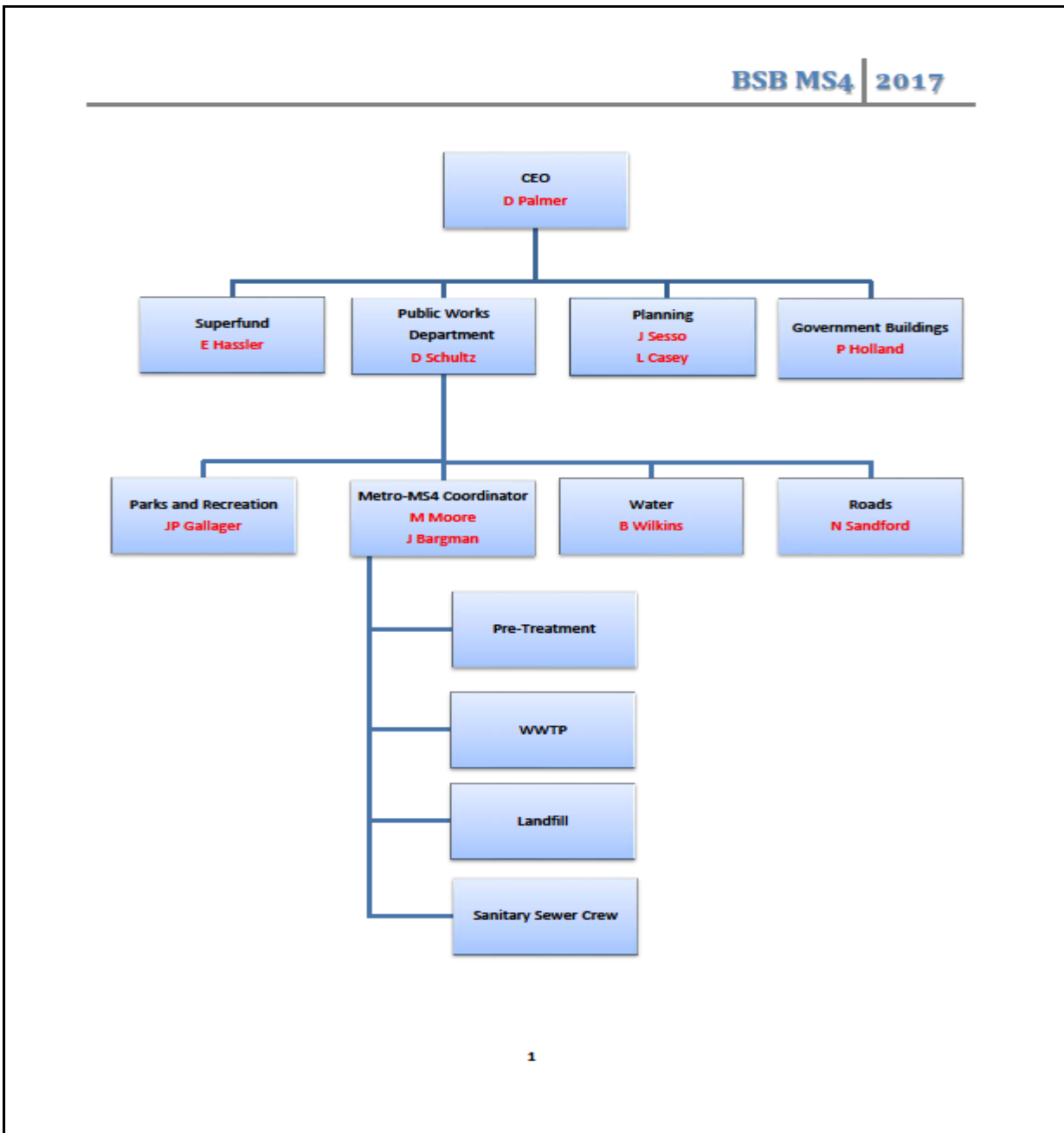


Figure 2 Storm Water Management Team Org Chart

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## 3. PERMITTEE'S SWMP RESOURCES

BSB current employs 1.35 FTE within the storm water budget. Other budget sources provide approximately .5 FTE additional hours to the support the utility (See Figure 3). Approximately .85 FTE is dedicated to permit compliance with the remainder used labor related to maintenance. BSB has entered into contract with Water and Environmental Technologies (WET) to assist in permit compliance (See Attachment A).

| City and County of Butte-Silver Bow 2017-2018 Annual Budget - Detail of Expenditures |                                  |            |              |             |           |             |           |        |
|--|----------------------------------|------------|--------------|-------------|-----------|-------------|-----------|--------|
| Fund   |                                  | Department |              |             | Activity  |             |           |        |
| 5330   | Storm Water                      | 103        | Public Works |             | 4306.50   | Storm Water |           |        |
|  |                                  | Actual     |              | 2016 - 2017 |           | 2017 - 2018 |           |        |
| Obj No   | Description                      | 2014-2015  | 2015-2016    | Budget      | Actual    | Request     | Approved  |        |
| 110  | Salaries & Wages                 | 17,837     | 49,603       | 52,660      | 25,451    | 63,293      | 63,293    | 20%    |
| 120  | Salaries & Wages Overtime        | 1,372      | 8,523        | 9,000       | 832       | 10,000      | 10,000    | 11%    |
| 130  | Salaries & Wages Longevity       | 0          | 0            | 0           | 0         | 218         | 218       | 0%     |
| 135  | Salaries & Wages Clothing Allowa | 0          | 0            | 0           | 0         | 190         | 190       | 0%     |
| 140  | Employer Contributions           | 6,421      | 25,632       | 32,819      | 11,418    | 36,914      | 36,914    | 12%    |
| 190  | On behalf payments               | 69         | 91           | 62          | 26        | 63          | 63        | 2%     |
| 210  | Office Supplies                  | 229        | 0            | 0           | 0         | 0           | 0         | 0%     |
| 220  | Operating Supplies               | 5,560      | 4,717        | 8,500       | 6,810     | 5,000       | 5,000     | -41%   |
| 230  | Repair & Maint. Supplies         | 3,458      | 7,401        | 19,000      | 28,288    | 105,000     | 105,000   | 453%   |
| 260  | Non capital fixed assets         | 0          | 0            | 1,500       | 0         | 1,500       | 0         | -100%  |
| 320  | Printing- Duplicating-Etc        | 383        | 8            | 500         | 0         | 500         | 500       | 0%     |
| 330  | Publicity- Subscr. & Dues        | 882        | 523          | 2,500       | 0         | 7,500       | 7,500     | 200%   |
| 340  | Utility Services                 | 0          | 154          | 3,000       | 466       | 3,000       | 3,000     | 0%     |
| 350  | Professional Services            | 81,246     | 61,317       | 126,925     | 92,391    | 142,500     | 142,500   | 12%    |
| 360  | Repair & Maint. Services         | 291        | 7,316        | 13,000      | 11,120    | 13,000      | 13,000    | 0%     |
| 370  | Travel                           | 438        | 158          | 2,000       | 0         | 2,000       | 2,000     | 0%     |
| 380  | Training Services                | 450        | 500          | 2,000       | 1,112     | 2,000       | 2,000     | 0%     |
| 390  | Other Purchased Services         | 0          | 788          | 3,000       | 1,434     | 3,000       | 3,000     | 0%     |
| 510  | Insurance                        | 0          | 0            | 1,083       | 1,081     | 1,083       | 1,083     | 0%     |
| 541  | Compensated Absences Exp         | 376        | -376         | 0           | 9,796     | 0           | 0         | 0%     |
| 830  | Depreciation                     | 0          | 23,655       | 0           | 24,869    | 0           | 0         | 0%     |
| 852  | Payroll Charges                  | 376        | 514          | 455         | 168       | 479         | 479       | 5%     |
| 854  | Personnel Charges                | 744        | 1,014        | 898         | 332       | 944         | 944       | 5%     |
| 858  | GIS Charges                      | 0          | 3,000        | 3,000       | 3,000     | 3,000       | 3,000     | 0%     |
| 930  | Improv other than Bldgs          | 0          | 0            | 40,000      | 0         | 0           | 0         | -100%  |
| 950  | Construction in Process          | 0          | 0            | 3,075       | 0         | 446,925     | 446,925   | 14434% |
| Total  |                                  | \$120,131  | \$194,536    | \$324,977   | \$218,594 | \$848,109   | \$846,609 | 161%   |

| Budget Commentary   |  |
|---|--|
| This fund was created to account for expenditures related to the maintenance of the new Storm Water System in accordance with the Butte-Silver Bow Storm Water Ordinance. |  |

| Personnel            |      | Fixed Assets    |                            |         |          |
|----------------------|------|-----------------|----------------------------|---------|----------|
| Position Description | Stat | Budgeted Salary | Description                | Request | Approved |
| Engineer Technician  | 0.35 | 14,799          | Computer                   | 1,500   | 0        |
| Laborer              | 1    | 48,902          | Greeley Storm Water Improv | 446,925 | 446,925  |
| OVERTIME             | 0    | 10,000          | Total                      | 448,425 | 446,925  |
| Total                | 1.35 | 73,701          |                            |         |          |

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Figure 3. 2017-2018 Fiscal Year Storm Water Budget



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## PERMITTEE'S SWMP RESOURCES CONTINUED

### 3.1 What are the sources of funding for implementation of the MS4 permit and the estimated percentage of the total budget allocated from each source?

- Figure 3. details the storm water budget for the 2018 fiscal year. The non-capital budget is \$399,684, of that approximately \$200,799 will be used in implementation of the MS4 permit. This is 50% of the budget, the remaining 50% will be used for maintenance and repair to the system.

### 3.2 Specific to the annual reporting calendar year, how did the permittee justify commitment of resources or budget allocations to implementation of the MS4 permit to decision-makers and the public?

- In 2017 the MS4 Coordinator requested one additional FTE from the BSB Chief Executive. This position was a Storm Water Technician, whose duties would have been solely dedicated to complying with the general permit. This FTE was denied; therefore, additional authority was budgeted to professional services. The increased authority and the budget in Figure 3 was passed by the Council of Commissioner in August 2017. In the fall of 2017 BSB release an RFQ for MS4 and Storm Water Services. This RFQ was responded to by WET and a contract was executed to provided the services as described in Attachment A.

### 3.3 Has the permittee demonstrated program effectiveness to obtain budget allocations for this annual reporting calendar year or previous years?

- As this an annual report for the calendar year 2017, responses will be specific to the 2017 calendar year. For information pertaining to previous years, please see those annual reports.
- Yes, the permittee has demonstrated the ability to set rates deemed appropriate by the BSB Council of Commissioners in order to comply with the MS4 general permit.

### 3.4 How was this annual reporting calendar year's approach to allocate resources different from previous year's approach?

- The primary difference is the substantial increase in requirements in the new permit versus the previous permit. As describes in section 3.2 BSB allocated additional budget in professional services in order to allocate the hours needed to comply with the new permit.

### 3.5 Was the permittee successful in their request for budget allocations?

- Yes, as shown in Figure 3 the requested budget is virtually equal to the approved budget.

# 2017 ANNUAL REPORT



## CONTACT INFORMATION

Matt Moore P.E. | Operations Manager-Metro | Butte-Silver Bow | Public Works | 126 West Granite | Butte, MT 59701 | (406) 497-6563 | Cell: (406) 581-6435 | [mmoore@bsb.mt.gov](mailto:mmoore@bsb.mt.gov)

# ATTACHMENT A

## *MS4 ASSISTANCE CONTRACT*

## PROFESSIONAL SERVICES AGREEMENT

THIS AGREEMENT is made and entered into this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, by and between the City and County of Butte-Silver Bow, a municipal corporation and political subdivision of the State of Montana (hereinafter referred to as “City-County”) and Water & Environmental Technologies, Inc, whose address is 480 East Park Street, Butte, Montana 59701 (hereinafter referred to as “Consultant”).

In consideration of the mutual covenants and agreements herein contained, the receipt and sufficiency whereof being hereby acknowledged, the parties hereto agree as follows:

1. PURPOSE: The City-County agrees to hire the Consultant as an independent contractor to perform for City-County services described in the Scope of Services attached hereto as Exhibit “A” and by this reference made a part hereof.

2. EFFECTIVE DATE: This Agreement is effective upon the date of its execution and will terminate on December 31<sup>st</sup>, 2022. BSB reserves the right to exercise one renewal for an additional 2 years.

3. SCOPE OF WORK: The Consultant will perform the work and provide the services in accordance with the requirements of the Scope of Services, which is attached hereto as Exhibit A and made a part hereof. BSB may request additional services from Consultant on MS4 and other related storm water projects.. Any changes to the scope of work and cost must be approved by the City-County.

4. PAYMENT: The City-County agrees to pay the Consultant for services performed pursuant to the attached Scope of Services. Any alteration or deviation from the described work that involves extra costs will be performed by the Consultant after written request by the City-County,

and will become an extra charge over and above the contract amount. The parties must agree upon any extra charges in writing.

5. INDEPENDENT CONTRACTOR STATUS: The parties agree that the Consultant is an independent contractor for purposes of this Agreement and is not to be considered an employee of the City-County for any purpose. The Consultant is not subject to the terms and provisions of the City-County's personnel policies handbook and may not be considered a City-County employee for workers' compensation or any other purpose. The Consultant is not authorized to represent the City-County or otherwise bind the City-County in any dealings between the Consultant and any third parties.

The Consultant shall comply with the applicable requirements of the Workers' Compensation Act, Title 39, Chapter 71, MCA, and the Occupational Disease Act of Montana, Title 39, Chapter 71, MCA. The Consultant shall maintain workers' compensation coverage for all members and employees of the Consultant's business, except for those members who are exempted by law.

The Consultant shall furnish the City-County with copies showing one of the following: (1) a binder for workers' compensation coverage by an insurer licensed and authorized to provide workers' compensation insurance in the State of Montana; or (2) proof of exemption from workers' compensation granted by law for independent contractors.

6. INDEMNITY AND INSURANCE: The Consultant agrees to indemnify, defend and save the City-County, its officers, agents and employees harmless from any and all losses, damage and liability occasioned by, growing out of, or in any way arising or resulting from any intentional or negligent act on the part of the Consultant or the Consultant's agents or employees. For this purpose, the Consultant shall provide the City-County with proof of the Consultant's liability insurance issued by a reliable company or companies for personal injury and property damage, in an

amount not less than \$1.0 million for each occurrence and \$750,000.00 per claim. The insurance must be in a form suitable to the City-County.

7. PROFESSIONAL SERVICE: The Consultant agrees that all services and work performed hereunder will be accomplished in a professional manner.

8. COMPLIANCE WITH LAWS: The Consultant agrees to comply with all federal, state and local laws, ordinances, rules and regulations. The Consultant agrees to purchase a City-County business license.

9. NONDISCRIMINATION: The Consultant agrees that all hiring by the Consultant of persons performing this Agreement will be on the basis of merit and qualification and will not discriminate on the basis of race, color, national origin, ancestry, religion, creed, political ideas, sex, age, marital or family status, physical or mental disability, sexual orientation, gender identity, or expression.

10. DEFAULT AND TERMINATION: If either party fails to comply with any condition of this Agreement at the time or in the manner provided for, the other party, at its option, may terminate this Agreement and be released from all obligations if the default is not cured within ten (10) days after written notice is provided to the defaulting party. Said notice shall set forth the items to be cured. Additionally, the non-defaulting party may bring suit for damages, specific performance, and any other remedy provided by law. These remedies are cumulative and not exclusive. Use of one remedy does not preclude use of the others. Notices shall be provided in writing and hand-delivered or mailed to the parties at the addresses set forth in the first paragraph of this Agreement.

11. MODIFICATION AND ASSIGNABILITY: This document contains the entire agreement between the parties and no statements, promises or inducements made by either party or

agents of either party, which are not contained in this written Agreement, may be considered valid or binding. This Agreement may not be enlarged, modified or altered except by written agreement signed by both parties hereto. The Consultant may not subcontract or assign the Consultant's rights, including the right to compensation or duties arising hereunder, without the prior written consent of the City-County. Any subcontractor or assignee will be bound by all of the terms and conditions of this Agreement.

12. OWNERSHIP AND PUBLICATION OF MATERIALS: All reports, information, data, and other materials prepared by the Consultant pursuant to this Agreement are the property of the City-County. The City-County has the exclusive and unrestricted authority to release, publish or otherwise use, in whole or part, information relating thereto. Any re-use without written verification or adaptation by the Consultant for the specific purpose intended will be at the City-County's sole risk and without liability or legal exposure to the Consultant. No material produced in whole or in part under this Agreement may be copyrighted or patented in the United States or in any other country without the prior written approval of the City-County.

13. LIAISON: The City-County's designated liaison with the Consultant is:

David Schultz, PE  
Public Works Director  
126 West Granite Street  
Butte, MT 59701

And Consultant's designated liaison with the City-County is:

Joshua T Vincent, PE  
Vice President  
Water & Environmental Technologies, Inc.  
480 East Park Street

Butte, MT 59701

14. APPLICABILITY: This Agreement and any extensions hereof shall be governed and construed in accordance with the laws of the State of Montana.

15. COUNCIL APPROVAL: This agreement was approved by Motion of the Council of Commissioners on \_\_\_\_\_.

IN WITNESS WHEREOF, the parties hereto have executed this instrument the day and year first above written.

CITY-COUNTY

\_\_\_\_\_  
DAVE PALMER  
CHIEF EXECUTIVE

ATTEST:

\_\_\_\_\_  
SALLY J. HOLLIS  
CLERK AND RECORDER

APPROVED AS TO FORM:

\_\_\_\_\_  
EILEEN JOYCE  
COUNTY ATTORNEY

STATE OF MONTANA)

: ss.  
County of Silver Bow )



On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me,  
\_\_\_\_\_, a Notary Public for the State of Montana, personally appeared  
MATTHEW S VINCENT and SALLY J. HOLLIS, known to me to be the Chief Executive and Clerk  
and Recorder, respectively, of the City and County of Butte-Silver Bow, a municipal corporation and  
political subdivision of the State of Montana, and acknowledged to me that they executed the written  
instrument on behalf of said municipal corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and  
year in this certificate first above written.

\_\_\_\_\_  
PRINTED NAME\_\_\_\_\_  
NOTARY PUBLIC FOR THE STATE OF MONTANA  
RESIDING AT BUTTE, MONTANA  
MY COMMISSION EXPIRES\_\_\_\_\_

CONSULTANT

\_\_\_\_\_  
BY\_\_\_\_\_  
ITS\_\_\_\_\_

ATTEST:

\_\_\_\_\_  
BY\_\_\_\_\_  
ITS\_\_\_\_\_

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

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me,  
\_\_\_\_\_, a Notary Public for the State of Montana, personally appeared  
\_\_\_\_\_ and \_\_\_\_\_, known to me to be the  
\_\_\_\_\_ and \_\_\_\_\_ of the  
\_\_\_\_\_ of the City and County of Butte-Silver Bow, and acknowledged to  
me that they executed the written instrument on behalf of \_\_\_\_\_.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and  
year in this certificate first above written.

\_\_\_\_\_  
PRINTED NAME \_\_\_\_\_  
NOTARY PUBLIC FOR THE STATE OF MONTANA  
RESIDING AT BUTTE, MONTANA  
MY COMMISSION EXPIRES \_\_\_\_\_

## **Attachment A.**

### **Task Order 01 - MS4 Compliance and Utility Rate Assessment**

#### **Scope of Work and Notice to Proceed**

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#### **Project Overview**

The Montana Department of Environmental Quality (DEQ) administers the Municipal Separate Storm Sewer System (MS4) program and Butte-Silver Bow (BSB) is one of the seven cities required to comply. A new general permit became effective January 2017, and this proposal addresses professional assistance for permit tasks required to maintain compliance. This proposal also includes professional services to assist BSB with a revision to its current storm water ordinance and fee schedule.

Water and Environmental Technologies (WET) has a long and successful record working with BSB and MDEQ on MS4 issues, having worked in this permitting arena since 2003. We are pleased to submit this proposal for MS4 technical assistance. Our Project Team has the background, training, experience, interest, and enthusiasm to assure that compliance is maintained.

#### **Scope of Work**

WET's project approach to the related work tasks are described below.

#### **Task 1. MS4 Compliance Activities**

##### *Task 1.1. Project Administration*

- Bi-weekly status update meeting to discuss MS4 permitting issues.
- Project administration and overall support for other areas of BSB's MS4 program, as requested by BSB staff.

##### *Task 1.2. Control Measure 3 – Illicit Discharge Detection and Elimination*

- Inspect outfalls required in 2017 (20%).
- Identify high priority outfalls.
- Coordinate meeting with MDT (adjacent MS4s).
- Update existing infrastructure map with recent investigation and construction data.
- Develop draft IDDE investigation and corrective action plan.

##### *Task 1.3. Control Measure 4 – Construction Site Storm Water Management*

- Review and revise existing BSB Ordinance 10-13 to include non-numeric technology-based effluent limitations and other new permit requirements.
- Revise variance language for regulated and non-regulated projects.
- Review and revise existing storm water checklists.

##### *Task 1.4. Control Measure 5 – Post Construction Site Storm Water Management in New and Redevelopment*

- Review and revise existing Engineering BSB Municipal Storm Water Engineering Standards.

- Research and incorporate new City-developed BMP database, as appropriate.
- Develop criteria and appropriate review procedures for off-site treatment of storm water.
- Develop a framework and/or database to inventory projects using off-site treatment.
- Develop a framework and/or database to inventory Non-Superfund permittee-owned and private high priority post construction storm water management controls.

*Task 1.5. Control Measure 6 – Pollution Prevention/Good Housekeeping for Permittee Operations*

- Finalize Parks & Recreation SWPPP.
- Review existing SWPPPs (Civic Center, Kelly Shop, Corral).
- Summarize BSB personnel and contact information for each facility.
- Work with BSB staff and Supervisors to develop an outline of Standard Operating Procedures (SOPs) for municipal operations that impact storm water.

*Task 1.6. Control Measure 7 – Program Management, Monitoring, and Training*

- Organize Quarter 4-2017, Quarter 1 & 2-2018 BSB Storm Water MS4 Team meetings.
- Review TMDL information and prioritize BSB's Pollutants of Concern (POCs).
- Consider BMPs to address POCs (install and monitor).
- Sample storm water at 4 outfalls (Oct-Dec 2017 & Jan-June 2018).

**TASK 2. Perform Comprehensive Assessment of BSB Storm Water Utility Rates**

*Task 2.1. Evaluate Current Storm Water Utility Rates*

- Evaluate existing rates and compare with current and anticipated storm water requirements. This evaluation will include an assessment of operation and maintenance, capital improvements, and administration requirements.
- Compare BSB rates with other major Montana cities.
- Develop changes to rates, if necessary, and assist with preparation of documentation for council approval.

*Task 2.2. Develop a GIS -Based Management Tool for Storm Water Rates*

- Determine how current rates are being applied and what software programs are being used at the local and state level.
- Work with BSB Public Works, Budget, and Assessor staff to develop a software platform that is compatible with existing software.
- Develop the ability for BSB to manage storm water utilities based on tax parcel ID.

**Project Timeline**

The above scope of work will be completed between November 1, 2017 and the end of the fiscal year on June 30, 2018. Schedules for individual tasks will be developed and approved in coordination with BSB.

**Estimated Cost**

Costs will be billed on a time and materials basis with a total not to exceed \$107,925.00, without approval from BSB. Budget may be transferred between tasks as necessary provided that the total amount is not exceeded. Please reference the Project Cost Estimate in Attachment B.

**Approval**

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Josh Vincent, PE  
Water & Environmental Technologies

Date: \_\_\_\_\_

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Matt Moore, PE  
Butte-Silver Bow County

Date: \_\_\_\_\_



## ATTACHMENT B.

### PROJECT COST ESTIMATE

WATER & ENVIRONMENTAL TECHNOLOGIES

480 East Park Street

Butte, MT 59701

November 1, 2017 through June 30, 2018

Date: October 16, 2017  
 Client: BSB Public Works Department  
 Address: 800 Centennial Road, Butte, MT 59701  
 Project: BSB Compliance  
 Project Description: MS4 Technical Support

WET Project #: BSBPWM41  
 Client Phone #: (406) 497-6563  
 Client Contact: Matt Moore, PE  
 WET Contact: Josh Vincent, PE

| TASK DESCRIPTION   | PRICE/UNIT | UNITS | QUANTITY | PRICE              |
|--|------------|-------|----------|--------------------|
| <b>TASK 1.1 PROJECT ADMINISTRATION/SUPPORT FOR OVERALL MS4 REQUIREMENTS</b>                            |            |       |          |                    |
| <i>LABOR</i>   |            |       |          |                    |
| Principal Engineer   | \$140.00   | HOURL | 40       | \$5,600.00         |
| Permitting Team Leader   | \$125.00   | HOURL | 80       | \$10,000.00        |
| Administrative Staff   | \$55.00    | HOURL | 5        | \$275.00           |
| <b>TASK 1.1 SUBTOTAL:</b>  |            |       |          | <b>\$15,875.00</b> |
| <b>TASK 1.2. CONTROL MEASURE 3 - ILLICIT DISCHARGE DETECTION &amp; ELIMINATION</b>                     |            |       |          |                    |
| <i>LABOR</i>   |            |       |          |                    |
| Permitting Team Leader   | \$125.00   | HOURL | 10       | \$1,250.00         |
| GIS Manager  | \$110.00   | HOURL | 30       | \$3,300.00         |
| Project II Engineer  | \$105.00   | HOURL | 30       | \$3,150.00         |
| Staff Engineer/GIS Specialist  | \$95.00    | HOURL | 30       | \$2,850.00         |
| Administrative Staff   | \$55.00    | HOURL | 5        | \$275.00           |
| <b>TASK 1.2 SUBTOTAL:</b>  |            |       |          | <b>\$10,825.00</b> |
| <b>TASK 1.3. CONTROL MEASURE 4 - CONSTRUCTION SITE STORM WATER MANAGEMENT</b>                          |            |       |          |                    |
| <i>LABOR</i>   |            |       |          |                    |
| Principal Engineer   | \$140.00   | HOURL | 20       | \$2,800.00         |
| Permitting Team Leader   | \$125.00   | HOURL | 20       | \$2,500.00         |
| <b>TASK 1.3 SUBTOTAL:</b>  |            |       |          | <b>\$5,300.00</b>  |
| <b>TASK 1.4. CONTROL MEASURE 5 - POST-CONSTRUCTION STORM WATER MANAGEMENT IN NEW AND REDEVELOPMENT</b> |            |       |          |                    |
| <i>LABOR</i>   |            |       |          |                    |
| Principal Engineer   | \$140.00   | HOURL | 20       | \$2,800.00         |
| Permitting Team Leader   | \$125.00   | HOURL | 20       | \$2,500.00         |
| Senior Engineer  | \$110.00   | HOURL | 40       | \$4,400.00         |
| GIS Manager  | \$110.00   | HOURL | 40       | \$4,400.00         |
| <b>TASK 1.4 SUBTOTAL:</b>  |            |       |          | <b>\$14,100.00</b> |
| <b>TASK 1.5. CONTROL MEASURE 6 - POLLUTION PREVENTION /GOOD HOUSEKEEPING FOR PERMITTEE OPERATIONS</b>  |            |       |          |                    |
| <i>LABOR</i>   |            |       |          |                    |
| Principal Engineer   | \$140.00   | HOURL | 5        | \$700.00           |
| Permitting Team Leader   | \$125.00   | HOURL | 20       | \$2,500.00         |
| Project II Engineer  | \$105.00   | HOURL | 40       | \$4,200.00         |
| Administrative Staff   | \$55.00    | HOURL | 10       | \$550.00           |
| <b>TASK 1.5 SUBTOTAL:</b>  |            |       |          | <b>\$7,950.00</b>  |

**TASK 1.6. CONTROL MEASURE 7 - PROGRAM MANAGEMENT, MONITORING, & TRAINING***LABOR*

|                        |          |      |    |            |
|------------------------|----------|------|----|------------|
| Principal Engineer     | \$140.00 | HOUR | 20 | \$2,800.00 |
| Permitting Team Leader | \$125.00 | HOUR | 60 | \$7,500.00 |
| Staff Engineer         | \$95.00  | HOUR | 60 | \$5,700.00 |
| Administrative Staff   | \$55.00  | HOUR | 5  | \$275.00   |

*DIRECT COSTS*

|                                      |            |        |   |            |
|--------------------------------------|------------|--------|---|------------|
| Lab Fees - Water samples at Outfalls | \$1,200.00 | EVENTS | 2 | \$2,400.00 |
| Sampling Supplies                    | \$25.00    | EVENTS | 2 | \$50.00    |

**TASK 1.6 SUBTOTAL: \$18,725.00**

**TASK 2.1. STORM WATER ORDINANCE AND FEE UPDATE***LABOR*

|                        |          |      |    |            |
|------------------------|----------|------|----|------------|
| Principal Engineer     | \$140.00 | HOUR | 40 | \$5,600.00 |
| Permitting Team Leader | \$125.00 | HOUR | 40 | \$5,000.00 |
| GIS Manager            | \$110.00 | HOUR | 20 | \$2,200.00 |
| Administrative Staff   | \$55.00  | HOUR | 5  | \$275.00   |

**TASK 2.1 SUBTOTAL: \$13,075.00**

**TASK 2.2. DEVELOP GIS MANAGEMENT TOOL FOR STORM WATER UTILITY***LABOR*

|                        |          |      |     |             |
|------------------------|----------|------|-----|-------------|
| Principal Engineer     | \$140.00 | HOUR | 20  | \$2,800.00  |
| Permitting Team Leader | \$125.00 | HOUR | 20  | \$2,500.00  |
| GIS Manager            | \$110.00 | HOUR | 150 | \$16,500.00 |
| Administrative Staff   | \$55.00  | HOUR | 5   | \$275.00    |

**TASK 2.2 SUBTOTAL: \$22,075.00**

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**ESTIMATED PROJECT COST: \$107,925.00**

# ATTACHMENT B

## SAMPLING PLAN



**MS4 Annual Report 2017**  
**City and County of Butte-Silver Bow Small MS4**  
**Authorization Number MTR040006**

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*The General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s) Part III. Special Conditions, requires permittees to choose either Monitoring Option 1 or Monitoring Option 2.*

Butte-Silver Bow chose Option 1 which states:

” For each semi-annual monitoring period, MS4 permittees must sample at the following location within the permitted geographic area:

- 2 discharge points which represent storm water runoff drainage areas from a relatively **commercial and/or industrial area**; and
- 
- 2 discharge points which represent storm water runoff drainage areas from a relatively **residential area**.

Monitoring must be consistently identified as “001A” and 001B” for the industrial/commercial locations, and “002A” and 002B” for the residential location.”

---

Butte-Silver Bow has twelve drainage basins range in size from 40-acres to 10,763-acres as shown in Table 1.

**Table 1. BSB Drainage Basins**

| Drainage Basins             | Acres  | Monitoring ID    |
|-----------------------------|--------|------------------|
| Montana Street              | 49     |                  |
| Warren Avenue               | 180    |                  |
| Idaho Street                | 223    |                  |
| Anaconda Road/Butte Brewery | 420    |                  |
| West Side                   | 525    |                  |
| Silver Bow Creek            | 533    |                  |
| Buffalo Gulch               | 599    | 001B             |
| Missoula Gulch              | 674    |                  |
| Grove Gulch                 | 3,988  |                  |
| Sand Creek                  | 5,778  |                  |
| Blacktail Creek             | 10,763 | 001A, 002A, 002B |
| Basin Creek                 | 25,889 |                  |

The drainage areas are shown on **Figure 1**.

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***City and County of Butte-Silver Bow Small MS4***  
***Authorization Number MTR040006***

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***Rationale***

The rationale for the four sites includes:

- upgradient location near surface water (Blacktail Creek),
- collects stormwater from a representative sample (either residential or commercial),
- drainage area produces adequate flow to sample during a storm event, and
- sampling assessability.

***Monitoring Frequency***

As required by the MS4 permit (Option 1), semi-annual sampling is required. One sampling event will be conducted during the January - June period and the second during the July - December period.

NOTE: During the January to June 2017 period, stormwater was not sampled. During the July to December period two sampling events occurred.

- September 15 - two residential and two commercial/industrial outfalls were sampled,
- December 29 - two commercial/industrial outfalls were sampled (there was not adequate flow to sample either residential outfall).

***Monitoring Parameters***

As required by the MS4 permit, the following parameters are sampled:

- pH,
- Total Suspended Solids (TSS),
- Oil & Grease,
- Nitrogen (total),
- Phosphorus (total),
- Zinc,
- Lead,
- Copper, and
- Chemical Oxygen Demand (COD).

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**City and County of Butte-Silver Bow Small MS4**  
**Authorization Number MTR040006**

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***Monitoring Locations***

The following sampling sites, shown on **Figure 2**, have been chosen.

**001A – Commercial/Industrial – Blacktail Creek Drainage Basin**

A stormwater sample is taken from the storm manhole (shown in Photograph 1) south of Walgreens (2611 Harrison Avenue), south of Harvard Avenue, west side of Harrison Avenue.



Photograph 1.



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***City and County of Butte-Silver Bow Small MS4***  
***Authorization Number MTR040006***

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**001B – Commercial/Industrial – Buffalo Gulch Drainage Basin**

A stormwater sample is taken at the Buffalo Gulch culvert outlet, located south of Holland Street, east of Montana Street, at the south end of S. Dakota Street.



Photograph 2.



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***City and County of Butte-Silver Bow Small MS4***  
***Authorization Number MTR040006***

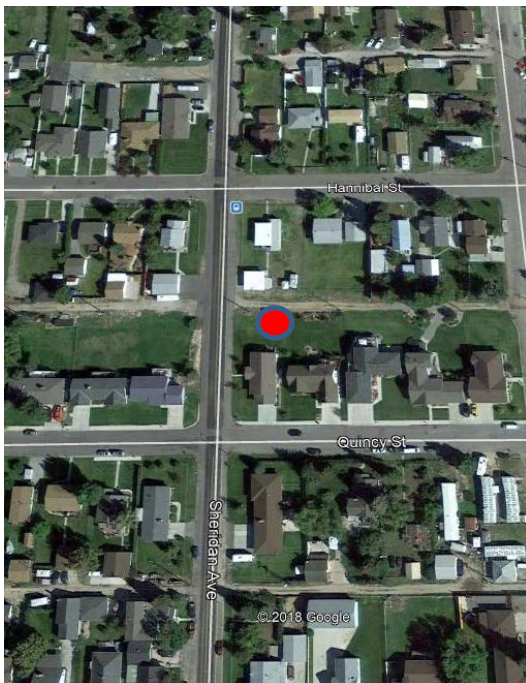
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**002A – Residential – Blacktail Creek Drainage Basin**

A stormwater sample is taken from a storm inlet located near the alley between Hannibal and Quincy, east of Sheridan Avenue.



Photograph 3.





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**Authorization Number MTR040006**

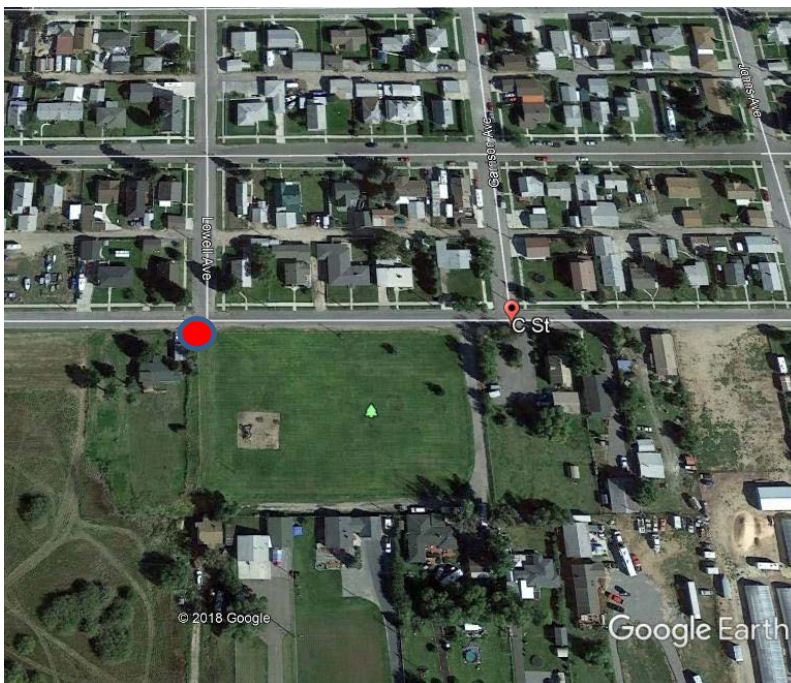
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**002B – Residential – Blacktail Creek Drainage Basin**

A stormwater sample is taken from a drain inlet at the southwest corner of C Street and Lowell Avenue.



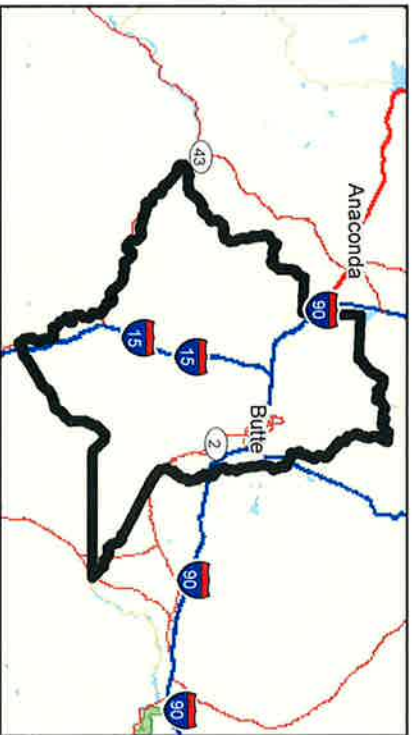
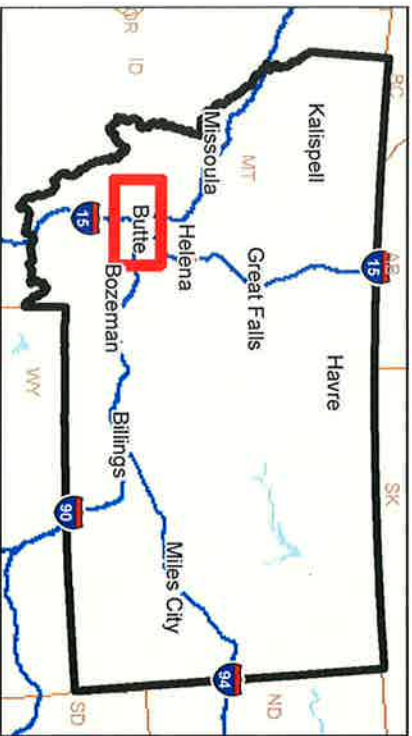
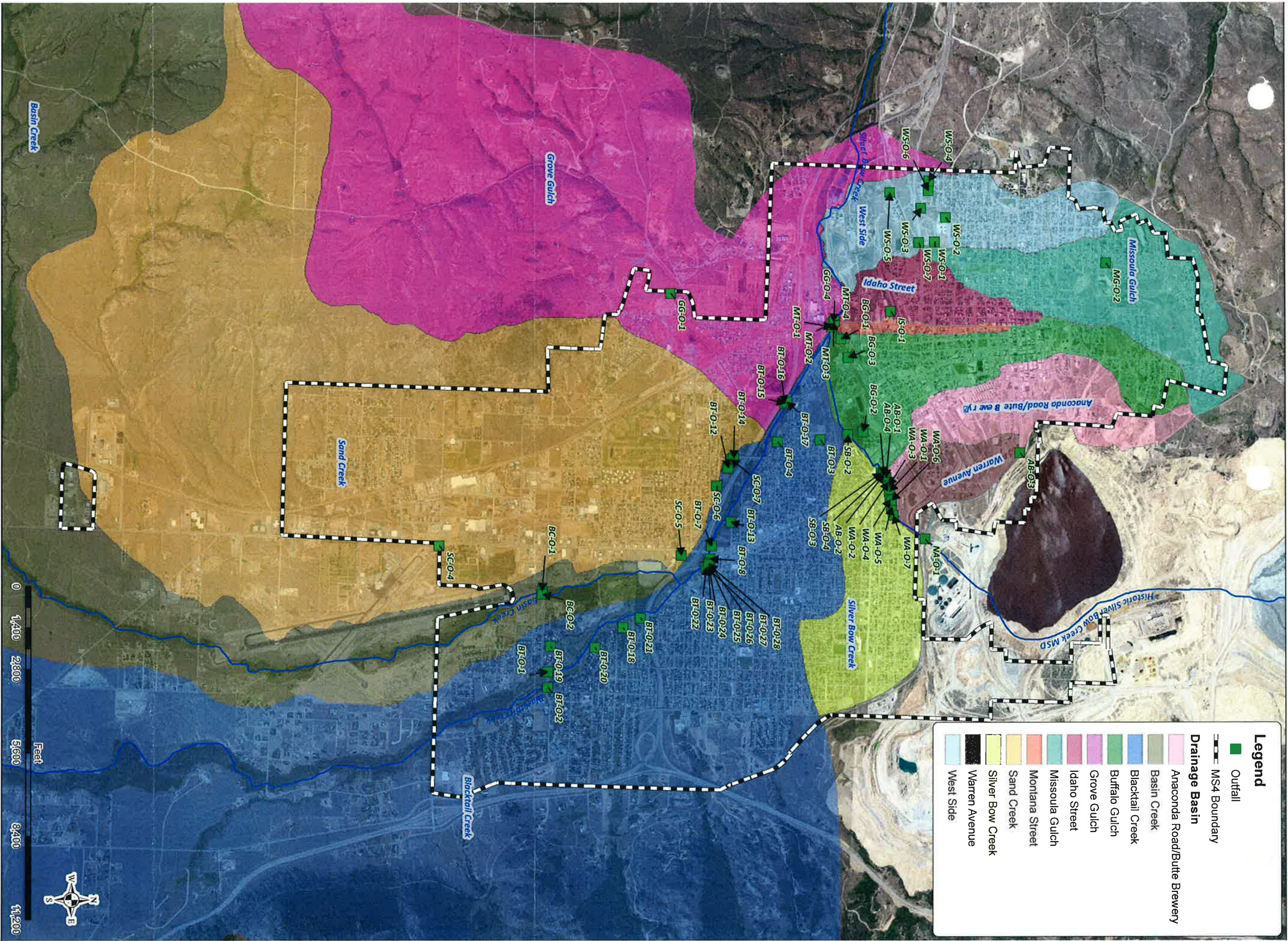
Photograph 4.



# ATTACHMENT C

## OUTFALLS TO IMPAIRED WATER BODIES







**Basin: Columbia Basin**

**Affected MS4s:** Butte-Silver Bow (BSB)

**Pollutants of Concern:** Total Phosphorus (TP), Total Nitrogen (TN), Total Suspended Solids (TSS), Metals (Arsenic, Cadmium, Copper, Lead, Mercury, and Zinc)

**MS4 WLAs as follows:**

**TSS:** The WLA is 179 tons of sediment per year from the BSB MS4 to Silver Bow Creek. (A 76% reduction from the current estimated load of 746 tons/yr.) The WLA comprises 8.5% of the Silver Bow Creek sediment TMDL.

**TSS Assumptions and Actions Specified by the TMDL:** Percent reduction allocations were developed, but the WLAs are not intended to add load limits to the permit. The WLAs are met by adhering to the permit requirements. As identified in the permit, monitoring data should continue to be evaluated to assess BMP performance and help determine whether and where additional BMP implementation may be necessary.

**Nutrients:** The MS4 will be assigned a WLA of zero (0) lbs/day TN and TP in Silver Bow Creek when the storm water system is not activated.

**Nutrient Assumptions and Actions Specified by the TMDL:** When the storm water system is activated, the WLAs are met by adhering to the permit requirements and that monitoring can be used to implement an adaptive management approach to minimize pollutant loads. The MS4 is assigned a wasteload allocation of zero when the storm water system is not activated or functioning during storm events. As required by the permit, an illicit discharge detection and elimination program is necessary to achieve this WLA, which requires the permittees to regularly update the storm sewer system map, showing the location and number of outfalls.

**Metals:** The Butte-Silver Bow MS4 and the Butte Area Superfund Site are presently addressed in Silver Bow Creek via a composite wasteload allocation (WLA<sub>Butte</sub>) because the sections of these areas overlap.

WLA<sub>Butte</sub>

Arsenic: 2.38 lbs/day

Cadmium: 0.07 lbs/day

Copper: 2.85 lbs/day

Lead: 1.09 lbs/day

Mercury: 0.01 lbs/day

Zinc: 36.6 lbs/day

**Metals Assumptions and Actions Specified by the TMDL:** The WLAs are met by adhering to the permit requirements because the Superfund site has the goal of meeting water quality targets in Silver Bow Creek with direction from the CERCLA program.

**Name and Date of TMDL:** Upper Clark Fork Phase 2 Sediment and Nutrients TMDLs and Framework Water Quality Improvement Plan (April 2014)

**Status of the TMDL:** Final

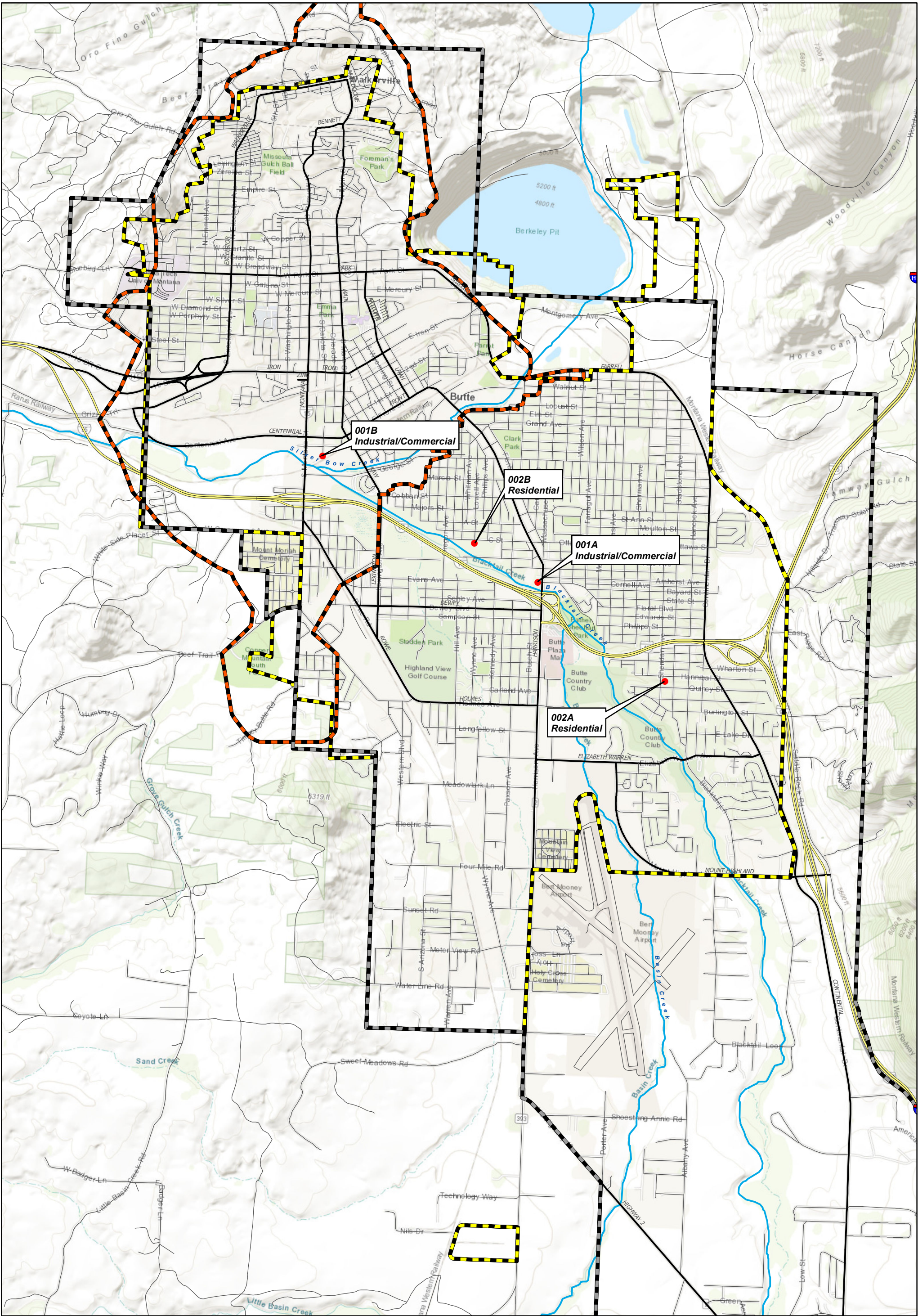
**Link to Main TMDL Document:**

<http://deq.mt.gov/Portals/112/Water/WQPB/CWAIC/TMDL/C01-TMDL-04a.pdf>

# ATTACHMENT D

## MONITORING RESULTS





Legend

Sampling Sites

BPSOU Boundary

Sewer District Boundary (MS4 Boundary)

Urban Limit Boundary

N

E

S

W

Miles

0

0.25

0.5

0.75

1

WET

Water & Environmental  
TECHNOLOGIES

Butte - Silver Bow  
MS4 Annual Report - 2017

Sampling Site Locations

Date: 2/12/2018

Job#: BSBPWW41

FIGURE 2

Path: M:\BSBPWM4\2017-MS4 Annual Report\Figure2.mxd, Author: trutheford





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## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Water and Environmental Technologies  
**Project:** BSBPWM41  
**Lab ID:** B18010058-001  
**Client Sample ID:** 001A

**Report Date:** 01/05/18  
**Collection Date:** 12/29/17 11:52  
**Date Received:** 01/03/18  
**Matrix:** Aqueous

| Analyses                            | Result | Units | Qualifiers | RL    | MCL/<br>QCL | Method      | Analysis Date / By     |
|-------------------------------------|--------|-------|------------|-------|-------------|-------------|------------------------|
| <b>PHYSICAL PROPERTIES</b>          |        |       |            |       |             |             |                        |
| pH                                  | 7.4    | s.u.  | H          | 0.1   |             | A4500-H B   | 01/03/18 11:21 / pjw   |
| Solids, Total Suspended TSS @ 105 C | 158    | mg/L  | D          | 20    |             | A2540 D     | 01/03/18 11:36 / bre   |
| <b>AGGREGATE ORGANICS</b>           |        |       |            |       |             |             |                        |
| Oxygen Demand, Chemical (COD)       | 117    | mg/L  | D          | 10    |             | E410.4      | 01/04/18 13:11 / mej   |
| <b>NUTRIENTS</b>                    |        |       |            |       |             |             |                        |
| Nitrogen, Nitrate+Nitrite as N      | 2.27   | mg/L  |            | 0.01  |             | E353.2      | 01/04/18 10:18 / taw   |
| Nitrogen, Kjeldahl, Total as N      | 2.1    | mg/L  |            | 0.5   |             | E351.2      | 01/04/18 15:12 / ks    |
| Nitrogen, Total                     | 4.4    | mg/L  |            | 0.5   |             | Calculation | 01/05/18 08:27 / jbm   |
| Phosphorus, Total as P              | 0.449  | mg/L  |            | 0.005 |             | E365.1      | 01/04/18 14:01 / ks    |
| <b>METALS, TOTAL</b>                |        |       |            |       |             |             |                        |
| Copper                              | 0.037  | mg/L  |            | 0.005 |             | E200.8      | 01/04/18 23:07 / jpv   |
| Lead                                | 0.013  | mg/L  |            | 0.001 |             | E200.8      | 01/04/18 23:07 / jpv   |
| Zinc                                | 0.17   | mg/L  |            | 0.01  |             | E200.8      | 01/04/18 23:07 / jpv   |
| <b>ORGANIC CHARACTERISTICS</b>      |        |       |            |       |             |             |                        |
| Oil & Grease (HEM)                  | 3      | mg/L  |            | 1     |             | E1664A      | 01/05/18 08:51 / eli-g |

**Report Definitions:**  
RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.  
H - Analysis performed past recommended holding time.



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## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Water and Environmental Technologies  
**Project:** BSBPWM41  
**Lab ID:** B18010058-002  
**Client Sample ID:** 001B

**Report Date:** 01/05/18  
**Collection Date:** 12/29/17 12:16  
**Date Received:** 01/03/18  
**Matrix:** Aqueous

| Analyses                            | Result | Units | Qualifiers | RL    | MCL/<br>QCL | Method      | Analysis Date / By     |
|-------------------------------------|--------|-------|------------|-------|-------------|-------------|------------------------|
| <b>PHYSICAL PROPERTIES</b>          |        |       |            |       |             |             |                        |
| pH                                  | 7.0    | s.u.  | H          | 0.1   |             | A4500-H B   | 01/03/18 11:23 / pjw   |
| Solids, Total Suspended TSS @ 105 C | 44     | mg/L  | D          | 20    |             | A2540 D     | 01/03/18 11:36 / bre   |
| <b>AGGREGATE ORGANICS</b>           |        |       |            |       |             |             |                        |
| Oxygen Demand, Chemical (COD)       | 273    | mg/L  | D          | 10    |             | E410.4      | 01/04/18 13:11 / mej   |
| <b>NUTRIENTS</b>                    |        |       |            |       |             |             |                        |
| Nitrogen, Nitrate+Nitrite as N      | 0.36   | mg/L  |            | 0.01  |             | E353.2      | 01/04/18 10:19 / taw   |
| Nitrogen, Kjeldahl, Total as N      | 2.7    | mg/L  |            | 0.5   |             | E351.2      | 01/04/18 15:13 / ks    |
| Nitrogen, Total                     | 3.2    | mg/L  |            | 0.5   |             | Calculation | 01/05/18 08:27 / jbm   |
| Phosphorus, Total as P              | 0.497  | mg/L  |            | 0.005 |             | E365.1      | 01/04/18 14:02 / ks    |
| <b>METALS, TOTAL</b>                |        |       |            |       |             |             |                        |
| Copper                              | 0.212  | mg/L  |            | 0.005 |             | E200.8      | 01/04/18 23:48 / jpv   |
| Lead                                | 0.104  | mg/L  |            | 0.001 |             | E200.8      | 01/04/18 23:48 / jpv   |
| Zinc                                | 0.82   | mg/L  |            | 0.01  |             | E200.8      | 01/04/18 23:48 / jpv   |
| <b>ORGANIC CHARACTERISTICS</b>      |        |       |            |       |             |             |                        |
| Oil & Grease (HEM)                  | 6      | mg/L  |            | 1     |             | E1664A      | 01/05/18 08:43 / eli-g |

**Report Definitions:**  
RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.  
H - Analysis performed past recommended holding time.



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## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Water and Environmental Technologies  
**Project:** BSBPWM041  
**Lab ID:** B17091566-001  
**Client Sample ID:** 001A

**Report Date:** 09/28/17  
**Collection Date:** 09/15/17 16:00  
**Date Received:** 09/19/17  
**Matrix:** Aqueous

| Analyses                            | Result | Units | Qualifiers | RL     | MCL/<br>QCL | Method      | Analysis Date / By     |
|-------------------------------------|--------|-------|------------|--------|-------------|-------------|------------------------|
| <b>PHYSICAL PROPERTIES</b>          |        |       |            |        |             |             |                        |
| pH                                  | 7.2    | s.u.  | H          | 0.1    |             | A4500-H B   | 09/20/17 10:52 / pjw   |
| Solids, Total Suspended TSS @ 105 C | 51     | mg/L  |            | 10     |             | A2540 D     | 09/21/17 09:40 / rik   |
| <b>AGGREGATE ORGANICS</b>           |        |       |            |        |             |             |                        |
| Oxygen Demand, Chemical (COD)       | 62     | mg/L  |            | 5      |             | E410.4      | 09/21/17 13:45 / mej   |
| <b>NUTRIENTS</b>                    |        |       |            |        |             |             |                        |
| Nitrogen, Nitrate+Nitrite as N      | 0.33   | mg/L  |            | 0.01   |             | E353.2      | 09/20/17 11:56 / ens   |
| Nitrogen, Kjeldahl, Total as N      | 0.8    | mg/L  |            | 0.5    |             | E351.2      | 09/21/17 15:37 / ks    |
| Nitrogen, Total                     | 1.1    | mg/L  |            | 0.5    |             | Calculation | 09/22/17 10:12 / jll   |
| Phosphorus, Total as P              | 0.257  | mg/L  |            | 0.005  |             | E365.1      | 09/20/17 14:12 / taw   |
| <b>METALS, TOTAL</b>                |        |       |            |        |             |             |                        |
| Copper                              | 0.049  | mg/L  |            | 0.002  |             | E200.8      | 09/21/17 15:57 / rlh   |
| Lead                                | 0.0124 | mg/L  |            | 0.0003 |             | E200.8      | 09/21/17 15:57 / rlh   |
| Zinc                                | 0.090  | mg/L  |            | 0.008  |             | E200.8      | 09/21/17 15:57 / rlh   |
| <b>ORGANIC CHARACTERISTICS</b>      |        |       |            |        |             |             |                        |
| Oil & Grease (HEM)                  | 1      | mg/L  |            | 1      |             | E1664A      | 09/25/17 09:16 / eli-g |

**Report Definitions:** RL - Analyte reporting limit.  
QCL - Quality control limit.  
H - Analysis performed past recommended holding time.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



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## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Water and Environmental Technologies  
**Project:** BSBPWM041  
**Lab ID:** B17091566-002  
**Client Sample ID:** 002A

**Report Date:** 09/28/17  
**Collection Date:** 09/15/17 15:30  
**Date Received:** 09/19/17  
**Matrix:** Aqueous

| Analyses                            | Result | Units | Qualifiers | RL     | MCL/<br>QCL | Method      | Analysis Date / By     |
|-------------------------------------|--------|-------|------------|--------|-------------|-------------|------------------------|
| <b>PHYSICAL PROPERTIES</b>          |        |       |            |        |             |             |                        |
| pH                                  | 7.1    | s.u.  | H          | 0.1    |             | A4500-H B   | 09/20/17 10:54 / pjw   |
| Solids, Total Suspended TSS @ 105 C | 15     | mg/L  |            | 10     |             | A2540 D     | 09/21/17 09:40 / rik   |
| <b>AGGREGATE ORGANICS</b>           |        |       |            |        |             |             |                        |
| Oxygen Demand, Chemical (COD)       | 26     | mg/L  |            | 5      |             | E410.4      | 09/21/17 13:45 / mej   |
| <b>NUTRIENTS</b>                    |        |       |            |        |             |             |                        |
| Nitrogen, Nitrate+Nitrite as N      | 0.17   | mg/L  |            | 0.01   |             | E353.2      | 09/20/17 11:57 / ens   |
| Nitrogen, Kjeldahl, Total as N      | ND     | mg/L  |            | 0.5    |             | E351.2      | 09/21/17 15:43 / ks    |
| Nitrogen, Total                     | ND     | mg/L  |            | 0.5    |             | Calculation | 09/22/17 10:12 / jil   |
| Phosphorus, Total as P              | 0.184  | mg/L  |            | 0.005  |             | E365.1      | 09/20/17 14:15 / taw   |
| <b>METALS, TOTAL</b>                |        |       |            |        |             |             |                        |
| Copper                              | 0.011  | mg/L  |            | 0.002  |             | E200.8      | 09/21/17 16:01 / rih   |
| Lead                                | 0.0044 | mg/L  |            | 0.0003 |             | E200.8      | 09/21/17 16:01 / rih   |
| Zinc                                | 0.022  | mg/L  |            | 0.008  |             | E200.8      | 09/21/17 16:01 / rih   |
| <b>ORGANIC CHARACTERISTICS</b>      |        |       |            |        |             |             |                        |
| Oil & Grease (HEM)                  | ND     | mg/L  |            | 1      |             | E1664A      | 09/25/17 09:16 / eli-g |

**Report Definitions:**  
RL - Analyte reporting limit.  
QCL - Quality control limit.  
H - Analysis performed past recommended holding time.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



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## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Water and Environmental Technologies  
**Project:** BSBPMW 41  
**Lab ID:** B17091561-001  
**Client Sample ID:** 001B

**Report Date:** 09/28/17  
**Collection Date:** 09/15/17 16:30  
**Date Received:** 09/19/17  
**Matrix:** Aqueous

| Analyses                            | Result | Units | Qualifiers | RL     | MCL/<br>QCL | Method      | Analysis Date / By     |
|-------------------------------------|--------|-------|------------|--------|-------------|-------------|------------------------|
| <b>PHYSICAL PROPERTIES</b>          |        |       |            |        |             |             |                        |
| pH                                  | 7.5    | s.u.  | H          | 0.1    |             | A4500-H B   | 09/20/17 10:44 / pjw   |
| Solids, Total Suspended TSS @ 105 C | 65     | mg/L  |            | 10     |             | A2540 D     | 09/21/17 09:40 / rik   |
| <b>AGGREGATE ORGANICS</b>           |        |       |            |        |             |             |                        |
| Oxygen Demand, Chemical (COD)       | 85     | mg/L  |            | 5      |             | E410.4      | 09/21/17 13:45 / mej   |
| <b>NUTRIENTS</b>                    |        |       |            |        |             |             |                        |
| Nitrogen, Nitrate+Nitrite as N      | 0.71   | mg/L  |            | 0.01   |             | E353.2      | 09/20/17 11:51 / ens   |
| Nitrogen, Kjeldahl, Total as N      | 1.0    | mg/L  |            | 0.5    |             | E351.2      | 09/21/17 15:35 / ks    |
| Nitrogen, Total                     | 1.7    | mg/L  |            | 0.5    |             | Calculation | 09/22/17 10:12 / jll   |
| Phosphorus, Total as P              | 0.293  | mg/L  |            | 0.005  |             | E365.1      | 09/20/17 14:06 / taw   |
| <b>METALS, TOTAL</b>                |        |       |            |        |             |             |                        |
| Copper                              | 0.058  | mg/L  |            | 0.002  |             | E200.8      | 09/21/17 15:49 / rlh   |
| Lead                                | 0.0314 | mg/L  |            | 0.0003 |             | E200.8      | 09/21/17 15:49 / rlh   |
| Zinc                                | 0.242  | mg/L  |            | 0.008  |             | E200.8      | 09/21/17 15:49 / rlh   |
| <b>ORGANIC CHARACTERISTICS</b>      |        |       |            |        |             |             |                        |
| Oil & Grease (HEM)                  | 2      | mg/L  |            | 1      |             | E1664A      | 09/25/17 09:15 / eli-g |

**Report** RL - Analyte reporting limit.  
**Definitions:** QCL - Quality control limit.  
H - Analysis performed past recommended holding time.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.





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## LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Water and Environmental Technologies  
**Project:** BSBPMW 41  
**Lab ID:** B17091561-002  
**Client Sample ID:** 002B

**Report Date:** 09/28/17  
**Collection Date:** 09/15/17 16:13  
**Date Received:** 09/19/17  
**Matrix:** Aqueous

| Analyses                            | Result | Units | Qualifiers | RL     | MCL/<br>QCL | Method      | Analysis Date / By     |
|-------------------------------------|--------|-------|------------|--------|-------------|-------------|------------------------|
| <b>PHYSICAL PROPERTIES</b>          |        |       |            |        |             |             |                        |
| pH                                  | 7.2    | s.u.  | H          | 0.1    |             | A4500-H B   | 09/20/17 10:49 / pjw   |
| Solids, Total Suspended TSS @ 105 C | 42     | mg/L  |            | 10     |             | A2540 D     | 09/21/17 09:40 / rik   |
| <b>AGGREGATE ORGANICS</b>           |        |       |            |        |             |             |                        |
| Oxygen Demand, Chemical (COD)       | 54     | mg/L  |            | 5      |             | E410.4      | 09/21/17 13:45 / mej   |
| <b>NUTRIENTS</b>                    |        |       |            |        |             |             |                        |
| Nitrogen, Nitrate+Nitrite as N      | 0.31   | mg/L  |            | 0.01   |             | E353.2      | 09/20/17 11:55 / ens   |
| Nitrogen, Kjeldahl, Total as N      | 0.7    | mg/L  |            | 0.5    |             | E351.2      | 09/21/17 15:36 / ks    |
| Nitrogen, Total                     | 1.1    | mg/L  |            | 0.5    |             | Calculation | 09/22/17 10:12 / jll   |
| Phosphorus, Total as P              | 0.283  | mg/L  |            | 0.005  |             | E365.1      | 09/20/17 14:07 / taw   |
| <b>METALS, TOTAL</b>                |        |       |            |        |             |             |                        |
| Copper                              | 0.042  | mg/L  |            | 0.002  |             | E200.8      | 09/21/17 15:54 / rlh   |
| Lead                                | 0.0130 | mg/L  |            | 0.0003 |             | E200.8      | 09/21/17 15:54 / rlh   |
| Zinc                                | 0.076  | mg/L  |            | 0.008  |             | E200.8      | 09/21/17 15:54 / rlh   |
| <b>ORGANIC CHARACTERISTICS</b>      |        |       |            |        |             |             |                        |
| Oil & Grease (HEM)                  | ND     | mg/L  |            | 1      |             | E1664A      | 09/25/17 09:16 / eli-g |

**Report Definitions:**  
RL - Analyte reporting limit.  
QCL - Quality control limit.  
H - Analysis performed past recommended holding time.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.



## MS4 sampling Site 001-A INDUSTRIAL/COMMERCIAL - WALGREENS

| Sampler | Testing Period | pH (su) | TSS (mg/L) | Oil & grease (mg/L) | Nitrogen (total) (mg/L) | Phosphorus (total) (mg/L) | Zinc (mg/L) | Lead (mg/L) | Copper (mg/L) | Chemical O <sub>2</sub> Demand (mg/L) | Data Source |
|---------|----------------|---------|------------|---------------------|-------------------------|---------------------------|-------------|-------------|---------------|---------------------------------------|-------------|
| Maximum |                | 9.0     | 125        | 10.0                | 2.0                     | 0.410                     | 0.21        | 0.165       | 0.04          | 80                                    |             |

|           |                           |           |           |           |           |           |           |           |           |           |  |
|-----------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| BSB Metro | January to July 2017      | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample |  |
| WET       | July to December 2017     | 7.2       | 51        | 1         | 1.1       | 0.257     | 0.09      | 0.0124    | 0.049     | 62        |  |
| WET       | July to December 2017 (2) | 7.4       | 158       | 3         | 4.4       | 0.449     | 0.17      | 0.013     | 0.037     | 117       |  |

**MS4 sampling Site 001-B INDUSTRIAL/COMMERCIAL - BUFFALO GULCH**

| Sampler | Testing Period | pH (su) | TSS (mg/L) | Oil & grease (mg/L) | Nitrogen (total) (mg/L) | Phosphorus (total) (mg/L) | Zinc (mg/L) | Lead (mg/L) | Copper (mg/L) | Chemical O <sub>2</sub> Demand (mg/L) | Data Source |
|---------|----------------|---------|------------|---------------------|-------------------------|---------------------------|-------------|-------------|---------------|---------------------------------------|-------------|
|         | Maximum        | 9.0     | 125        | 10.0                | 2.0                     | 0.410                     | 0.21        | 0.165       | 0.04          | 80                                    |             |

|           |                           |           |           |           |           |           |           |           |           |           |  |
|-----------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--|
| BSB Metro | January to July 2017      | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample | No Sample |  |
| WET       | July to December 2017     | 7.5       | 65        | 2         | 1.7       | 0.293     | 0.242     | 0.0314    | 0.058     | 85        |  |
| WET       | July to December 2017 (2) | 7         | 44        | 6         | 3.2       | 0.497     | 0.82      | 0.104     | 0.212     | 273       |  |

## MS4 sampling Site 002-A RESIDENTIAL- SHERIDAN AVE BETWEEN HANNIBAL AND QUINCY

| Sampler | Testing Period | pH (su) | TSS (mg/L) | Oil & grease (mg/L) | Nitrogen (total) (mg/L) | Phosphorus (total) (mg/L) | Zinc (mg/L) | Lead (mg/L) |  | Copper (mg/L) | Chemical O <sub>2</sub> Demand (mg/L) | Data Source |
|---------|----------------|---------|------------|---------------------|-------------------------|---------------------------|-------------|-------------|--|---------------|---------------------------------------|-------------|
|         | Maximum        | 9.0     | 125        | 10.0                | 2.0                     | 0.410                     | 0.21        | 0.165       |  | 0.04          | 80                                    |             |

[illegible]**MS4 sampling Site 002-B RESIDENTIAL- C STREET AT LOWELL ST INTERSECTION**

| Sampler | Testing Period | pH (su) | TSS (mg/L) | Oil & grease (mg/L) | Nitrogen (total) (mg/L) | Phosphorus (total) (mg/L) | Zinc (mg/L) | Lead (mg/L) |  | Copper (mg/L) | Chemical O <sub>2</sub> Demand (mg/L) | Data Source |
|---------|----------------|---------|------------|---------------------|-------------------------|---------------------------|-------------|-------------|--|---------------|---------------------------------------|-------------|
|         | Maximum        | 9.0     | 125        | 10.0                | 2.0                     | 0.410                     | 0.21        | 0.165       |  | 0.04          | 80                                    |             |

[illegible]

# Gravity Storm Pipe Flow Model

9/15/17 - MS4 Sampling

## Model Inputs:

|                           |              |   |        |
|---------------------------|--------------|---|--------|
| 001A I.D. (inches)=       | 48           | Concrete Pipe (Walgreens)                         |        |
| 002A I.D. (inches)=       | 36           | Concrete Pipe (Hannibal/Quincy)                   |        |
| 001B I.D. (inches)=       | 48           | Concrete Pipe (Buffalo Gulch)                     |        |
| 002B I.D. (inches)=       | 12           | PVC Pipe (Lowell/C Street)                        |        |
| 001A Slope (ft/ft)=       | 0.0322       |   |        |
| 002A Slope (ft/ft)=       | 0.0093       |   |        |
| 001B Slope (ft/ft)=       | 0.0101       |   |        |
| 002B Slope (ft/ft)=       | 0.0194       |   |        |
| n=                        | 0.015        | Manning Roughness Coefficient for Concrete Sewer* |        |
| n=                        | 0.010        | Manning Roughness Coefficient for PVC Sewer*      |        |
| k=                        | 1.49         | Conversion Factor to English Units                |        |
| <b>y<sub>001A</sub> =</b> | <b>3.98</b>  | Flow Depth 001A (inches)                          | 8.29%  |
| <b>y<sub>002A</sub> =</b> | <b>2.40</b>  | Flow Depth 002A (inches)                          | 6.67%  |
| <b>y<sub>001B</sub> =</b> | <b>18.96</b> | Flow Depth 001B (inches)                          | 39.50% |
| <b>y<sub>002B</sub> =</b> | <b>1.56</b>  | Flow Depth 002B (inches)                          | 13.00% |

## Model Outputs:

|      | y/d    | θ (rad) | P (ft) | A (ft <sup>2</sup> ) | R (ft) | T (ft) | V (ft/sec) | Q (GPM) |
|------|--------|---------|--------|----------------------|--------|--------|------------|---------|
| 001A | 0.0829 | 1.1684  | 2.3367 | 0.4965               | 0.2125 | 2.2060 | 6.3        | 1414    |
| 001B | 0.3950 | 2.7184  | 5.4369 | 4.6156               | 0.8489 | 3.9108 | 9.0        | 18569   |
| 002A | 0.0667 | 1.0446  | 1.5669 | 0.2024               | 0.1292 | 1.2649 | 2.4        | 222     |
| 002B | 0.1300 | 1.4755  | 0.7377 | 0.0600               | 0.0813 | 0.0000 | 3.9        | 105     |

# Gravity Storm Pipe Flow Model

12/29/17 - MS4 Sampling

## Model Inputs:

|                     |        |   |        |
|---------------------|--------|---|--------|
| 001A I.D. (inches)= | 48     | Concrete Pipe (Walgreens)                         |        |
| 002A I.D. (inches)= | 36     | Concrete Pipe (Hannibal/Quincy)                   |        |
| 001B I.D. (inches)= | 48     | Concrete Pipe (Buffalo Gulch)                     |        |
| 002B I.D. (inches)= | 12     | PVC Pipe (Lowell/C Street)                        |        |
| 001A Slope (ft/ft)= | 0.0322 |   |        |
| 002A Slope (ft/ft)= | 0.0093 |   |        |
| 001B Slope (ft/ft)= | 0.0101 |   |        |
| 002B Slope (ft/ft)= | 0.0194 |   |        |
| n=                  | 0.015  | Manning Roughness Coefficient for Concrete Sewer* |        |
| n=                  | 0.010  | Manning Roughness Coefficient for PVC Sewer*      |        |
| k=                  | 1.49   | Conversion Factor to English Units                |        |
| Y <sub>001A</sub> = | 1.94   | Flow Depth 001A (inches)                          | 4.04%  |
| Y <sub>002A</sub> = | 0.00   | Flow Depth 002A (inches)                          | 0.00%  |
| Y <sub>001B</sub> = | 10.92  | Flow Depth 001B (inches)                          | 22.75% |
| Y <sub>002B</sub> = | 0.00   | Flow Depth 002B (inches)                          | 0.00%  |

## Model Outputs:

|      | y/d    | θ (rad) | P (ft) | A (ft <sup>2</sup> ) | R (ft)  | T (ft) | V (ft/sec) | Q (GPM) |
|------|--------|---------|--------|----------------------|---------|--------|------------|---------|
| 001A | 0.0404 | 0.8097  | 1.6193 | 0.1712               | 0.1057  | 1.5755 | 4.0        | 306     |
| 001B | 0.2275 | 1.9888  | 3.9776 | 2.1498               | 0.5405  | 3.3537 | 6.6        | 6401    |
| 002A | 0.0000 | 0.0000  | 0.0000 | 0.0000               | #DIV/0! | 0.0000 | #DIV/0!    | #DIV/0! |
| 002B | 0.0000 | 0.0000  | 0.0000 | 0.0000               | #DIV/0! | 0.0000 | #DIV/0!    | #DIV/0! |



# ATTACHMENT E

## 2017 ANNUAL REPORT ATTACHMENTS

## **CFWEP Report MS4 Contract with Butte Silver-Bow 2017**

**Provided by: Rayelynn Brandl**

**Reporting Period: March 1, 2017-February 15, 2018**

### **Overall Goal of the Project**

The project partners established new objectives for the contract period in September of 2017. The purpose of the re-alignment was to directly correlate the education efforts with the new MS4 permit. Dedicated work toward the MS4 objectives began in September of 2017 and currently on-going. Prior to the re-alignment the main focus of the education/outreach contract was to raise awareness within both student and adult populations. This effort remains part of the current contract, although focus is now less centered on the student learning outcomes than prior reports.

- 1) **Continue to provide public outreach and education efforts including stormwater curriculum, storm drain marking, and mapping. The target number of students to be served annually is to be greater than or equal to 100 students per year.**

CFWEP reached 326 students through targeted stormwater outreach. The events included concentrated work with Butte Central High school for drain mapping and marking and classroom visits with East Middle School. The annual Clean Up Blacktail Stream (CUBS) day involved high school students and two elementary schools. The total number of students involved was 250.

The team continued stormwater art project as a collaboration between community business, BSB, and local artists. To date, four signal boxes have been wrapped with artwork connecting the storm drain to the watershed as a whole. The art project was identified as a method for connecting audiences not otherwise reached through targeted outreach and allowed for partnership/awareness with local businesses. Business sponsors provide \$600 for the wrap materials and are featured as a stormwater-aware business. The team currently has two more sponsors ready for the spring 2018 season. Artwork and sponsor details can be viewed at [www.bsbstormwater.org](http://www.bsbstormwater.org). CFWEP continues to feature stormwater events and news through our social media and website platforms at <https://www.facebook.com/CfwepOrg-184958538193824/> and [www.cfwep.org](http://www.cfwep.org).

- 2) **Coordinate work efforts with Water and Environmental Technology (WET) and BSB to determine key target audiences most appropriate for stormwater outreach in addition to school students.**
  - a. **Assist with analysis of business types and/or residential behaviors that are common sources of illicit discharges, etc.**

- b. **Develop a list, description and rationale for selection of key target audiences based on business and residential groups associated with illegal discharges and improper disposal of waste to the MS4.**
- c. **List the pollutants associates with each key target audience.**

This work is on-going with WET as of this writing. Patty Hamblock of WET has reviewed the key target audiences and is presently working with Kayla Lappin, CFWEP's communications coordinator to determine messaging. Kayla Lappin is working with Butte Central High School students to produce a second round of radio Public Service Announcements (PSAs) that will air beginning in the late spring/early summer of 2018. The PSAs will focus on residential awareness. Additionally, key target audiences identified for Butte Silver Bow include concrete contractors, construction contractors, and trail users. The team has planned to develop a series of calendar images that relay 'best practices' for stormwater for passive training. Targeted training for contractors has been part of the usual permitting process and will likely continue per Butte Silver Bow instructions. Targeted outreach for trail users will include outreach at club meetings, print materials for groups, and signage at the trails. The team identified that coordination between Butte Silver Bow Parks Department and the Water Division is important as the trail systems do not have appropriate receptacles for pet waste at all sites. The team will work to assist with coordination efforts, including development of signage and informational outreach.

**3) Assist BSB and WET to identify approaches for involving key target audiences in SWMP development and implementation.**

This goal is currently under review by the team with WET and BSB. Re-development of the stormwater website and developing targeted outreach materials was deemed high priority in September. Progress in this goal area has been to identify which audiences should be involved in development of the SWMP. CFWEP will assist with enlisting target audiences in the development process and documentation of the collaborations.

**4) Develop and advertise a stormwater website for access by key target audiences, other interested stakeholder, and the general public.**

This goal was completed in December of 2017. The website went live in January of 2018 and is currently hosted with the BSB Metro Sewer Site. It can also be found stand-alone at [www.bsbstormwater.org](http://www.bsbstormwater.org). All requirements of the 2016 MS4 permit are included on the website. In addition, the team has constructed the 'stormwater champions' feature. This feature identifies local groups (target audiences) that are maintaining high-quality stormwater standards. The intention of the 'stormwater champions' feature is to highlight work that is being done well and to give positive public recognition to target audience groups.

### 3. ILLICIT DISCHARGE DETECTION ELIMINATION

The permittee shall develop, implement and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4.

Permit Year - Circle one - 2017, 2018, 2019, 2020, 2021 March 20, 2017

#### MS4 significant contributors of pollutants

|   | Yes,<br>an issue | No,<br>not an issue | Local controls/conditions<br>placed on these discharges |
|---|------------------|---------------------|---|
| water line flushing   | X                |                     | none currently*   |
| landscape irrigation  |                  | X                   |   |
| diverted stream flows   |                  | X                   |   |
| rising ground waters,   |                  | X                   |   |
| uncontaminated ground water infiltration as<br>defined in ARM 17.30.1102(8) |                  | X                   |   |
| discharges from potable water sources                                       |                  | X                   |   |
| foundation drains   |                  | X                   |   |
| air conditioning condensation   |                  | X                   |   |
| irrigation water  |                  | X                   |   |
| springs   |                  | X                   |   |
| water from crawl space pumps  |                  | X                   |   |
| footing drains  |                  | X                   |   |
| lawn watering   |                  | X                   | limit days per week                                     |
| individual residential car washing  |                  | X                   |   |
| flows from riparian habitats and wetlands                                   |                  | X                   |   |
| dechlorinated swimming pool discharges                                      |                  | X                   |   |
| street wash water   | X                |                     | none currently*   |
| discharges or flows from firefighting activities                            |                  | X                   |   |

**\*Water line flushing & street wash water - current issues, BSB personnel are encouraged but not required to use inlet protection**



### 3. ILLICIT DISCHARGE DETECTION ELIMINATION

The permittee shall develop, implement and enforce a program to detect and eliminate illicit discharges (as defined in ARM 17.30.1102(7)) into the permitted Small MS4.

Permit Year - Circle one - 2017, 2018, 2019, 2020, 2021

MS4 occasional incidental non-storm water discharges incidental ⇨ non-commercial, charity car wash

| Potential incidental non-storm water discharges | Yes, an issue | No, not an issue | Local controls/conditions placed on these discharges   |
|---|---------------|------------------|--|
| charity car wash                                | Maybe 2/year  |                  | *encourage but do not require car washes to be located on pervious surfaces rather than impervious surfaces near storm sewer inlets. |
|   |               |                  | *locations for car washes are encouraged to be setback from area surface waters (Sand Creek, Basin Creek, Silver Bow Creek).         |
|   |               |                  |  |
|   |               |                  |  |
|   |               |                  |  |

## ILLICIT DISCHARGE INVESTIGATION AND CORRECTIVE ACTION PLAN WITHIN THE CITY AND COUNTY OF [BUTTE-SILVER BOW], MONTANA

[10/4/16]

### Introduction

In accordance with the General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewer System (MS4), issued by the Montana Department of Environmental Quality (DEQ), the City and County of *Butte-Silver Bow* is required to develop and implement an illicit discharge investigation and corrective action plan. Illicit discharge as defined in the Administrative Rules of Montana (ARM) 17.30.1102(7) "means any discharge to a municipal separate storm sewer that is not composed entirely of storm water except discharges pursuant to an MPDES permit (other than the MPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from fire fighting activities." This plan provides guidelines for tracking potential illicit discharges and criteria by which City personnel can determine the most appropriate corrective action to eliminate an illicit discharge. *Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments*, developed by the Center for Watershed Protection (CWP), was utilized to guide the development of this plan. The complete document is available at <http://www.co.silverbow.mt.us/documentcenter/view/89> for reference.

This plan has been developed with the following objectives in mind:

- Identify the source of an illicit discharge
- Determine appropriate corrective actions
- Abate damages following detection of illicit discharge
- Prevent recurrence of illicit discharge violations

### 1. Source Detection and Investigation Procedures

Potential illicit discharges can be revealed through various sources such as outfall inspections, reports from staff, or public complaints. If the source of a potential illicit discharge is not immediately clear the City will begin an official illicit discharge investigation to trace the source of the illicit discharge following the procedures outlined in this section.

In cases where the source of an illicit discharge is immediately known (e.g. when an illegal dumping or illicit discharge problem is directly observed by a member of the City staff) it is generally not necessary to follow investigation procedures. In such cases the *Metro Sewer Employee* will complete the steps outlined in Sections 1.1 - 1.4 and will then refer to the corrective action procedures provided in Section 2.

#### 1.1 Documentation

When a potential illicit discharge is identified the *Metro Sewer Employee who witnessed the activity* will start an investigation file. An Illicit Discharge Investigation and Corrective Action Form which includes a creation date, case description, and any information related to the observed or suspected problem will be filled out. The *Metro Sewer Employee* will keep an accurate log of labor, materials and costs associated with the investigation for invoicing the responsible party, if necessary. The form will be started prior to completing any additional field work unless the nature of the discharge necessitates an immediate response. As the investigation proceeds, any field investigations, photographs, corrective actions, or other activities associated with the suspected problem area will be documented and saved on file as this becomes the City's official record of the illicit discharge detection and elimination (IDDE) investigation. Additional documentation may include the following:

*List the forms and information specific to your City's process below*

- Copy of Outfall Inspection Report
- Photographs
- Additional field notes

- Lab testing results
- Compliance letters sent and responses received
- Correspondence (mail, email, telephone logs)
- Proof of corrected problems (contract and invoice or clean field investigation report)

## **1.2 Site Visit**

In cases where the City's **Metro Sewer** did not discover the potential illicit discharge (e.g. the City was made aware via a public complaint), the **Metro Sewer Employee** will conduct a site visit to confirm the nature of the problem and determine the prioritization of the investigation.

## **1.3 Prioritization**

Each suspected illicit discharge has the potential to cause damage to the MS4 and receiving waters; however, certain situations may warrant more immediate attention than others and each investigation must be prioritized in order to protect public health and avoid serious threats to the environment or damage to property. The following items will be considered when determining the immediacy of the investigation: *Edit the following list per your city's pollutants of concern, priority levels, and response times.*

- Discharges posing an immediate threat to human health
- Discharges within **100** feet of a surface or drinking water source
- Discharges containing substances with significant potential to cause immediate damage to the environment
- Potential threat of contaminating groundwater

## **1.4 Notification of Appropriate Agencies**

### Threat to Human Health:

Discharges and/or activities which are believed to be an immediate threat to human health or the environment will be reported to Montana DEQ and **Environmental Protection Agency** DEQ's Enforcement Division may assist in the investigation and corrective action process if necessary. The phone number and website to access a Complaint/Spill Form are as follows:

Phone: (406) 444-0379

Website: <http://deq.mt.gov/enf/spill.mcpx>

The local health department protects people from health threats such as food-borne illnesses, natural and man-made disasters, toxic exposures, and preventable illness and injury. This includes hazardous spills near drinking water sources, parks with dogs and children, and potential to contaminant soils and groundwater. The health department phone number is:

Phone: (406) **497-5073**

### Hazardous Materials:

The **Butte-Silver Bow Fire Department** will be contacted for situations requiring hazardous materials response. When hazardous materials are suspected the **Fire Services Coordinator** will be contacted to determine if hazardous materials response is necessary:

Phone: (406) **497-6481**

### [Other]:

*Add any other local agencies that need to be contacted for specific responses.*

## **1.5 Select Appropriate Investigation Method**

The four investigation methods which may be used to trace and identify the source of a suspected illicit discharge are as follows:

- Storm Drain Network Investigations
- Drainage Area Investigations
- On-Site Investigations
- Septic System Investigations

The **Metro Sewer Employee** will review available information (e.g. initial documentation, previous investigations conducted in the vicinity, etc.) and select the appropriate method. Each method, as described by the CWP, is briefly discussed below. Once the appropriate method is selected Chapter 13 of the CWP's [Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments](#) will be consulted, which contains detailed guidance on how to efficiently conduct each investigation.

After the appropriate investigation method has been selected, the **Metro Sewer Employee** will coordinate the appropriate resources to begin the investigation to trace and identify the source of the illicit discharge.

*The four investigation methods are briefly introduced below, additional information and instructions for each method may be found in Chapter 13 of the CWP's IDDE Guidance Manual referenced above. The City may choose to either use this manual to further develop this section of the document or refer the reader to Chapter 13 of the IDDE Guidance Manual.*

#### **i.) Storm Drain Network Investigations**

City personnel inspect manholes within the area of the suspected illicit discharge and examine the manhole contents for chemical or physical indicators of contaminants in an effort to narrow the illicit discharge location to an isolated pipe segment between two manholes. Indicators may include odor, color, staining, unusual films, floatables, or samples which may be taken for chemical testing in a laboratory. The City's storm drainage system map will be helpful in determining which manholes to visit and inspect. After the pipe segment has been isolated, on-site investigations may be used to locate the exact location of the illicit discharge.

#### **ii.) Drainage Area Investigations**

When there is strong evidence that suggests a specific and known contaminant or if the known contaminant points towards a short list of potential discharge sources, it is often most effective to survey the drainage area and focus on sites which are known to produce and/or contain the contaminant which has been identified within the storm drain network. The primary methods for conducting drainage area investigations include windshield surveys and mapping analyses. While conducting the investigation it is recommended to consult the mapped pipe network and compare this to maps of high priority businesses, land use types and zoning, and on-going construction projects.

#### **iii.) On-Site Investigations**

The on-site investigation diagnoses the exact location and source of an illicit discharge and should be performed after the illicit discharge has been isolated to a specific section of the storm drain network. Techniques such as dye testing the plumbing systems of households and buildings, video testing, and smoke testing may be necessary for this type of investigation. It is important to understand when a technique would work best for the application and to understand limitations that may deem the technique unusable.

#### **iv.) Septic System Investigations**

Some residential watersheds do not have sanitary sewer systems or stormwater conveyance piping, but rather have septic systems and alternative practices for dealing with stormwater volumes. Stormwater conveyance systems consisting of swales, ditches, and ponds are common in these watersheds and the illicit discharges often come from failing septic systems and illegal dumping. Two separate types of analyses are typically employed in these areas: on-site septic investigations and detailed system inspections. On-site septic investigations typically include homeowner system audits or surface condition analyses. Detailed system inspections are more thorough, typically involve the use of infrared imagery, and are usually

appropriate if the on-site investigations are not successful in locating the source of an illicit discharge.

## **1.6 Document Investigation Findings**

Once the source of an illicit discharge has been identified, the **Metro Sewer Employee** will document the findings and progress towards the corrective action process. Documentation may include but are not limited to:

- Investigation method(s)
- Photographs
- Additional field notes
- Lab testing results

## **2. Corrective Action Process and Procedures**

After the source of an illicit discharge has been identified, the **Metro Sewer Employee** will begin the corrective action process to eliminate the discharge. Where applicable, corrective actions will focus first on education to promote voluntary compliance and escalate to increasingly severe enforcement actions as needed.

### **2.1 Determine Type of Illicit Discharge**

The type of an illicit discharge can be generalized as either behavioral or structural, each of which is discussed below.

#### **i.) Behavioral**

The nature of the illicit discharge is an action, operation, or conduct and the illicit discharge will be eliminated when this behavior is modified.

#### **ii.) Structural**

The illicit discharge is caused by a physical configuration or connection which requires modification of the system in order to eliminate the discharge.

### **2.2 Assign Responsibility**

The party responsible to fix the illicit discharge will be identified based on the nature and location of the illicit discharge.

#### **i.) Private Property Owner**

*Refer to Chapter 32 of Title 13 of the Butte-Silver Bow Municipal Code*

#### **ii.) Municipality**

*Refer to Chapter 32 of Title 13 of the Butte-Silver Bow Municipal Code*

#### **iii.) Other Public Entity**

*Refer to Chapter 32 of Title 13 of the Butte-Silver Bow Municipal Code*

### **2.3 Select Appropriate Corrective Action**

If deemed to be safe and within the **Metro Sewer Employee's** authority and capabilities the illicit discharge may be eliminated immediately using appropriate and available methods. For situations requiring proper authorization and/or expertise, a work order will be generated and sent to **Metro Sewer Operations Manager** for approval.

For cases where a private property owner is responsible the **Metro Sewer Employee and Metro Sewer Operations Manager** will coordinate with the Responsible Party to determine an appropriate method to eliminate the illicit discharge. If necessary, enforcement actions such as a compliance

schedule will be created to ensure that the illicit discharge is eliminated in a timely manner (refer to the Enforcement Response Plan (ERP) to determine appropriate enforcement actions).

Chapters 8 and 14 of the CWP's [Illicit Discharge Detection and Elimination: A Guidance Manual for Program Development and Technical Assessments](#) provides a list of methods to remove and eliminate illicit discharges and will be used, if necessary, to determine the appropriate corrective action.

*Complete this section using the workflow deemed appropriate for your MS4, if necessary.*

## **2.4 Confirm and Document Elimination of Contamination Source**

*Modify this section to address which confirmation methods are appropriate for your MS4.*

A site visit may be necessary to confirm the source has been eliminated, the corrected operations are sufficient, and/or the structural problem has been fixed according to the approved corrective action. In other cases it may be sufficient to allow a verbal confirmation from the property owner, a photograph of the modification, as-built drawings, or simply verify that all signs of the illicit discharge are gone. Once confirmed, the **Metro Sewer Employee** will close the investigation and correction file by noting the elimination of the discharge within the Illicit Discharge Investigation and Corrective Action Form.

## **2.5 Enforcement Actions**

In circumstances where the responsible party does not volunteer compliance, refuses compliance, or disputes responsibility, the City will take enforcement actions consistent with the Enforcement Response Plan in order to ensure that the discharge is eliminated. Note that voluntary compliance in eliminating an illicit discharge may not preclude the responsible party from enforcement actions.

Modify and/or further develop this form, which is referenced in the Illicit Discharge Investigation and Corrective Action Plan

## ATTACHMENT A ILLICIT DISCHARGE INVESTIGATION & CORRECTIVE ACTION FORM

|  |                 |                          |                          |
|--|-----------------|--------------------------|--------------------------|
| City Personnel Involved  |                 | Date                     |                          |
| Type of Initial Notification (e.g. Phone call from public, result of City inspection, Dry weather screening, etc.) |                 |                          |                          |
| Location of Illicit Discharge (Address)  |                 |                          |                          |
| (   ) -  |                 | <input type="checkbox"/> | <input type="checkbox"/> |
| Responsible Party Name/Company   | Telephone       | Repeat Offender          | High Priority Site       |
| Street   | City            | Zip                      |                          |
| <u>Description of Investigations Conducted and Investigation Findings:</u>   |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <u>Description of Corrective Action:</u>   |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <u>Enforcement Action (if applicable):</u>   |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| Level of Response  | Selected Remedy | Date for Follow-Up       |                          |
| <u>Additional Notes:</u>   |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| <u>Confirmation of Resolution:</u>   |                 |                          |                          |
| <hr/>  |                 |                          |                          |
| City Personnel   |                 | Date                     |                          |

## 2017 Illicit Discharge Detection and Elimination Report

The detection of the illicit discharge found in January of 2016 happened when a homeowner located on May Street discovered that she has been discharging into a cesspool because of a sewage backup and contacted a local contractor about the issue. The Contractor then contacted Butte-Silver Bow about the cesspool discharging into a ravine which discharged into a storm sewer because the cesspool had been overflowing. Butte-Silver Bow contracted W.E.T. to design a sewer line to alleviate this problem. The sewer line was constructed and the home has been connected to the sanitary sewer system since August of 2017. We have begun a smoking program that will aid Butte-Silver Bow in detecting and eliminating cross connections between the existing sanitary and storm sewer systems. Our initial testing phase took place in a very remote location in order to attempt to ascertain the limits of the smoking apparatus and the five minute smoke cartridges we were employing. Having determined the smoke would be most effective in a two block radius we then mobilized in the North West section of Butte. We began our Smoking at the intersection of Woolman and Emmett streets. We proceeded to walk the area and look for signs of smoke coming from locations not associated with Sanitary Sewer: i.e. House vents, manhole covers etc. We found in each new setup that there were no apparent cross connections between the two systems. We concluded with 8 blocks North of the initial intersection having completed 4 setups all together.



**MS4 Annual Report 2017**  
**City and County of Butte-Silver Bow Small MS4**  
**Authorization Number MTR040006**

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*The General Permit for Storm Water Discharges Associated with Small Municipal Separate Storm Sewer Systems (MS4s)* Part II. Storm Water Management Program, MCM #4 - Construction Site Storm Water Management, (a) (iii), requires permittees to submit documentation of progress towards creation of ERP with the 1<sup>st</sup> Annual Report.

---

Butte-Silver Bow (BSB) County adopted Ordinance No. 10-13 for the control and management of storm water, Chapter 32 of Title 13 of the Butte Silver Bow Municipal Code entitled “Storm Water Management” became effective May 20, 2011.

Ordinance No. 10-13 (Article I. General Provisions, Article II. Construction/Postconstruction Stormwater Requirements, and Article III. Illicit Discharge Requirements) address many of the required elements of an ERP.

During the 2017 permit year, BSB reviewed/compared the existing Ordinance with the necessary components of the ERP.

The following Section of Ordinance No. 10-13 have been compared to the ERP requirements:

|           |  |
|-----------|--|
| 13.32.080 | Violations, enforcement, penalties,  |
| 13.32.310 | Discharge prohibitions,  |
| 13.32.320 | Industrial or construction activity,   |
| 13.32.340 | Requirement to prevent, control, and reduce stormwater pollutants by the use of best management practices, |
| 13.32.350 | Requirement to eliminate illegal discharges,   |
| 13.32.370 | Notification of spills.  |

The following ERP requirements have been reviewed:

1. Enforcement Response Plan Overview
2. Determining the Appropriate Level of Response
  - Level 1: No Enforcement Action
  - Level 2: Informal Response
  - Level 3: Formal Response
  - Level 4: Judicial Response
  - Level 5: Referral to Other Agencies
3. Selecting an Appropriate Response Remedy
  - Informal Remedies
  - Formal Remedies
  - Judicial Remedies
  - Additional Considerations
4. Enforcement Roles and Responsibilities
5. Escalation Process and Schedule for Construction Site Violations

***MS4 Annual Report 2017***  
***City and County of Butte-Silver Bow Small MS4***  
***Authorization Number MTR040006***

---

During the 2018 permit year a formal ERP for illicit discharges will be completed by describing:

- Legal authority,
- Enforcement staff,
- Enforcement actions,
- Enforcement escalation process, &
- Schedule to eliminate the source.

The following will also be addressed:

- Informal response,
- Formal response, &
- Judicial response.

The BSB ERP will be implemented during 2018.

# Storm Water Management Application CHECKLIST

 Site Name / Address: \_\_\_\_\_  
 \_\_\_\_\_

This checklist must accompany the Storm Water Management Permit Application

Please check appropriate box: I = Included, N/A = Non-Applicable (If "NA" is checked, an explanation must be entered)

| Storm Water Management Requirements   | I | N/A | BSB<br>CHK'D |
|---|---|-----|--------------|
| <b>1 Engineer Report Requirements</b>   |   |     |              |
| A Cover sheet   |   |     |              |
| B Table of contents   |   |     |              |
| C General   |   |     |              |
| a Proposed project description  |   |     |              |
| b Physical address of the site where the work is proposed   |   |     |              |
| c Name and address of owner   |   |     |              |
| D Extent of storm drainage  |   |     |              |
| Describe existing conditions including structures, basins, bypass areas, flow type and flow paths, pervious / impervious areas, slopes, vegetation / surface, soil type(s), ect.  |   |     |              |
| Describe proposed developed conditions including structures, basins, bypass areas, compensatory areas, flow type and flow paths, pervious / impervious areas, slopes, vegetation / surface, source control BMP's runoff control, runoff treatment, ect. |   |     |              |
| c State runoff control / treatment design assumptions   |   |     |              |
| d Delineation of drainage areas, estimates of peak flow, and estimates of flow volumes  |   |     |              |
| e Delineation of drainage areas outside the project area  |   |     |              |
| f For flows that originate outside the project area, show that these flows will not flood Storm Water Facilities  |   |     |              |
| g For flows that originate within the project area, show provisions for detaining or retaining these flows  |   |     |              |
| h Where storm drainage is intended to be discharged into the ground, show locations of wells and drainfields (within 200') that may be impacted   |   |     |              |
| i Show calculations / figures required to support the design  |   |     |              |
| j Professional engineer's stamp   |   |     |              |
| <b>2 Plans</b>  |   |     |              |
| 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)  |   |     |              |
| B Detailed plans  |   |     |              |
| a Location, size, type, slope, and minimum cover of any proposed pipes  |   |     |              |
| b Location and details of any proposed structures   |   |     |              |
| c Direction of drainage flow paths with slope, flow type, surface type, and run   |   |     |              |
| d Location, size, length, and slope of any proposed storm drain lines   |   |     |              |
| e Location and details of any proposed detention or retention ponds   |   |     |              |
| f Location and details for erosion control (temporary and permanent)  |   |     |              |

# Storm Water Management Application CHECKLIST

|                                     |  |  | BSB   |
|-------------------------------------|--|--|-------|
| Storm Water Management Requirements |  |  | CHK'D |
| g                                   | Site property boundary, wetlands, basin / sub-basin / bypass areas, setbacks, easements, two-foot contours, ect. |  |       |
| h                                   | State on each figure the total area and amount of pervious / impervious area                                     |  |       |
| i                                   | Location of storm water discharge from project boundary  |  |       |
| <b>3 Specifications</b>             |  |  |       |
| A                                   | Complete, detailed, technical specifications shall be supplied for the proposed drainage project                 |  |       |
| <b>4 Attachments</b>                |  |  |       |
| A                                   | Performance Security or Bond (125% of estimated construction cost)   |  |       |
| B                                   | Storm Water Management Permit Application  |  |       |
| C                                   | Storm Water Management Application Checklist   |  |       |
| D                                   | BSB Operation and Maintenance Agreement  |  |       |
| E                                   | MPDES Construction Storm Water Permit Application  |  |       |

Site Contact: \_\_\_\_\_

\_\_\_\_\_ Routine

\_\_\_\_\_Complaint based

\_\_\_\_\_ Visual inspection

Receiving Water: \_\_\_\_\_

check: status of USACE 404-permit

### Inspection Matrix:

- Comments:**

Inspected by: \_\_\_\_\_



DATE RECEIVED \_\_\_\_\_

**CITY OF BUTTE**  
**Public Works Department**  
**POST-CONSTRUCTION STORMWATER MANAGEMENT**  
**PLAN REVIEW CHECKLIST**

|                                     |                       |              |
|-------------------------------------|-----------------------|--------------|
| NAME OF PROJECT                     | PROJECT FILE NO.      | ADDRESS      |
| TOTAL PROJECT ACRES                 | TOTAL DISTURBED ACRES |              |
| Latitude: _____ Longitude: _____    |                       |              |
| GPS LOCATION OF CONSTRUCTION SITE   |                       |              |
| APPLICANT                           | ADDRESS               | PHONE NUMBER |
| OWNER (If different from Applicant) | ADDRESS               | PHONE NUMBER |

**Review History**

**First Review**

|                            |                        |
|----------------------------|------------------------|
| Plan Received on: _____    | Approved/Denied: _____ |
| Review Completed on: _____ | Comments: _____        |
| Reviewed by: _____         | _____                  |

**Second Review**

|                            |                        |
|----------------------------|------------------------|
| Plan Received on: _____    | Approved/Denied: _____ |
| Review Completed on: _____ | Comments: _____        |
| Reviewed by: _____         | _____                  |

**Third Review**

|                            |                        |
|----------------------------|------------------------|
| Plan Received on: _____    | Approved/Denied: _____ |
| Review Completed on: _____ | Comments: _____        |
| Reviewed by: _____         | _____                  |

**REPORT OF TECHNICAL REVIEW**

\_\_\_\_\_ The Stormwater Management Plan for the above named project or activity **includes** the necessary post-construction controls in order to comply with the State and local post-construction stormwater requirements (as identified within the attached checklist).

\_\_\_\_\_ The Stormwater Management Plan for the above named project or activity **does not include** the necessary post-construction controls in order to comply with the State and local post-construction stormwater requirements (as identified within the attached checklist) through failure to include the following:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Review by: \_\_\_\_\_



Signature: \_\_\_\_\_

Date: \_\_\_\_\_



Project Name: \_\_\_\_\_

Applicant: \_\_\_\_\_

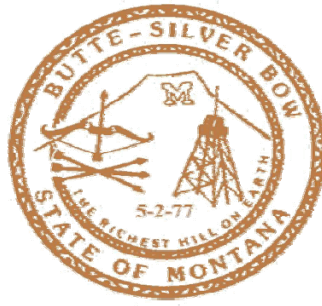
|  | Complete | Incomplete | N/A |
|--|----------|------------|-----|
| <b>General Information</b>   |          |            |     |
| 1. Location  |          |            |     |
| a. Address, subdivision name, legal description, etc...                            |          |            |     |
| 2. Type of development (residential, commercial, etc...)                           |          |            |     |
| 3. Areas (ac)  |          |            |     |
| a. Total disturbed area  |          |            |     |
| b. Existing impervious area  |          |            |     |
| c. Post-development impervious area  |          |            |     |
| 4. Drainage basin maps are provided which clearly label the following:             |          |            |     |
| a. Existing basin boundaries   |          |            |     |
| b. Existing time of concentration flowpaths for each basin                         |          |            |     |
| c. Post-development basin boundaries   |          |            |     |
| d. Post-development time of concentration flowpaths for each basin                 |          |            |     |
| e. Discharge location(s)   |          |            |     |
| f. Receiving waters within 200 feet of project are identified                      |          |            |     |
| 5. Montana Licensed Engineer Stamp   |          |            |     |
| <b>Drainage Plan Content</b>   |          |            |     |
| 1. Topographic map of existing and finished grade contours at 2-foot max intervals |          |            |     |
| 2. Location of each permanent stormwater control                                   |          |            |     |
| 3. Plan and profile of each permanent stormwater control                           |          |            |     |
| 4. Invert elevations, slopes, and lengths of storm drain facilities                |          |            |     |
| 5. Size, types, invert elevations and lengths of all culverts and pipe systems     |          |            |     |
| 6. Discharge points clearly labeled  |          |            |     |
| 7. Receiving surface waters identified   |          |            |     |
| 8. Existing on-site natural resources identified and protected                     |          |            |     |
| 9. FEMA floodplains identified   |          |            |     |
| <b>Calculations and Design Documentation</b>                                       |          |            |     |
| 1. Hydrology calculations  |          |            |     |
| a. State runoff method used (rational, SCS, etc...)                                |          |            |     |
| b. State modeling constants and assumptions  |          |            |     |
| c. Description of design storms (frequency, depth, duration)                       |          |            |     |
| d. Existing and post-development land uses   |          |            |     |



Project Name: \_\_\_\_\_

Applicant: \_\_\_\_\_

|   | Complete | Incomplete | N/A |
|---|----------|------------|-----|
| <b>Calculations and Design Documentation (Continued)</b>  |          |            |     |
| e. Existing and post-development peak runoff rate for each design storm   |          |            |     |
| f. Existing and post-development runoff volume for each design storm  |          |            |     |
| 2. Post-construction BMP sizing calculations  |          |            |     |
| a. State design requirements (0.5-inch 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 design requirements  |          |            |     |
| e. If 0.5-inch 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 capacities and outlet velocities   |          |            |     |
| 4. Ditch capacities and velocities  |          |            |     |
| <b>Additional Information</b>   |          |            |     |
| 1. Permits, easements, setbacks, and discharge agreements   |          |            |     |
| 2. Floodplain maps  |          |            |     |
| 3. Operations and Maintenance Manual for each permanent stormwater 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. System failure and replacement criteria to define the structure's performance requirements   |          |            |     |
| 4. Geotechnical Report  |          |            |     |



# Butte Silver Bow's Municipal Storm Water Engineering Standards

Prepared for:

Butte Silver Bow Public Works Department  
124 West Granite St.  
Butte, MT 59701

Prepared by:

Morrison-Maierle, Inc  
&  
Water & Environmental Technologies, PC

March 2011

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# 1 INTRODUCTION

It is the purpose of these Storm Water Engineering Standards to enact a comprehensive and coordinated storm water control program for the conservation and protection of land, water, public and private resources of Butte-Silver Bow to:

- Encourage the use of land in accordance with its capabilities;
- Prevent or reduce degradation of streams, reservoirs, lands and lakes; and
- Protect and promote the health, safety, and general welfare of the people.

The intent of the standards is to establish uniform design practices; however, it does not replace the need for engineering judgment or preclude the use of information not specifically required.

The urbanized area of Silver Bow County consisting of Butte, Walkerville and the municipal and developed area of Summit Valley surrounding these communities are regulated for storm water discharge by the Montana Department of Environmental Quality (MDEQ) as required by the Clean Water Act (CWA). These standards are intended to conform to the current requirements promulgated under Phase II of the National Pollutant Discharge Elimination System (NPDES) regulations as related to small municipal separate storm sewers (MS4s) and to provide guidance to Owners, Engineers and Contractors designing, and performing construction activities in Butte-Silver Bow. This guidance is intended to set forth a uniform set of minimum guidelines that conform to accepted design principals, existing specifications and standards such as the Montana Public Works Standards Specifications (MPWSS), and current storm water practices in Butte-Silver Bow.

Several reference documents will be referred to periodically by these Engineering Standards. The design Engineer should be familiar with these references as necessary for design of storm drainage systems. Reference documents are detailed in Section 11.

## 1.1 Definitions

For the purpose of this ordinance, the following terms phrases and words, and their derivatives shall have the meaning given herein, except where the context clearly indicates a different meaning:

Accelerated erosion means erosion caused by development activities that exceeds the natural processes by which the surface of the land is worn away by the action of water, wind, or chemical action.

Applicant means a property owner or applicant of a property owner who has filed an application for a storm water management permit.

As-built plan means a set of engineering or site drawings that delineate the specific permitted storm water management features as actually constructed.

Appeals board shall be the Public Works Committee of the Council of Commissioners.

Authorized enforcement agency means the Director, employees or designees of the Butte-Silver Bow Public Works Department are designated to enforce this ordinance.

Best Management Practices (BMPs): schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to storm water, receiving waters, or storm water conveyance systems. BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Butte-Silver Bow means the local government of the City and County of Butte-Silver Bow, Montana, including all officers, employees, agents, boards, departments, commissions and authorities and includes all of that area within its jurisdiction with authority to inspect or enforce storm water compliance.

Channel means a natural or artificial watercourse with a definite bed and banks that conveys flowing water continuously or periodically.

Clean Water Act means the federal Water Pollution Control Act (33 U.S.C. ' 1251 et seq.), and any subsequent amendments thereto.

Construction activity means activities subject to the requirements of this ordinance. These include construction projects resulting in land disturbance greater than or equal to 1-acre. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Construction Site BMP Manual means the most current Montana Department of Transportation Erosion and Sediment Control Best Management Practices (BMP) Reference Manual and Field Manual or EPA National Menu of Best management Practices (BMPs), as amended from time to time.

Dedication means the deliberate appropriation of property by its owner to general public use.

Drainage easement means a legal right granted by a landowner to a grantee allowing the use of private land for storm water management purposes.

Hazardous materials mans any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal discharge means any direct or indirect non-storm water discharge to the storm water system, except as exempted in Article III, Section 2 of the BSB Storm Water Ordinance.

Illicit connections means an illicit connection is defined as either of the following:

- a. Any drain or conveyance, whether on the surface or subsurface, which allows an illegal discharge to enter the storm water system including but not limited to any conveyances which allow any non-storm water discharge including sewage, process wastewater, and wash water to enter the storm water system and any

connections to the storm water system from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by an authorized enforcement agency.

- b. Any drain or conveyance connected from a commercial or industrial land use to the storm water system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Impervious cover means those surfaces that cannot effectively infiltrate rainfall (e.g., building rooftops, pavement, sidewalks, driveways. etc).

Industrial activity means activities subject to NPDES Industrial Permits as defined in 40 CFR, Section 122.26 (b)(14).

Land disturbing activity means any activity which changes the volume or peak flow discharge rate of rainfall runoff from the land surface. This may include the grading, digging, cutting, scraping, or excavating of soil, placement of fill materials, paving, construction, substantial, removal of vegetation, or any activity which bares soil or rock or involves the diversion or piping of any natural or artificial watercourse.

Landowner means the legal or beneficial owner of land, including those holding the right to purchase or lease the land, or any other person holding proprietary rights in the land.

Lateral means storm conveyance piping from the inlet to the municipal trunk main.

Maintenance agreement means a legally recorded document that acts as a property deed restriction, and which provides for long-term maintenance of storm water management practices.

MS4 means Municipal Separate Storm Sewer as defined by the Environmental Protection Agency.

National Pollutant Discharge Elimination System (NPDES) Storm Water Discharge Permit means a permit issued by EPA (or by a State under authority delegated pursuant to 33 USC ' 1342(b)) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Non-point source pollution means pollution from non-discernable, unconfined, diffuse sources and shall include, but not be limited to, pollutants from agricultural, silvicultural, mining, construction, subsurface disposal, and urban runoff sources.

Non-storm water discharge means any discharge to the storm drain system that is not composed entirely of storm water.

Off-site facility means a storm water management measure located outside the subject property boundary described in the permit application for land development activity.

On-site facility means a storm water management measure located within the subject property boundary described in the permit application for land development activity.

Off-site sedimentation means the deposit of soil material beyond the limits of the property undergoing land disturbing activity or in city streets, alleys or drainage facilities in an amount sufficient to constitute a threat to public safety and comfort.

Outfall means the place where a sewer, drain, or channel discharges to surface waters.

Person means any individual, association, organization, partnership, firm, corporation or other entity recognized by law and acting as either the owner or as the owner's agent.

Pollutant means anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes and yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects, ordinances, and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; hazardous substances and wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

Premises mean any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking areas.

Professional engineer means an engineer properly registered, licensed, and qualified to conduct storm water and erosion control design work within the State of Montana.

Responsible party means a business entity, franchised utility company, developer, landowner, contractor or holder of a building permit who is required to comply with the terms of this ordinance.

Stop work order means an order issued which requires that all land disturbance activity on a site be stopped.

Storm water means any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

Storm water system means publicly-owned facilities by which storm water is collected and/or conveyed, including but not limited to any roads with drainage systems, municipal streets, gutters, curbs, inlets, piped storm drains, pumping facilities, retention and detention basins, natural and human-made or altered drainage channels, reservoirs, and other drainage structures.

Storm water management means the use of structural or non-structural practices that are designed to reduce storm water runoff pollutant loads, discharge volumes, and/or peak flow rates.

Storm water management facilities mean those structures and facilities that are designed for the collection, conveyance, storage, treatment, and disposal of storm water runoff.

Storm water engineering report means a written document that details the Best Management Practices, use of structural or non-structural practices to be implemented by a person or business designed to reduce storm water runoff, pollutant loads, discharge volumes, and/or peak flow rates to the maximum extent practicable.

Storm Water Pollution Prevention Plan means a plan that is designed to minimize the accelerated erosion and sediment runoff at a site during construction activities.

Temporary erosion control devices means devices installed or practices implemented and maintained during land disturbance activities to prevent, minimize, or control the erosion and deposit of soil materials.



Wastewater means any water or other liquid, other than uncontaminated storm water, discharged from a facility.

Watercourse: A natural or artificial channel through which water flows.

Water quality means those characteristics of storm water runoff from a land disturbing activity that relates to the physical, chemical, biological, or radiological integrity of water.

Water quantity means those characteristics of storm water runoff that relate to the rate and volume of the storm water runoff to downstream areas resulting from a land disturbance activity.

## **2 COVERAGE AREAS**

According to the DEQ, the Butte MS4 regulated area is based on the current city limits or urban area. However, Butte-Silver Bow is a combined city-county government; as a result, these engineering standards apply to all of Silver Bow County. A map of the Butte urban area is presented as Figure 1 located in Appendix A.

Refer to: <http://www.deq.state.mt.us/wqinfo/mpdes/StormWater/ms4.mcp> for current information from the MDEQ regarding storm water.

In addition, certain design standards may be modified to conform to the character of the historic district of uptown Butte. These standards include curbing, inlet grates and other surface treatments visible to the public. Figure 2 is a map of the uptown Butte Historic District (located in Appendix A).

## **3 EXEMPTIONS (AS REGULATED IN S.W. ORDINANCE 13.32.210)**

The following development activities are exempt from Ordinance provisions:

- Land disturbance activities on agricultural land for production of plants and animal useful to man (crops, dairy, poultry, livestock, etc), except if the land disturbance includes the construction of a major building which requires the issuance of a building permit.
- Land disturbing activities undertaken on forest land for the production and harvesting of timber and timber products.
- Land disturbance activities that are less than 1-acre of disturbance and are not part of a subdivision or part of a commercial or industrial development.
- Emergency land management practices posing an immediate danger to life or property, or substantial flood or fire hazards.

## **4 APPLICABLE REGULATIONS AND ORDINANCES**

### **4.1 Clean Water Act**

The Clean Water Act (CWA) is a law enacted by Congress and signed by the President that establishes environmental programs, including the National Pollutant Discharge Elimination System (NPDES) program, to protect the Nation's waters and directs EPA to develop, implement, and enforce regulations consistent with this law.

The 1972 amendments to the Federal Water Pollution Control Act (known as the Clean Water Act or CWA) provide the statutory basis for the NPDES permit program and the basic structure for regulating the discharge of pollutants from point sources to waters of the United States. Section 402 of the CWA specifically required EPA to develop and implement the NPDES program.

Final Rule for Regulations for Revision of the Water Pollution Control Program Addressing Storm Water Discharges NPDES (Phase II MS4 Regulation):

*Phase II regulations expand the existing NPDES storm water program (Phase I) by addressing storm water discharges from small MS4s and construction sites that disturb 1 to 5 acres. Although these sources are automatically designated by the rule, the rule allows for the exclusion of certain sources from the national program based on a demonstration of the lack of impact on water quality, and the inclusion of others based on a higher likelihood of localized adverse impact on water quality. The regulations also exclude from the NPDES program storm water discharges from industrial facilities that have "no exposure" of industrial activities or materials to storm water.*

### **4.2 MS4 Permit**

EPA's Stormwater Phase II Rule requires a Municipal Separate Storm Sewer System (MS4) Storm Water Management Program (SWMP) that is intended to improve the Nation's waterways by reducing the quantity of pollutants that storm water runoff transports into storm drain systems during storm events. Common pollutants include oil and grease from roadways, pesticides from lawns, sediment from construction sites, and carelessly discarded trash, such as cigarette butts, paper wrappers, and plastic bottles. Within the Butte MS4 sits the Butte Priority Soils Operable Unit (BPSOU), a federal Superfund site from historic mining activities in the Butte area. Within the BPSOU, sediment carrying heavy metals may also be a potential pollutant to area receiving waters. Additional storm water requirements may be necessary within this area. When deposited into nearby waterways through MS4 discharges, these pollutants can impair the waterways, thereby discouraging recreational use of the resource, contaminating drinking water supplies, and interfering with the habitat for fish, other aquatic organisms, and wildlife.

In 1990, EPA promulgated rules establishing Phase I of the National Pollutant Discharge Elimination System (NPDES) storm water program. The Phase I program for MS4s requires operators of "medium" and "large" MS4s, that is, those that generally

serve populations of 100,000 or greater, to implement a storm water management program as a means to control polluted discharges from these MS4s. The Stormwater Phase II Rule extends coverage of the NPDES storm water program to certain “small” MS4s defined as located outside of an urbanized area serving a jurisdiction with a population of at least 10,000 and a population density of at least 1,000 people/square mile.

*According to 40 CFR 122.26(b)(8), “municipal separate storm sewer means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):*

- i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law)...including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States.*
- ii. Designed or used for collecting or conveying storm water;*
- iii. Which is not a combined sewer; and*
- iv. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.”*

Operators of regulated small MS4s are required to design their programs to:

- Reduce the discharge of pollutants to the “maximum extent practicable” (MEP);
- Protect water quality; and
- Satisfy the appropriate water quality requirements of the Clean Water Act.

Implementation of the MEP standard will typically require the development and implementation of Best Management Practices (BMPs) and the achievement of measurable goals to satisfy each of the six minimum control measures.

The Phase II Rule defines a small MS4 Storm Water Management Program as a program comprising six elements called *minimum control measures* that, when implemented in concert, are expected to result in significant reductions of pollutants discharged into receiving waterbodies. BSB has completed a SWMP as part of its Phase II MS4 permit coverage (*Storm Water Management Program for the Butte MS4, March 2003*). This document is available at the BSB Public Works office.

These engineering standards are intended to conform to the requirements outlined in the current MDEQ General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewer System, effective January 1, 2010. Strategies and requirements related to two of the six minimum control measures (construction site storm water control, and post-construction storm water management in new development and redevelopment) are discussed in detail in Sections 7 and 8 respectively.

### **4.3 Liability**

Neither the approval of a plan or any other action of Butte-Silver Bow under the provisions of these Standards shall relieve any person from the responsibility for damage to any person or property otherwise imposed by law, nor impose any liability upon Butte-Silver Bow for damage to any person or property.

## **5 ENGINEER REPORT REQUIREMENTS**

A storm water engineering report shall be prepared by a professional engineer for any engineered storm water structure, conveyance or study as required by the BSB Storm Water Ordinance. The report is required with all permit applications and will include sufficient information to evaluate the environmental characteristics of the project site, the potential impacts of the proposed development, both present and future, on the water resources, and the effectiveness and appropriateness of the measures proposed for managing storm water generated at the project site. The intent of this planning process is to determine the type of storm water management measures necessary for the proposed project, and ensure adequate planning for management of storm water runoff from future development.

All drainage reports must include the design calculations necessary to support the proposal. The selection of water quality BMPs must be completed by going through the selection process in HEC-22, Chapter 10.1, in conjunction with Section 7 of these standards. Approval will only be issued when final, complete detailed plans and specifications have been submitted to the reviewing authority and found to be satisfactory, as defined in the BSB Storm Water Ordinance. Three copies of the final plans and specifications must be submitted. Two approved sets will be returned to the applicant, one must be retained at the construction site at all times during construction. Storm water engineering reports should incorporate the following in approximately this format:

- Engineering report including a summary of the basic design,
- General layout of drainage patterns and drainage structures,
- Detailed plans and specifications, and
- Attachments as appropriate.

### **ENGINEERING REPORT**

The engineering report for storm water projects shall present the following information:

General information, including:

- A. Identification of the project,
- B. Physical address of the site where work is proposed, and
- C. Name, mailing address, and telephone number of all persons having a legal interest in the property and the tax reference number and parcel number of the property or properties affected.

Extent of the storm drainage, including:

- A. Describe existing conditions including structures, basins, bypass areas, flow type and flow paths, pervious/impervious areas, slopes, vegetation/surface and CN numbers, soil type(s), constants used (s,n,k...), upstream offsite flow routing conditions,
- B. Describe proposed developed conditions including structures, basins, bypass areas, compensatory areas, flow type and flow paths, pervious/impervious areas, slopes, vegetation/surface and CN numbers, constants used (s,n,k ...), upstream offsite flow routing, source control BMP's runoff control, runoff treatment, nutrient control, frontage improvements and associated storm improvements, time of concentration, storage volume, release rates, and overflow route capacity. If something is not required, state in the report,
- C. State runoff control/treatment design assumptions. Describe method of analysis. Selection of water quality treatment BMPs must follow the process in HEC-22 Chapter 10.1,
- D. Delineation of drainage areas within the project boundaries, estimates of peak flows generated within these drainage areas, and estimates of flow volumes if detention ponds or other storage facilities are included in the design,
- E. Delineation of drainage areas outside the project that flow through the project area, and estimates of peak flows generated within these drainage areas,
- F. For flows that originate outside the project area, provisions for passing these flows through the project without flooding structures or drainfield sites (at a recurrence interval of the 100-year, 24-hour storm), and without overtopping of roadways (at a recurrence interval of the 10-year, 24-hour storm event),
- G. For flows that originate within the project, provisions for detaining or retaining these flows, so that the peak flow (from Section 6.1.1) that leaves the project area after development does not exceed the peak flow before development,
- H. Where storm drainage is intended to be discharged into the ground, locations of nearby (within 200 feet) wells and drainfields that may be impacted, or a statement that there are no wells or drainfields nearby,
- I. If a storm water management control measure depends on the hydrologic properties of soils (e.g., infiltration basins), then a geotechnical report shall be submitted. The geotechnical report shall be based on on-site boring logs, test pit profiles, percolation test results, or appropriate NRCS soils information. Soil borings or test pits may be required by the Butte-Silver Bow Public Works Department if deemed necessary to determine the suitability and distribution of soil types present for the control measure, and
- J. Show calculations/figures required to support the design including basin summary, time of concentration, weighted CN numbers, percent impervious area, level pool routing summary, stage-discharge and stage-storage tables, volume correction, and conveyance system capacity calculations. Suggested CN values are given in HEC-22 Table 3-6. Calculations should be located in an appendix.



- K. A detailed plan must be submitted for management of vegetation at the site after construction is complete, including who will be responsible for the maintenance of vegetation at the site and what practices will be employed to ensure that adequate vegetative cover is preserved.

## **PLANS**

Plans for storm drainage improvements as prepared by a professional engineer shall provide for the following:

General layout including:

- A. Suitable title,
- B. Name of entity responsible for maintaining the storm drainage improvements (if other than Butte Silver Bow),
- C. Scale, in feet,
- D. North arrow,
- E. Name of the designer and date of design,
- F. Legible prints,
- G. Location, nature and size of existing storm drainage facilities, if any, including drainage structures under existing roadways, and
- H. All elevations shall be based on NAVD 88 datum.

Detailed plans, including:

- A. Location, size, type, slope and minimum cover of any proposed pipes,
- B. Location and details of any proposed structures,
- C. Direction of drainage flow paths with slope, flow type, surface type, and run length,
- D. Location, size, length and slope of any proposed storm drain trunk lines,
- E. Location and details of any proposed detention or retention ponds,
- F. Location and details for erosion control (temporary and permanent) at each location where storm drainage leaves the project, and at any other location where erosive velocities may occur. Information on soil types at these locations will be necessary to determine appropriate erosive velocities,
- G. Site property boundary, basin/sub-basin/bypass area boundaries, wetlands, sensitive area buffers and setbacks, easements, two-foot contours, etc.,
- H. State on each figure the total area and the amount of pervious and impervious area in each basin/sub-basin/bypass area, and
- I. The location of storm water discharge from the project boundary to the nearest existing municipal storm water structure or natural water body.
- J. The location of existing utilities as listed in Section 9.4.

## **SPECIFICATIONS**

Complete, detailed, technical specifications shall be supplied for the proposed drainage project.

## **ATTACHMENTS**

The following attachments shall be submitted as required in the Storm Water Ordinance:

- A. Approved MPDES Permit Application Package and approval letter from MDEQ.
- B. Operation and Maintenance Agreement.

## **PERFORMANCE BOND/SECURITY**

The Butte-Silver Bow Public Works Department will require the submittal of a performance security or bond prior to issuance of a permit in order to insure that the storm water practices are installed by the permit holder as required by the approved storm water engineering report. The amount of the installation performance security shall be the total estimated construction cost of the storm water management practices approved under the permit, plus 25%. The performance security shall contain forfeiture provisions for failure to complete work specified in the storm water engineering report. The installation performance security shall be released in full only upon submission of as built plans and written certification by a professional engineer that the storm water practice has been installed in accordance with the approved plan and other applicable provisions of this ordinance. The Butte-Silver Bow Public Works Department will make a final inspection of the storm water practice to ensure that it is in compliance with the approved plan and the provisions of this ordinance.

## **PREPARATION BY A PROFESSIONAL ENGINEER**

All storm water engineering reports, plans, specifications, and inspections or certifications shall be signed and stamped by a professional engineer qualified to conduct erosion control and storm water design work in the State of Montana.

## **6 ANALYSIS REQUIREMENTS**

### **6.1 Hydrologic Analysis & Design**

All storm water volume calculations shall be designed using a hydrologic analysis based on hydrograph methodology. Peak flow calculations and volume calculations are governed by the procedures and methods outlined in Chapter 3.3 of the HEC-22 Manual.

#### **6.1.1 Design Storms**

The design storm for all hydrograph analyses shall be a 24-hour duration (if available), standard SCS Type I rainfall distribution resolved to 10-minute time intervals. Refer to

Table 6-1 for the City of Butte's measured precipitation levels, located at the Butte Airport. Table 6-2 summarizes the information from the State of Montana Precipitation Isopluvials, NOAA Atlas 2, Vol. 1. For projects outside of the Butte urban boundary the design storm will be based on the NOAA Atlas 2 unless more detailed information is available.

Existing and post-development conditions shall be analyzed to quantify runoff rates, volumes and treatment needs for the following storms:

- 6-month, 24-hour storm (water quality design storm, urban setting on-site retention);
- 2-year, 6-hour storm (rural setting on-site retention)
- 2-year, 24-hour storm (stream bank protection);
- 10-year, 24-hour storm (on-site inlets, lateral piping and conveyances);
- 25-year, 24-hour storm (municipal trunk main piping and conveyances); and
- 100-year, 24-hour storm (runoff control, floodplain delineations and regional ponds).

**Table 6-1. Butte Airport 24-Hour Precipitation Depths**

| <b>Recurrence Interval</b> | <b>24-Hour Precipitation Depth(inches)</b> |
|----------------------------|--|
| 6-month                    | 0.78                                       |
| 1-year                     | 0.92                                       |
| 2-year                     | 1.07                                       |
| 5-year                     | 1.42                                       |
| 10-year                    | 1.66                                       |
| 25-year                    | 1.99                                       |
| 50-year                    | 2.25                                       |
| 100-year                   | 2.51                                       |

**Table 6-2. SCS Rainfall Distribution Curve Determination**

| NOAA ATLAS Rainfall Distribution |                      |                      | Rainfall Distribution Curve |
|----------------------------------|----------------------|----------------------|-----------------------------|
| 2-year                           | Precipitation (inch) | $P_6 / P_{24}$ Ratio |                             |
| 6-hr                             | 0.75                 | 0.625                | Type I                      |
| 24-hr                            | 1.20                 |                      |                             |
| <b>5-year</b>                    |                      |                      |                             |
| 6-hr                             | 1.00                 | 0.625                | Type I                      |
| 24-hr                            | 1.60                 |                      |                             |
| <b>10-year</b>                   |                      |                      |                             |
| 6-hr                             | 1.10                 | 0.611                | Type I                      |
| 24-hr                            | 1.80                 |                      |                             |
| <b>25-year</b>                   |                      |                      |                             |
| 6-hr                             | 1.40                 | 0.636                | Type I                      |
| 24-hr                            | 2.20                 |                      |                             |
| <b>50-year</b>                   |                      |                      |                             |
| 6-hr                             | 1.50                 | 0.577                | Type I                      |
| 24-hr                            | 2.60                 |                      |                             |
| <b>100-year</b>                  |                      |                      |                             |
| 6-hr                             | 1.70                 | 0.607                | Type I                      |
| 24-hr                            | 2.80                 |                      |                             |

### 6.1.2 Rational Method

The Rational Method may be used in predicting a conservative peak flow rate to determine the required capacity for storm water laterals, trunk mains and culverts for drainage sub-basin areas (A) not exceeding 25 acres for a single calculation. The Rational Method may be used to calculate the peak discharge in conjunction with a hydrograph method to calculate the run-off volume, (retention and detention); or, the hydrograph method may be used solely for all calculations.

#### 6.1.2.1 Time of Concentration

The minimum time of concentration ( $T_c$ ) shall be 6.3 minutes, and the maximum shall not exceed 100 minutes.

#### 6.1.2.2 Precipitation Intensity Values to match Time of Concentration ( $T_c$ )

Short duration precipitation intensity values are not available from the Butte weather station. If short duration precipitation intensity values are required, the one-hour precipitation values (in inches) presented in Table 6-3 can be multiplied by the statewide averages for short duration intensities summarized in Table 6-4 to calculate the short duration precipitation intensity ( $i$ ) to be used with the Rational Method.

**Table 6-3. One-Hour Precipitation (in)**

| <b>Station</b>            | <b>Return Period (Years)</b> |          |           |           |           |            |
|---------------------------|------------------------------|----------|-----------|-----------|-----------|------------|
|                           | <b>2</b>                     | <b>5</b> | <b>10</b> | <b>25</b> | <b>50</b> | <b>100</b> |
| <i>8 Miles S of Butte</i> | 0.41                         | 0.58     | 0.70      | 0.85      | 0.97      | 0.96       |

Source: MDT Hydraulics Manual, Appendix B

**Table 6-4. Statewide Averages for Short-Duration Intensities**

| <b>Duration<br/>(minutes)</b> | <b>Multiply 1-hour<br/>intensity by:</b> |
|-------------------------------|--|
| 5                             | 4.7                                      |
| 10                            | 3.4                                      |
| 15                            | 2.8                                      |
| 30                            | 1.7                                      |

Source: MDT Hydraulics Manual, Appendix B

### **6.1.3 Hydrologic Models**

Storm drain systems may be designed using hydrograph-based computer modeling methods or the Rational Method as permitted in these standards.

Acceptable computer modeling packages:

- TR-20 (or any software that uses this program),
- TR-55 (or any software that uses this program),
- Hydrological Simulation Program-Fortran (HSPF),
- EPA Storm Water Management Model SWMM 5.0,
- Stormcad ®,
- Stormshed ®, and
- HydroCAD ®.

The list provided may not be all inclusive but serves as a general guideline. Other programs not included in this list may also be acceptable and can be reviewed and approved for use on a case-by-case basis by the Butte-Silver Bow Public Works Department. It is incumbent on the licensed engineer to select the appropriate modeling program and apply it appropriately to the design situation.

**Time of Concentration Calculations** - Use the procedures and methods outlined in Chapter 3.2.2.3 of the HEC-22 Manual.

**Curve Numbers** - Curve numbers are set forth in Table 3-6 of the HEC-22 Manual. For single-family residential plat developments, use Table 3.6 of the HEC-22 Manual as minimum values. Storm water system designs shall address future build-out of the proposed development. Impervious areas of future development may justify higher curve numbers and greater impervious area coverage. For commercial and multi-family residential developments, use actual project values.

**Soil Types** - Use site-specific geotechnical information (when available) or the Soil Survey – Butte Silver Bow County Area (MT670) – prepared by the Natural Resources Conservation Service (NRCS) to identify the hydrologic soil group.

#### **6.1.4 Runon/Runoff Capacity Analysis**

Offsite capacity analysis is required when either the location of discharge or rate of discharge will be changed by a proposed development.

On a map (minimum USGS 1:24000 Quadrangle Topographic Map) delineate the upstream drainage areas to the site and to the downstream system. Physically inspect the existing on- and off-site drainage system and investigate any known problems. Also document historical on- and off-site drainage performance by contacting BSB Public Works Department and property owners of known problems. The analysis must extend from the proposed project discharge location to the point downstream where the site runoff would join the nearest existing municipal storm water structure or existing drainage course.

Describe the makeup and general condition of the existing and proposed drainage system. Include such information as pipe sizes, channel characteristics, and drainage structures. Address anticipated drainage problems.

For any existing and/or predicted problem drainage location identified in the analysis, develop hydrographs or peak flow rates for the 100-year, 24-hour design storm events for the (total composite) drainage area tributary to that location for existing runoff conditions, excluding the proposed project development runoff. Then evaluate impacts of adding the controlled peak runoff from the proposed project development to this existing peak runoff from the drainage area tributary to these problem drainage locations.

#### **6.1.5 Floodplain/Floodway Analysis**

The official floodplain maps for Butte Silver Bow are the Flood Insurance Rate Maps (FIRM) and Flood Boundary Floodway Maps from a scientific and engineering report entitled "The Flood Insurance Study for Butte-Silver Bow, Montana," dated February, 1982, and the "Floodplain Management Study, Big Hole River, Silver Bow County Montana." Updated mapping is in the process of being reviewed and adopted by FEMA in 2010-2011. Floodplain and floodway analyses require the most current official maps for determination of floodplain/floodway location and the ordinances in Title 18 for associated requirements.

### **6.2 Hydraulic Analysis and Design**

Unless otherwise noted, all structures shall be designed with proper materials, sizing and appurtenances to provide for a 75-year design life.

#### **6.2.1 Open Channels**

Use the criteria set forth in Chapter 5 of the HEC-22 Manual for open channel flow capacity analysis.



## **6.2.2 Culverts & Bridges**

Culvert and bridges shall be sized to accommodate the peak runoff from a 100-year, 24-hour storm. Bridge designs shall be reviewed by the Butte Silver Bow bridge engineer unless on a State route in which case MDT will be responsible for design review. Cross-drain culverts outside of a designated floodplain area may use the 50-year, 24-hour storm event, provided that the roadway is not overtopped.

### **6.2.2.1 Hydraulic Criteria - Culverts**

All applications requiring culverts larger than 24" shall be hydraulically designed. Use methods set forth in Chapter 9 of the MDT Drainage Manual as modified herein to design culverts. Determine capacity by analyzing inlet, outlet, and barrel controls.

When an abrasive bed load is anticipated or when velocities exceed 10 feet per second, protective measures shall be implemented to minimize pipe damage and provide for a minimum 75-year design life.

### **6.2.2.2 Hydraulic Criteria - Bridges**

Bridges shall conform to Montana Department of Transportation requirements.

## **6.2.3 Storm Main Piping**

Refer to HEC-22 Manual, Section 7 for design parameters for storm drain pipe capacity analysis. Table 7-7 of HEC-22 provides minimum pipe slopes based on pipe size and flow.

Storm drain piping infrastructure shall have non-pressurized (non-surcharged) flow during the 25-year design storm; except that the last pipe run upstream of a detention facility or open outfall (into a stream or lake) may be inundated during the 100-year event to a maximum distance of 200 linear feet, so long as all the other conditions of these Engineering Standards are met. This also applies for those outfalls into streams where the outfall elevation is set at the approximate bankfull water surface elevation (2-year runoff event).

The flows computed at structures (manholes and catch basins) may be used to estimate the water surface profile along the pipe system.

When an abrasive bed load is anticipated or when velocities exceed 10 feet per second, protective measures shall be implemented to minimize pipe damage and provide for a minimum 75-year design life.

## **6.2.4 Detention and Retention Facilities**

Use the criteria and methods set forth in Section 8 of the HEC-22 Manual for capacity analysis requirements and design considerations for appurtenant structures such as orifices, weirs, etc.

The design of storm water detention and retention facilities must consider both water quality and storm water routing. Storm water shall be routed through a catch basin or pre-sediment basin prior to discharging to the pond, in order to facilitate the easy maintenance and removal of transported sediments and debris.

The 100-year, 24-hour storm shall be detained for runoff control. The 6-month, 24-hour storm shall be retained to address water quality concerns.

When existing conditions make storm water detention impossible for some portion of a site, compensatory storage volume and reduction of the release rates may be allowed if the bypass area and detention system are tributary to the same drainage basin both prior to and after development. The peak rate of runoff (developed condition) from the bypass areas shall be subtracted from the allowable release rate to determine the detention system release rate. In no case shall the runoff from the entire site exceed the allowable release rate.

Runoff control systems shall be designed to maximize reliability, minimize maintenance needs, maximize the distance between the inlet and outlet to improve runoff quality, minimize hazards to persons or property (both on-site and off-site), and minimize nuisance problems and risk of failure.

In areas of high groundwater, groundwater collection system flows shall bypass the storm water detention system.

Runoff control facilities proposed to serve multiple sites are subject to all of the engineering and design requirements in the Storm Water Ordinance and these Standards. For phased developments, conceptual site plans for the entire site to be served by the proposed storm water facilities shall be submitted to Butte-Silver Bow for review, in addition to a detailed engineering design for the first project phase. Detailed design plans will be submitted as appropriate for future project phases. Construction of storm water facilities must occur in conjunction with each project phase.

The 100-year water surface shall not surcharge roof, footing and yard drains, or under-drains.

Runoff control facilities serving the public right-of-way shall be owned and operated by Butte-Silver Bow and shall be separate from private on-site systems. If storm water facilities will be owned and operated by Butte-Silver Bow, runoff from the right-of-way and private properties may be combined and controlled in a single facility. Private detention systems may accommodate public drainage (e.g., from a public right-of-way) if a hold harmless agreement is completed by the Owner and recorded against the property, and the proposal meets all the other design requirements of the Utility.

Drainage basins may be considered as separate if tributary areas drain to different storm water conveyance networks via drainage routes that remain separate for a minimum of ¼-mile downstream.

### **6.2.5 Storm Drain Outfalls**

Use methods set forth in Chapter 7.1.5 of the HEC-22 Manual as modified herein.

The invert of any outfalls shall discharge at the bankfull water surface elevation (2-yr storm) in open channels or streams.

The orientation of the outfall should be pointed in the downstream flow direction and must include considerations for scour at the outlet.

## **7 EASEMENTS**

### **7.1 General**

Drainage facilities that are constructed to serve predominantly public property or public right-of-way shall be publicly owned and shall be dedicated to Butte-Silver Bow.

Where possible, public storm water conveyance systems shall be constructed within the public right-of-way. When site conditions preclude this requirement, public utility easements or dedicated tracts shall be provided and included on the Certificate of Survey. Private drainage facilities shall be constructed on private property.

When vehicle access for maintenance is required, a dedicated tract or access easement shall be provided. The access easement conditions shall prohibit the property owner from installing any landscaping, improvements, retaining walls, etc., which would hinder access to the drainage facility or necessitate restoration of access easement area.

### **7.2 Easement Width**

For pipes and vaults, the required utility easement width can be calculated using one of the following methods: 1) a minimum of 20-feet; or 2) determined by extending a line from the bottom edge of the structure or the bottom of the excavation at the outside diameter for pipes, at a 1 H: 4V slope until it intercepts the finished grade. Butte-Silver Bow Public Works shall select the required easement width based on site conditions.

For pipes/vaults 5 feet and greater in width, the minimum utility easement width shall be the outside dimension plus 15 feet, but not less than 20 feet total width.

For open channels to be maintained by the Butte-Silver Bow, the utility easement width shall include the entire width of the channel (top-of-bank to top-of-bank or width at freeboard elevation) plus maintenance access when deemed necessary by the Butte-Silver Bow Public Works. For privately-maintained open channels, the private utility easement width shall be, at minimum, the width of the channel at freeboard elevation.

For maintenance access roads, the minimum access easement width shall be 15 feet.

Storm drainage facilities shall be located in the center of the easement unless approved by Butte-silver Bow Public Works.

### **7.3 Easement Documentation**

All easements shall be shown on the project plans and shall be designated either "private" or "public".

All property documentation shall be properly executed. Easement/tract documents shall include a map, the Butte Silver Bow County Certificate of Survey number of affected properties, property legal description, Geocode, and owners' names.

Easements shall be dedicated to and approved by Butte-Silver Bow prior to acceptance of a public drainage system. Grantee shall be "Butte-Silver Bow, a municipal corporation, its heirs, successors, or assignees."

Indemnification and hold-harmless agreements to hold Butte-Silver Bow harmless shall be included in recorded documents where maintenance access across private property and/or pumping of storm drainage is deemed necessary by Butte-Silver Bow.

Bills of sale for all drainage facilities appurtenant to public easements or tracts shall be given to Butte-Silver Bow with the executed real property documents that transfer property rights to Butte-Silver Bow. Grantor shall pay all title policy and recording fees necessary to transfer rights to Butte-Silver Bow.

#### **7.4 Maintenance Access**

All storm water facilities shall have sufficient easement widths in order to be accessible for maintenance and operation.

When vehicle access is necessary, access roads shall be provided in dedicated tracts or dedicated access easements. The minimum clear driving lane width is 12 feet.

For culverts, provide maintenance access easements for inspection and debris removal of the upstream and downstream ends of the culvert.

Gates and/or bollards are required when necessary to restrict access to storm water facilities. Cables and/or chains stretched across access roads are not acceptable.

Where no direct vehicle access can be provided or when greater than 15 feet from a roadway, all structures shall be channelized and shall not have catchments. Provide an oversized catch basin to compensate for lost catchments at the first available access point for maintenance vehicles. An easement for to a vehicle access ramp shall be provided as necessary.

Roof, footing, and yard drainage systems, drainage systems on commercial and multi-family properties, drainage facilities within private easements, and drainage facilities otherwise denoted as private, shall be designed to provide access for maintenance and operation by the owners of such facilities.

Additional maintenance requirements specific to individual storm water facilities are included in Section 9.

### **8 STORM WATER CONTROL AT CONSTRUCTION SITES**

#### **8.1 General**

As required by the Storm Water Ordinance, storm water Best Management Practices (BMPs) shall be implemented to protect water quality in accordance with Chapter 10 of the HEC-22 Manual and these Engineering Standards. These standards define approved water quality BMPs for new development and redevelopment construction projects in Butte-Silver Bow. Construction storm water BMPs will be described in a written Storm Water Pollution Prevention Plan (SWPPP). All construction on public rights-of-way shall be completed in accordance with Butte-Silver Bow's municipal standards and the procedures and methods set forth in the Montana Public Works Standard Specifications (MPWSS) as modified herein.

Land disturbance activities greater than 1-acre must comply with requirements of the MPDES *General Permit for Storm Water Discharge Associated with a Construction Activity*, permit number MTR1000000. These requirements include preparation of a SWPPP on a form provided by MDEQ.

A copy of the approved Engineering Report and SWPPP must be kept on-site during construction. The applicant is responsible for obtaining any other required or related permits prior to beginning construction.

Wastewater from construction cleaning operations shall not be discharged to the storm drainage system, surface waters, or the BSB sanitary sewer system without prior approval by the Butte Silver Bow Wastewater Superintendent. Owner and/or Contractor shall be responsible for cleanup of mud and debris tracked onto city streets. Finally, under no condition shall sediment be discharged to surface waters or natural wetlands.

## **8.2 Construction Project SWPPP**

Construction projects with land disturbance activities greater than 1-acre shall submit a copy of their MPDES *General Permit for Storm Water Discharge Associated with a Construction Activity* Storm Water Pollution Prevention Plan (SWPPP), and permit approval letter from MDEQ. Information and submittal requirements can be found on the MDEQ website: <http://deq.mt.gov/wqinfo/mpdes/stormwaterconstruction.mcp.x>.

### **8.2.1 Minimum Components of SWPPP**

The construction SWPPP should contain a description of best management practices (BMPs) which shall be implemented to control erosion. Several strategies are discussed in this section of the Engineering Standards. The following minimum components shall be addressed along with a schedule for implementation, unless approved otherwise in writing by the Butte-Silver Bow Public Works Department:

- A description of construction practices designed to preserve existing vegetation where practicable and revegetate open areas as soon as possible after grading or construction. In developing vegetative practices, the operator shall consider: temporary seeding, permanent seeding, mulching, sod stabilization, vegetative buffer/filter strips, grassed waterways, erosion control blankets and tree and shrub planting;
- A description of temporary structural practices (BMPs) which indicates how, to the degree practicable, the Contractor will divert, store, or otherwise limit runoff from exposed areas of the site. In developing structural practices the operator shall consider the appropriateness of: straw bale dikes, silt fences, straw fiber rolls/wattles, earth dikes, brush barriers, drainage swales, check dams, subsurface drains, drop structures, rock outlet protection, drain inlet and outlet protection, temporary drain diversions, sediment traps, temporary sediment basin, infiltration trenches or basins, and retaining walls. All temporary control structures, including silt fences and straw bale dikes, shall not be removed until permanent vegetation and site stabilization has taken place;
- Where practical, use gravel surfacing on access entrance and exit drives and parking areas to reduce the tracking of sediment onto public or private roads. All unpaved roads on the site carrying more than 25 vehicle trips per day should be graveled; and

- When trucking saturated soils from site, either leak-proof trucks must be used or loads must be required to drain until drippage has been reduced to less than 1 gallon per hour before leaving the site.

Visible or measurable erosion which leaves the construction site is prohibited. Visible or measurable erosion is defined as:

- Deposits of mud, dirt, sediment or similar material exceeding 1 cubic foot in volume in any area of 100 square feet or less on public or private streets, adjacent property, or into the storm and surface water system, either by direct deposit, dropping, discharge, or as a result of the action of erosion; or
- Evidence of concentrated flows of water over bare soils; turbid or sediment laden flows; or evidence of on-site erosion such as rivulets or rills on bare soil slopes, where the flow of water is not filtered or captured on the site using the techniques in the approved erosion control plan; or
- Earth slides, mud flows, earth sloughing, or other earth movement which leaves the property; or
- Measured turbidity greater than 280 NTUs as required by the EPA under the Clean Water Act.

Contractors need to address controls for the following pollutants: fuel (gasoline and diesel), oils, grease, solvents, paints, concrete truck wash down material, and miscellaneous, raw materials, litter, and debris.

### **8.2.2 Exemptions**

A construction SWPPP will not be required for construction projects with land disturbance less than 1-acre, or other development activities specifically exempted in the BSB Storm Water Ordinance. However, construction BMPs should still be employed at these smaller sites. If problems are noted at construction sites, BSB may consider sediment releases illicit discharges per the storm water ordinance.

### **8.3 Source Control and Waste BMPs**

Source control and waste BMPs are preventive BMPs and include good site design and use, minimizing use and storage of deleterious products at the construction site, good site management/housekeeping, and good operation and maintenance procedures. The goal of source control BMPs is to keep contaminants associated with a project's activities from entering the storm water system rather than removing contaminants (i.e: runoff treatment later), thereby reducing the amount of pollutants picked up by storm water. These BMPs are aimed at activities that produce the contaminants and are preferred by Butte Silver Bow over treatment BMPs because of the lower development and maintenance costs.

As stated in the requirements for the SWPPP, Contractors need to provide source controls for the following pollutants:

- fuel (gasoline and diesel),
- oils,



- grease,
- paints,
- solvents,
- concrete truck wash down,
- raw materials for manufacturing concrete (sand, aggregate, and cement),
- litter,
- debris, and
- sanitary wastes.

### **8.3.1 Erosion Control**

The objective of erosion control is to minimize erosion of disturbed areas during the construction of a project. Erosion and subsequent sediment transport can have a significant impact on the water quality of receiving surface waters. Sediment loads to surface waters increase turbidity, increase water temperatures, degrade fish habitat and spawning areas, and depress dissolved oxygen concentrations. Moreover, toxic substances, trace metals and nutrients, which are absorbed to soil particles, can be transported into surface waters. The addition of these substances to surface waters degrades the existing water quality.

The following are the main erosion control principles required at a construction site:

- Construction plans must conform to existing topography and soil type to create the lowest practical erosion potential.
- To the maximum extent practicable, natural vegetation shall be retained, protected, and supplemented. Temporary vegetation or mulching shall be employed to protect exposed areas during development.
- Stripping of vegetation, regrading and other development activities shall be conducted in such a manner so as to minimize erosion, and the duration of exposure to erosive elements shall be kept to a practicable minimum.
- Cut and fill operations must be kept to a minimum and may not endanger adjoining property. Fills also may not encroach upon natural water courses or constructed channels in a manner that adversely affects other property owners.
- Grading equipment must cross flowing watercourses via bridges or culverts except when such methods are not feasible.
- Design and install BMPs to minimize runoff velocities and retain runoff on-site. BMPs can be used to effectively control runoff velocity and detain it to remove 80 to 90 percent of the sediment from runoff.

- Perimeter control practices can protect the disturbed area from off-site runoff and to prevent sedimentation damage to areas downgradient of the construction site. A sediment and runoff barrier surrounding the disturbed area prevents construction site runoff from moving offsite and fouling surface waters downstream.
- Stabilize disturbed areas immediately after final grade has been attained. Any exposed soil is subject to erosion from rainfall, wind, and vehicle traffic. Soil stabilization BMPs should be applied as quickly as possible after the land is disturbed. Temporary stabilization practices include seeding, mulching, and erosion control blankets or mats.
- Coordinate disturbance activities with seasonal precipitation and growing patterns to reduce the exposure of disturbed ground to the elements, and to minimize the window between disturbance and revegetation.
- Develop a schedule and implement a BMP inspection and maintenance program. This principle is vital to the success of erosion control. BMPs must receive regular inspection and maintenance to ensure that they are operating effectively and optimally, both during and after construction.

### **8.3.2 Conventional Pollutant Treatment**

Refer to Table 10-2 in the HEC-22 Manual for approved conventional pollutant treatment BMPs. The selected BMPs shall be designed in accordance with Chapter 10.2 of the HEC-22 Manual as modified herein.

Only runoff from conventional pollutant-generating surfaces must be treated using BMPs set forth herein. Conventional pollution-generating surfaces typically include driving surfaces (streets and roads), uncovered parking areas, driveways, and uncovered storage areas for wastes, materials, equipment, etc. Drainage from surfaces that typically do not generate conventional pollutants include roof tops, sidewalks, and landscaping. Such runoff need not be treated for conventional pollutants and may bypass the conventional pollutant treatment facility, if feasible.

#### **8.3.2.1 Oil/Water Separation**

There are three types of oil/water separation BMPs:

- Spill Control (SC) separators which are effective at retaining small spills, coarse sediments and floating debris.
- American Petroleum Institute (API) separators which can remove dispersed oil and floating debris, and contain spills.
- Coalescing plate (CP) separators which can remove dispersed oil, and floating debris, and contain spills.

It is incumbent on the design Engineer, in consultation with Butte Silver Bow Public Works Department, to determine the appropriate type of oil water separator for the project.

## **Location Requirements for Oil/Water Separators**

Locate the appropriate oil/water separator upstream from the detention system, or immediately before leaving the site if there is no detention system. If there are multiple outfalls into the detention system or water quality facilities (other than oil/water separators), then an oil/water separator must be included in the last catch basin in each tributary line draining a potential spill area.

### **8.3.2.2 Nutrient Treatment**

Nutrient removal from storm water is difficult and can be very expensive. The best way to remove nutrients from storm water is to prevent them from entering the storm water system. Therefore, source control is the best mechanism for addressing nutrients in storm water. Land uses with potentially nutrient-rich runoff include but are not limited to nurseries, gardening supplies, animal care and boarding facilities, golf courses, parks, sports fields, livestock stables, and pastures, etc.

Source control strategies may include:

- Design of new facilities and storm water structures to prevent comingling of nutrient rich water and storm water runoff,
- Proper timing and application rate of fertilizers,
- Proper watering (to prevent overwatering and runoff) of fertilizer/nutrient rich areas, and
- Buffer strips between nutrient rich areas and storm water channels/infrastructure.

## **8.4 Runoff Treatment BMPs**

### **8.4.1 General**

Runoff treatment BMPs are designed as part of the on-site storm water system and must treat the water quality design storm (6-month, 24-hour storm). This exemption does not apply to source control and oil/water separation requirements. Areas which are not anticipated to produce contaminants are not required to be treated.

Runoff treatment BMPs are categorized by the type of contaminants most effectively removed. These categories are:

- Conventional Pollutant Treatment designed to remove particulates and contaminants typically associated with particulates, such as heavy metals.
- Oil/Water Separation designed to remove and contain oil.
- Nutrient Treatment designed to remove suspended and dissolved nutrients.

Follow these steps to determine which treatments are required for a specific development or redevelopment proposal.

- Determine if the proposed project is subject to runoff treatment requirements.
- Determine if nutrient treatment or oil/water separation is required for the proposed project.

- Select the appropriate BMP(s) to treat contaminants anticipated from the proposed project. Use Table 10-2 of the HEC-22 Manual for evaluation of pollutant removal of various BMPs.
- Incorporate runoff treatment BMPs into the design of the on-site storm water system. Note that several of the allowable BMPs can also be designed to meet runoff control requirements.
- The Montana Section 303(d) List (of impaired waterbodies) needs to be referenced when planning a proposed project. , Any implications to a waterbody on the list should be noted in the drainage report and ESC.

There are a number of common and practical BMPs for runoff treatment depending on the area requiring treatment, depth to groundwater, slope, soil type, geometric constraints, etc. Table 10-1 in the HEC-22 manual provides a summary of runoff treatment BMPs summarized in this list:

- Biofiltration,
- Infiltration Trench,
- Infiltration Basin,
- Grassed Swales (with Check Dams),
- Filter Strips,
- Water Quality Inlets,
- Detention Ponds,
- Retention Ponds,
- Extended Detention/Retention Ponds, and
- Detention/Retention Ponds with Wetland Bottoms.

Runoff treatment facilities for the right-of-way shall be owned and operated by Butte-Silver Bow and shall be separate from private on-site systems. Maintenance agreements between Butte Silver Bow and other government agencies (such as MDT) may be necessary. In a development where the storm water facilities will be owned and operated by Butte-Silver Bow, runoff from the right-of-way and private properties may be combined and treated in a single facility.

If "clean" runoff is routed to the water quality facility, those flows must be included in the sizing calculations for the facility. Drainage from landscaped and vegetated areas, especially areas in native vegetation, should not be mixed with untreated runoff from streets and driveways, if practical. Once runoff from non-contaminant generating areas is combined with runoff from contaminant-generating areas, it cannot be discharged without treatment.

Drainage basins may be considered as separate if tributary areas drain to different storm water conveyance networks via drainage routes that remain separate for a minimum of ¼-mile downstream.

Proprietary BMPs shall be evaluated on a case-by-case basis through the deviation process and Chapter 10 of the HEC-22 Manual.

#### **8.4.2 Sediment Control**

Under no condition shall sediment be discharged to surface waters or natural wetlands. Installation of temporary sediment ponds, sedimentation tanks, filter vaults, or other sediment control facilities is required to control sediment laden storm water during construction. All types of ponds (detention, retention, extended, and wet) provide adequate suspended sediment removal if properly designed and maintained. Other sediment control BMPs include:

- Sedimentation tanks,
- Filter vaults,
- Infiltration trenches, and
- Infiltration basins.

Filter strips and grassed swales provide minimal sediment control. Porous pavement is not an acceptable method for controlling or treating runoff.

If ponds or infiltration structures cannot be used at the site for sediment control, the Owner of the project and their Engineer will need to consult with Butte-Silver Bow Public Works to determine alternative sediment control mitigation measures such as source control, temporary paving, preservation of existing vegetation, etc.

#### **8.5 Construction BMP Operation and Maintenance Schedule**

All approved construction BMPs as detailed in the construction SWPPP must be inspected at a minimum every 14 days during construction and after every precipitation event. An inspection and maintenance log shall be maintained by the Contractor and shall be provided to Butte-Silver Bow Public Works Department upon request.

After significant construction activities are completed on the site, but before the implementation of permanent vegetation and/or structural BMPs, the Contractor shall inspect and maintain the construction BMPs not less than monthly and after every significant precipitation event (0.5 inches or greater).

### **9 STORM WATER CONSTRUCTION AND MANAGEMENT FOR NEW DEVELOPMENT/ REDEVELOPMENT**

#### **9.1 General**

In accordance with the 2010 MS4 Permit, the Owner shall retain and use low impact development practices that infiltrate, evapo-transpire, or capture for reuse the runoff generated from the storm events listed in Section 6.1.1. If this requirement cannot be implemented for a new development project or redevelopment project, the Owner must provide documentation demonstrating why this requirement cannot be met. The Owner shall evaluate and document alternatives for reducing the amount of impervious surface

area for either new developments or redevelopments, and shall include this information in the design drawings or in the engineering report for the project.

Street and parking overlays are considered to be routine maintenance and are not considered to be redevelopment and, therefore, are not subject to provisions in this section.

## **9.2 Structural BMPs**

This section details the general types of storm water structural BMPs that are permissible to Butte-Silver Bow Public Works Department. They are grouped into ponds (surface water structures) and infiltration structures (subsurface). These structural BMPs must be designed by a licensed professional engineer and are required for all new projects that increase the amount of impervious area or are reasonably anticipated to adversely impact storm water quality. BMPs not included in this section will be evaluated by Butte-Silver Bow on a case-by-case basis. Refer to Section 10 of the HEC-22 Manual for additional information regarding these BMPs.

### **9.2.1 Ponds and Water Quality BMPs**

The following are the peak reduction and water quality BMPs that are permissible by the Butte-Silver Bow Public Works Department. Refer to Section 10 of the HEC-22 Manual for additional information regarding these BMPs.

- **Extended Detention Dry Ponds** are depressed basins that are designed to temporarily store storm water for a minimum of 24 and up to 48 hours following a storm event. These storm water facilities typically do not impound water or have a free water surface between storm events.
- **Wet Ponds / Retention Basins** are designed to store a permanent pool of water between storm events.
- **Constructed Wetlands** are similar to wet or dry ponds with the exception that they are specifically planted with wetland and/or riparian vegetation to provide some storm water treatment.
- **Water Quality Catch Basin Filters** These types of filters are commercially available for specific pollutants, litter, or oil and grease.

### **9.2.2 Infiltration BMPs**

The following are the infiltration BMPs that are permissible by the Butte-Silver Bow Public Works Department. Storm water infiltration by its nature typically resolves surface water quality impacts. However, consideration must be given to the potential for creating groundwater quality impacts with these types of BMPs. Section 10 of the HEC-22 Manual contains some additional information regarding these BMPs.

- **Infiltration Basin** is similar in appearance to dry ponds and consists of a shallow impoundment that detains and infiltrates runoff into permeable soils.
- **Underground Infiltration** is defined as temporary storage and infiltration of runoff in an infiltration chamber located beneath an engineered layer of soil and vegetation.



- **Infiltration Trenches** are shallow trenches which have been backfilled with rock and have positive drainage. An infiltration trench may be used as part of a larger storm drain system (like a commercial parking lot), or it may serve a portion of a roof or a single catch basin.
- **Dry Well / Seepage Pit** is typically a smaller underground Infiltration system designed to temporarily store and infiltrate runoff from a building or structure.
- **Constructed Filters** are structures or excavated areas containing a layer of sand, compost, organic material, peat, or other filter media that reduce pollutant levels in storm water runoff by filtering sediments, metals, hydrocarbons, and other pollutants.
- **Vegetated Swales** are broad, shallow, trapezoidal or parabolic channels, densely planted with a variety of trees, shrubs, and/or grasses. It is designed to attenuate and/or infiltrate runoff, allowing some pollutants to settle out in the process. In steeper slope situations, check dams may be used to enhance attenuation and infiltration.
- **Vegetated Filter Strips** are permanent, maintained strips of planted or indigenous vegetation located between nonpoint sources of pollution and receiving water bodies for the purpose of removing or mitigating the effects of nonpoint source pollutants such as nutrients, pesticides, suspended solids.
- **Infiltration Berm & Retentive Grading** consists of a mound of compacted earth with gently sloping sides to detain storm water runoff and allow infiltration. These structures can be used in conjunction with grassed channels to allow for detention and infiltration during storm events.

### 9.3 Non-structural BMPs

Non-structural BMPs focus on preserving open space, protecting natural systems, and incorporating existing landscape features such as wetlands and stream corridors into a site plan to manage storm water at its source. Focus should be placed on clustering and concentrating development, minimizing disturbed areas, and reducing the size of impervious areas. The following lists primary non-structural BMPs that should be implemented on all sites to the maximum extent practicable:

1. Preserving and utilizing existing natural features and systems;
2. Managing storm water as close to the source as possible;
3. Sustaining the hydrologic balance of surface and ground water;
4. Disconnecting, decentralizing and distributing sources and discharges;
5. Source control of potential pollutants into runoff;
6. Appropriate construction sequencing and planning;
7. Good housekeeping and pollution prevention strategies on construction sites;
8. Integrating storm water management into the initial site design process; and
9. Inspecting and maintaining all BMPs.

#### **9.4 New Infrastructure Operation and Maintenance Agreement**

For privately maintained storm water systems, an operation and maintenance (O&M) agreement and schedule for source control, runoff control and runoff treatment BMPs must be approved by the Butte-Silver Bow Public Works Department prior to acceptance of the completed storm drainage system. For private storm water facilities, the party responsible for O&M must be identified. If storm water facilities are to be maintained by Butte-Silver Bow, the O&M schedule shall provide information regarding any unique facilities or features not normally used by Butte-Silver Bow. The agreement must allow access to Butte-Silver Bow for inspection purposes, and must be recorded with the property deed to ensure the agreement is bound to the property in perpetuity.

An example storm water maintenance agreement is included in Appendix C.

#### **9.5 Plan Implementation**

Each landowner or responsible party shall implement and maintain storm water management facilities and temporary erosion and sediment control measures to minimize and control erosion during any land disturbance activity. During construction, appropriate phasing and implementation of BMP's is required. Inspection of all temporary control measures will be conducted during active construction activities. All storm water management facilities will be constructed according to the design plans and specifications.

#### **9.6 Inspection and Certification**

The applicant must notify the Butte-Silver Bow Public Works Department in advance before the commencement of construction. Inspections of the storm water management system construction may be conducted by Butte-Silver Bow Public Works Department personnel at its discretion to determine the overall effectiveness of the storm water engineering report. All inspections shall be documented and shall contain the following information:

1. The date and location of the inspection.
2. Whether construction is in compliance with the approved storm water engineering report.
3. Variations from the approved construction specifications.
4. Any violations that exist.

#### **AS-BUILT PLANS**

Applicants are required to submit as-built plans for any on-site or off-site storm water management practices after final construction is completed. The plan must show detailed final specifications for all storm water management facilities and must be certified by a professional engineer. A final inspection by the Butte-Silver Bow Public Works Department is required before the release of any performance securities can occur.

## **LANDSCAPING AND STABILIZATION REQUIREMENTS**

Any area of land from which the natural vegetative cover has been either partially or wholly cleared or removed by development activities shall be revegetated within thirty (30) days of the completion of such clearing and construction, or have appropriate storm water controls implemented. In addition, all components of the landscaping plan submitted as part of the Storm Water Engineering Report must be completed, as appropriate.

### **9.7 Post Construction Infrastructure Acceptance Procedure**

Prior to use or occupancy of any portion of a phased development, storm drainage facilities shall be completed and operational to provide conveyance, runoff control, and water quality treatment for the phase for which occupancy is requested.

Prior to the installation of impervious surfacing, detention facilities shall be operational.

Contractor shall provide Manufacturer's Certificate of Compliance when requested by Butte-Silver Bow for all pipe, fittings, precast concrete products, castings, and manufactured fill materials to be used in the project.

Testing of the drainage system by the Contractor shall conform to the testing requirements for the particular component of the system as set forth in the MPWSS and issued permits.

Documentation for the newly installed drainage facilities required by these standards or issued permits shall be submitted and approved prior to construction acceptance. Prior to the final inspection, the Contractor shall clean the storm drain system and any off-site drainage systems affected by construction activities by a method approved by Butte-Silver Bow.

## **10 MINIMUM DESIGN STANDARDS**

The Design Engineer and Contractor shall refer to MPWSS as modified by these minimum Engineering Standards promulgated by Butte-Silver Bow Public Works Department.

### **10.1 Road Section**

Roads and streets shall be designed with adequate longitudinal and cross slopes (minimum 0.5% and 2% respectively) and to ensure proper drainage. If possible, roads should have a normal crown at the center of the road (or between opposing driving lanes).

### **10.2 Curb and Gutter**

Curb and gutter shall be required for all new and redevelopment projects. For projects located within the Historic Uptown Butte Zoning District, a vertical curb and gutter section shall be constructed to maintain historical character of the area. Refer to the Figure in Appendix A for the current Historic Designations of Uptown Butte. All other areas of Butte and the surrounding area shall have an integral curb and gutter system

conforming to the curb and gutter details provided in MPWSS (Standard Drawing 02528-1), unless written approval is granted by the Butte-Silver Bow Public Works Department.

### **10.3 Open Channels**

Minimum freeboard requirements for open channels shall be one half (0.5) foot below the top of bank for the design flow rate. Additional freeboard should be included for large conveyance channels.

Rock riprap for channel armoring shall conform to the Montana Department of Transportation for Road and Bridge Construction, Section 613, Rip-rap and Slope and Bank Protection.

Swales shall be located no closer than 10 feet to any structure foundation measured horizontally from the edge of the swale at the freeboard elevation.

### **10.4 Underground Utility Separations and Minimum Clearances**

Storm drain piping shall not be located:

- Within the 1:1 slope from the bottom edge of the pipe or structure to the finished grade at a building or structure; and
- Within the 1:1 slope from the bottom edge of the pipe or structure to the property line at finished grade when an easement is not provided on the adjacent property; and
- Underneath any structure (e.g. buildings, sheds, decks, or retaining walls which run parallel to the pipeline); and
- Where such facilities interfere with other underground utilities; and
- Where allowable design loads would be exceeded.

At a minimum, the following utilities shall be shown on the plans: cable television, fiber optic cable, natural gas, power, sanitary sewer, telephone, and water. Check for crossing or parallel utilities. Maintain minimum vertical horizontal clearances. Avoid crossing at highly acute angles (the smallest angle measure between utilities should be between 45 and 90 degrees).

Where storm drain pipes cross over or below a water main, one full length of pipe shall be used with the pipes centered for maximum joint separation. All storm water piping crossing water mains must consider the potential effects of frost and measures should be considered by design Engineer to prevent the freezing of water mains.

For storm drain crossings of water and sanitary sewer pipelines, the Montana Circulars DEQ 1 and 2 for water/wastewater systems and Montana Department of Environmental Quality criteria will apply.

All clearances listed below are from edge-to-edge of each pipe.

**Table 10-1. Required Utility Clearances**

| <b>Utility</b>                 | <b>Required Clearance</b>    |                              |
|--------------------------------|------------------------------|------------------------------|
|                                | <b>Vertical<br/>(inches)</b> | <b>Horizontal<br/>(feet)</b> |
| <i>Water</i>                   | 18                           | 10                           |
| <i>Sewer</i>                   | 12                           | 5                            |
| <i>Cable TV</i>                | 12                           | 5                            |
| <i>Gas (distribution only)</i> | 12                           | 5                            |
| <i>Power</i>                   | 12                           | 5                            |
| <i>Telephone, Fiber Optics</i> | 12                           | 5                            |

### **10.5 Trench Design**

Trenches shall be excavated to the width, depth, and grade as set forth in MPWSS. Material excavated that is unsuitable for backfill shall not be used for filling on or around storm water facilities. In paved areas within the public right-of-way, provide a neat vertical cut in existing pavement by saw cutting.

Trenches shall be backfilled in accordance with MPWSS as modified herein. All backfill within the pipe compaction zone shall be compacted to a minimum of 95% of maximum dry density per ASTM D 1557 (Modified Proctor).

Excavated material may be used as trench backfill when it has been demonstrated by the Contractor to meet gradation and compaction requirements.

#### **10.5.1 Installation of Storm Drain Pipe**

Installation of storm drain pipe shall be in accordance with the MPWSS as modified.

Existing storm flows shall be diverted away from the pipe segment under construction by methods approved by Butte-Silver Bow Public Works Department.

#### **10.5.2 Pipe Bedding Material**

Pipe bedding material shall be in accordance with MPWSS for Trench Excavation and Backfill for Pipelines & Appurtenant Structures as well as pipe and fitting manufacturer's specifications for bedding material.

Excavated material may be used as pipe bedding when it has been demonstrated by the Contractor to meet gradation and compaction requirements.

### **10.6 Connections/Modifications to Public Drainage System**

When connecting existing metal storm pipe to new catch basins, the Contractor shall treat the newly exposed end of the pipe per the following.

Provide enamel linings and coatings in accordance with the following:

- Provide minimum dry film of 5 mils of acceptable asphalt base material.
- Provide coating subject to following additional requirements.

- Do not use enamel-lined or coated-steel pipe exposed to temperatures below 10 Deg F.
- Do not handle enamel-lined or coated-steel pipe when temperature of pipe is below 20 Deg F.
- Galvanize surface in accordance with hot-dip method using a grade of zinc acceptable to ASTM B6.

Where new pipe is connected to existing, the Contractor shall verify the type of existing pipe and join in-kind with new. If the existing pipe is no longer an approved material, the Contractor shall connect the new to the existing with an appropriate coupling device. The appropriate coupling device shall be approved by Butte-Silver Bow Public Works Department prior to installation.

The following connections to a pipe system shall be made only at structures:

- When the inletting pipe is greater than 8 inches in diameter; or
- When roadway, driveway or parking lot runoff is conveyed; or
- When commercial and multi-family storm water pipes connect to the municipal conveyance system; or
- When connecting to corrugated metal pipe (CMP) conveyance systems.

Roof/footing/yard drain pipes, 8 inches or less in diameter, from single family residences, may be connected to the existing storm water conveyance system by core drilling the appropriate diameter hole. Protrusions into storm drain mains or laterals shall be contoured to match main inside wall if a Tee is not used.

When a connection is made without the benefit of a structure, a clean-out shall be provided upstream of each tee on the inletting private drainage system pipe.

When connecting pipes at structures, match crowns whenever possible.

### **10.7 Storm Drain Piping**

Off-site storm water flows passing through the site shall be conveyed by a hydraulically adequate conveyance system as set forth herein.

Catch basins or manholes are required when joining pipes of different materials (does not apply to "taps") and joining pipes of different slopes. Vertical bends are not permitted.

Minimum slope for storm drain mains shall be 0.5%, unless specified otherwise herein. Minimum diameter for storm drain mains within a road section or public right of way shall be 12-inches.

Only the pipe materials listed below are approved for use in storm drain systems and culverts. Pipe systems shall meet MPWSS, as modified herein, for the materials shown below. The minimum pipe diameter for all publicly owned and maintained storm pipe shall be 8-inches; however, some pipe materials have higher minimum diameters.



### **Solid Wall Polyvinyl Chloride (PVC) Pipe**

PVC pipe must be at least SDR 35 and meet the requirements of ASTM D 3034 for diameters up to 15 inches and ASTM F 679, Type I for sizes 18 to 27 inch diameter.

The maximum fill depth is 25 feet.

### **Profile Wall PVC Pipe**

Profile wall PVC pipe shall conform to AASHTO M 304. Joints shall be an integral bell gasketed joint conforming to ASTM D 3212. Elastomeric gasket material shall conform to ASTM F 477.

The minimum pipe diameter shall be 8 inches. The maximum pipe diameter shall be 15 inches or the diameter for which a supplier has a joint conforming to ASTM D 3212, whichever is less.

Fittings for profile wall PVC pipe shall meet the requirements of AASHTO M 304 and shall be injection molded, factory welded, or factory solvent cemented.

The maximum fill depth is 25 feet.

### **Polypropylene (PP) Pipe**

Polypropylene (PP) pipe shall have smooth interior and shall be joined with a gasketed integral bell and spigot joint providing a water tight seal. Fittings shall utilize welded or integral bell and spigot with gaskets meeting ASTM F 477. Fitting joints shall meet the watertight joint performance requirements of ASTM D 3212. Installation of PP pipe shall be in accordance with ASTM D 2321 and manufacturer's recommended guidelines. Gasketed joints shall be lubricated during installation as recommended by the manufacturer.

The minimum pipe diameter shall be 12 inches.

Minimum fill depth shall be one foot from top of pipe or manufacturer's minimum requirement for class of pipe, whichever is greater. For pipe depths greater than 15 feet, pipe type and backfill class shall be determined on a case-by-case basis with back up documentation provided by the Engineer and pipe manufacturer.

### **Corrugated Polyethylene Pipe (CPEP)**

Corrugated polyethylene pipe (CPEP), a type of HDPE, shall have a smooth interior wall and meet the requirements of AASHTO M294, Type S for 12-inch through 60-inch sizes (or AASHTO M252, Type S for 8 and 10-inch sizes) and ASTM F2306. Joints for corrugated polyethylene pipe shall be watertight per ASTM D 3212. Installation of PE pipe shall be in accordance with ASTM D 2321 and manufacturer's recommended guidelines. Gasketed joints shall be lubricated during installation as recommended by the manufacturer.

The minimum pipe diameter shall be 8 inches.

Minimum fill depth shall be one foot from top of pipe or manufacturer's minimum requirement for class of pipe, whichever is greater. For pipe depths greater than 15 feet, pipe type and backfill class shall be determined on a case-by-case basis with back up documentation provided by the Engineer and pipe manufacturer.

## **Reinforced Concrete Pipe (RCP)**

RCP shall meet ASTM C-76 with a joint conformation to ASTM C-443, providing a water tight O-Ring gasket joint.

Minimum cover is one foot from the top of pipe to the finished grade or manufacturer's minimum requirement for class of pipe, whichever is greater. For pipe depths greater than 15 feet, pipe type and backfill class shall be determined on a case-by-case basis with back up documentation provided by the Engineer and pipe manufacturer.

### **10.8 Culverts**

Culvert crossings within the urban and suburban area of Butte are generally limited to driveway culverts. The minimum diameter of any driveway culvert shall be 12-inches. Where minimum cover requirements can be met, an 18-inch diameter culvert is required to minimize debris blockages.

Culverts outside of the urban boundary may be made of concrete, steel, aluminum, or corrugated polyethylene pipe (CPEP). Culverts within the urban boundary shall be made of concrete or CPEP only. Factors to be considered in material selection include: bed load, structural strength, hydraulic roughness, in-place foundation conditions, abrasion and corrosion resistance and water tightness requirements.

Headwalls, cut-off walls, and/or anti-seep collars shall be provided on culverts where the hydraulic piping of bedding and backfill materials is possible.

### **10.9 Manholes, Catch Basins, and Inlets**

#### **10.9.1 Design Considerations**

Storm water inlets located in a roadway with a sloping grade shall be located in the curb line and shall be fitted with vaned grates.

A through-curb inlet frame shall be used where conditions limit the effectiveness of a flat grate inlet. Examples of such conditions are where a high likelihood of clogging from leaf fall or other debris exists, in sag vertical curves, intersection curb returns, and when the structure is a surface drainage end point, such as in a cul-de-sac.

Non-vaned grates shall be used in vertical sag locations (low spots).

#### **10.9.2 Spacing Requirements**

Maximum spacing between inlet grates shall be based on the spread width calculations provided by the Design Engineer. The spread width for the design storm cannot exceed  $\frac{1}{2}$  the nearest travel lane. The inlet spacing may need to be decreased as required by grate flow capacities. Refer to HEC-22 Section 4.4.6 and Appendix B.

Maximum distance between manholes is 400 feet along storm mains. For storm mains greater than 13 feet in depth (as measured from the deepest pipe invert to the top of the grate or manhole), manholes shall be a minimum of 60" in diameter. For storm mains greater than 20 feet deep manholes shall be 72" in diameter.

The number and size of pipes that may be connected to any one structure (manhole or catch basin) shall be limited in order to maintain the integrity of the structure and must follow manufacturer's specifications for pipe spacing and structure sizing.

### 10.9.3 Adjusting Manholes and Catch Basins to Grade

Where shown on the approved plans or as directed by Butte-Silver Bow, existing manholes, catch basins and inlets shall be adjusted to conform to finished grade in accordance with standard detail Adjusting Manholes and Catch Basins to Grade of the MPWSS as modified herein.

Where riser bricks (blocks) are used to bring the frame to grade, the maximum height of the brick shall be two rows. If more than two rows of bricks are required, a precast riser section shall be used along with no more than two rows of bricks to complete the adjustment.

### 10.9.4 Materials

Precast concrete products for manholes, inlets, and catch basins shall comply with the MPWSS. Infrastructure within the Butte historic district may need to be adjusted to comply with integrated sidewalk and vertical curb.

Metal castings for frames, inlet grates, and rectangular covers shall conform to the MPWSS as modified herein. Rings and covers shall be designed per Butte-Silver Bow Utilities Division Standards.

Acceptable inlet grates and manhole covers are listed in Table 9-2:

**Table 10-2. Approved Inlet Grates**

| Manufacturer* | Grate # | Dimensions | Style                | Application                                       |
|---------------|---------|------------|----------------------|---|
| D&L Foundry   | I-3559  | 36" Dia    | Vaned                | Inlet on slope                                    |
|               | I-3559  | 36" Dia    | Non-vaned            | Inlet on sag                                      |
|               | I-3517  | 31"x43"    | L                    | Combination manhole sloping, high traffic & bikes |
|               | I-3519  | 31"x43"    | DL, Directional      | Combination manhole sag high water flow areas     |
|               | A-1174  | 24" Dia    | Label as Storm Drain | Storm manhole cover                               |

Note: \*D&L Foundry provided for reference or approved equal

All catch basin grated covers in roadways shall be ductile iron grates with cast iron frames, per these engineering standards or approved equal. Vaned gates shall be used where  $S > 0.4\%$ , or as required by Butte-Silver Bow Public Works Department.

All grated covers shall have in raised letters "Outfall to Stream, Dump No Pollutants".

Manhole round covers and rectangular covers shall have the word "STORM DRAIN" in block letters at least two (2) inches high, recessed so as to be flush with the surface.

Dipping, painting, welding, plugging or any repair of defects to castings shall not be permitted in accordance with AASHTO M 306.

All structure ladders, when used, shall be firmly attached using stainless steel hardware and extend to the bottom of the structure.

Vertical ladders or steps shall be installed immediately under the cover or grate opening to a walkable surface on all structures exceeding four feet deep to the pipe invert.

When connecting to a concrete structure, openings must be core-drilled unless an existing knockout is available. Connections shall be made with watertight rubber boots, sand collars, manhole adapters, or other approved watertight connectors except for: 1) concrete; 2) ductile iron; 3) corrugated metal pipe. For 1, 2, and 3 above, connections shall be made with non-shrink Portland Cement Grout to make a watertight connection.

#### **10.10 Service Connections**

Private storm drainage systems shall comply with all criteria for storm water systems set forth herein unless specifically exempted.

All service connections shall connect to any existing storm water conveyance system within 100 feet and downgradient of the property line

For driveways, parking lots and situations not listed above, the minimum diameter for conveyance pipes shall be 8-inches.

Any storm line with a 20% slope or greater shall provide pipe anchors to provide stability on the slope.

#### **10.11 Runoff Control**

##### **10.11.1 Discharge Location**

The Owner or Engineer shall show the location of storm water discharge from the project boundary to the nearest existing municipal storm water structure or natural water body.

##### **10.11.2 Unconcentrated Flow**

Where no downstream drainage system exists adjacent to the property and the runoff from the project site was previously unconcentrated flow, the downstream drainage system shall be extended to the property line and the location and direction of all runoff from the property shall be documented. The Owner shall secure drainage easements from the downstream owners and record such easements prior to drainage design plan approval as necessary under State Law.

##### **10.11.3 Alternate Discharge**

If the Owner finds that easements per Section 6 herein are not reasonably obtainable, then all additional runoff from development shall be conveyed to an infiltration system per these engineering standards.

##### **10.11.4 Temporary Discharges to the Sanitary Sewer**

Storm water runoff into the sanitary sewer system is prohibited. Temporary discharges into the sanitary sewer system may be permissible but must be approved by:

- The Public Works Department
- Wastewater Treatment Plant (WWTP) Supervisor
- Utilities Maintenance Supervisor

Butte-Silver Bow WWTP Supervisor and the Metro Sewer Utility Maintenance Supervisor will determine the:

- Location of connection to the sanitary sewer,
- Method for the connection and pre-connection requirements (i.e., settling tanks, sump pump, etc.),
- Time of discharge,
- Duration, rate and volume of the discharge, and
- Other applicable discharge conditions.

## **10.12 Detention Pond Facilities**

### **10.12.1 Detention Design Considerations**

Upstream, off-site runoff must bypass the proposed detention facilities, if possible. However, if the existing 100-year, 24-hour peak runoff rate from the upstream, off-site area is less than 50 percent of the allowable release rate for the 100-year, 24-hour design storm event of the proposed project, then upstream runoff will be allowed. Existing water quality treatment must also remain unchanged.

The detention pond outlet shall include debris barriers or trash racks to protect the outlet from blockage or plugging.

### **10.12.2 Sites with Existing Storm Water Detention Systems**

When runoff control is required on a site with an existing detention system, the design Engineer may choose one of the following options:

- Retain the existing detention system, modify the control structure and add volume as needed to meet the current requirements for runoff control;
- Retain the existing detention system to control runoff from existing impervious surfaces and design a second system to meet current requirements to control runoff from new portions of the development; or
- Replace the existing detention with a system designed to meet current runoff control requirements for both existing and proposed conditions.

Existing storm water detention ponds may be used as interim sedimentation facilities during construction, if they are cleaned and restored to approved plan conditions following completion of all construction activities.

### **10.12.3 Embankments**

Embankment material for detention ponds shall conform to the guidelines set forth in the MPWSS and the Montana State Department of Natural Resources and Conservation Dam Safety guidelines. Pond vegetation should be established using the materials described in these standards.

Fill placed around structures in the pond embankment shall be placed in 12- inch maximum lifts and compacted to 95 percent of ASTM D- 1557.

The maximum embankment height is measured from the down-slope toe to the crest of the embankment.

All embankments for detention facilities 6-feet and higher shall be designed, inspected and certified by a licensed and qualified professional engineer. The professional engineer shall submit a letter certifying that all embankment design requirements have been met during embankment construction.

Anti-seep collars or other design features shall be used on all conveyance pipes and trenches within the embankment to prevent embankment piping failures from seepage along the outlet pipe.

Ponds may be designed with retaining walls only as approved by Butte-Silver Bow Public Works on a case-by-case basis. Public safety shall be a primary design consideration.

#### **10.12.4 Detention Pond Setbacks**

Detention ponds shall not be located:

- within the 1:1 plane from the pond bottom to the finished grade at an adjacent building; and
- within the 1:1 plane from the pond bottom to the property line when an easement is not provided on the adjacent property; and
- where such facilities interfere with other underground utilities.

The top of a cut embankment and the toe of a fill embankment shall be setback at least 5 feet from property lines.

For ponds where the maximum design water depth is less than three (3) feet deep, the minimum bottom width is 6 feet.

For ponds where the maximum design water depth is 3 feet deep and greater, the minimum bottom width shall be 12 feet to allow maintenance.

The pond bottom shall be sloped at 0.5% towards the outlet for drainage to help facilitate maintenance.

#### **10.12.5 Vegetation & Landscaping**

Vegetation on pond embankments shall be limited to shallow rooted varieties, as tree roots can affect the integrity of a pond embankment. Deciduous shrubs and shrub/trees may be used in other areas to provide habitat and for aesthetic purposes.

All pond landscaping shall provide for slope stability, erosion control, and low maintenance. Landscape materials shall be fully compatible with use as a storm water detention facility, including runoff treatment.

Ponds with walls higher than 6 feet shall be landscaped.

Floatable or erodible material (i.e., wood chips, beauty bark, straw mulch, etc.) shall not be allowed in the pond interiors. Vegetation shall be placed into topsoil above or adjacent to the engineered pond embankment.



If detention pond vegetation shall be maintained by the Utilities Department, landscaping shall be non-irrigated, low maintenance and drought tolerant native plant species. Lawn or turf grass is not allowed. Utilize plant species native to the State of Montana to the maximum extent practicable.

For Butte-Silver Bow maintained facilities, all plant material shall be guaranteed for a period of one (1) year after acceptance. Defective materials shall be promptly replaced in like kind and size. The guarantee period may be extended for those defective materials which are replaced.

#### **10.12.6 Multi-Purpose Use**

Detention facilities designed for multiple-use (neighborhood parks, open space, play areas, picnic areas, etc.) are allowed but must be approved by Butte-Silver Bow Public Works Department.

Storage for runoff from more frequent storms shall be stored separately from the multiple use areas. At a minimum, the detained volume for the 2-year, 24-hour design storm shall be used to size the separate facilities.

All multi-use amenities shall be anchored to prevent floatation. Maintenance of multi-use amenities must be included in the Maintenance Agreement for the proposed development and approved by Butte-Silver Bow during the design process.

#### **10.12.7 Safety**

Fencing shall be required when vertical walls are used, when more than 25% of the perimeter side slopes are steeper than 3 H: 1V, and when the permanent pool depth exceeds 2 feet.

#### **10.12.8 Emergency Overflow & Spillways**

Use the criteria set forth in Chapter 8.4.4.4 of the HEC-22 Manual as modified herein.

All detention storage facilities shall include a provision for non-erosive control of overflows. Overflow design must protect adjacent and downstream properties from damage. Calculations and data to support the design shall be provided in the engineering report.

Surface detention ponds shall provide a minimum of two controlled emergency overflows - the primary overflow in the control structure and the secondary overflow at the engineered embankment.

The crest of the secondary overflow shall be at least 0.5 feet above the crest of the primary overflow.

#### **10.12.9 Detention Structure Maintenance Access**

All storm water detention system control structures shall be accessible for maintenance and operation.

In new subdivisions, control structures, which are not abutting a roadway, shall be provided with dedicated tracts at least 15-feet wide to accommodate maintenance vehicles. The minimum clear driving width shall be 12-feet.

Maintenance access to the bottom of the detention pond is required when the bottom width is 15-feet or greater and/or when the height of the interior pond embankment and/or wall is greater than 4-feet. The grade of the access ramp shall be no steeper than 20%.

Maximum access road grades shall be 15%.

Gates and/or removable bollards are required to restrict access, as necessary, to drainage facilities. Cables and/or chains stretched across access roads are not acceptable.

## **10.13 Outfalls**

### **10.13.1 Design Considerations**

Storm drain pipelines shall not be installed aboveground and shall be buried in accordance with the manufacturer's specifications and these Engineering Standards.

Conveyance systems downstream of detention facilities or water quality treatment facilities shall be designed to prevent backwater conditions.

The use of pumped systems or backflow preventers shall not be used to prevent flooding due to backwater conditions.

Each runoff control facility shall provide emergency storage of at least 10% of the 100-year, 24-hour design storm volume or a minimum of 0.5 feet deep on the site prior to discharging runoff to a safe overflow route. The overflow route shall have the capacity for the 100-year, 24-hour flow in the event of overflow. Overflows shall be routed to the municipal storm drainage system, or an alternative overland flow discharge shall be identified and shown on the plan.

### **10.13.2 Control Structures**

Use the criteria and methods set forth in Chapter 8 of the HEC-22 Manual except as modified herein.

Precast concrete products for control structures shall comply with the MPWSS.

Ponds four feet deep or greater to be maintained by Butte-Silver Bow shall be equipped with a slide gate. Ponds less than four feet deep can utilize an orifice plate to control discharge.

The minimum clearance between the rim of the overflow standpipe and the bottom side of the structure's top slab shall be a minimum of 0.5-feet.

The minimum clearance between the flow restrictor (standpipe, orifices, shear gate, etc) and the steps/ladder rungs shall be 2-feet.

### **10.13.3 Orifices**

Orifices less than 8-inches in diameter must be screened.

A notch weir may be incorporated into the tee-type flow restrictor when a floatable baffle is provided.

Orifice plates shall be fabricated from aluminum plate (0.125-inch), high density polyethylene (HDPE) sheeting (0.25-inch), or PVC sheeting (0.25-inch). Orifice plates shall be bolted to the flange on the flow restrictor with stainless steel hardware. Orifices may be fabricated by drilling the specified diameter hole in an end cap, but must still meet screening requirements.

Protective screening for orifices less than 8 inches in diameter shall be hot-dipped galvanized, 0.5-inch x 0.5-inch "hardware cloth" or polymer geo-grid with the approximate same size openings.

#### **10.13.4 Energy Dissipation**

Energy dissipation must be provided when exit velocities are in excess of 10 fps. When discharging to an existing ditch, swale, or stream, energy dissipation is required to minimize erosion and scour. Energy dissipation measures shall be designed pursuant to FHWA HEC-14, "Hydraulic Design of Energy Dissipators for Culverts and Channels," as modified herein.

#### **10.13.5 Materials**

Acceptable pipe materials for all outfall sections of storm water pipe shall include those listed in Section 9 of these Standards, except that PVC pipe is not permitted due to ultraviolet light sensitivity and degradation.

### **10.14 Retention Systems**

Retention ponds and infiltration systems must have the capacity to fully detain and infiltrate the 100-year, 24-hour design storm. A routing diagram must show the discharge location for storm water flows that exceed the 100-year, 24-hour storm event. In addition provisions must be made so that storm water run-on can be by-passed around the project.

#### **10.14.1 Retention Ponds**

Retention ponds shall have the same design considerations as detention ponds with the only distinction being that they will not have an outlet structure. They will however, have an emergency spillway and are subject to all other requirements within these Standards.

#### **10.14.2 Infiltration Systems**

Use the criteria and methods set forth in Chapter 10 of the HEC-22 Manual as modified herein.

All storm water shall be routed through a catch basin prior to discharging to detention vaults or pipes to facilitate the easy removal of transported sediments and debris.

#### **Infiltration Design Considerations**

Infiltration systems for runoff control shall be designed to infiltrate the 100-year, 24-hour design storm volume in 24 hours or less after the storm is over. Soil capabilities must be established by a geotechnical investigation.

The Engineer shall demonstrate through: 1) Infiltration testing; 2) soil logs; and 3) a written opinion of a licensed professional engineer, that sufficient permeable soils exist

for a properly functioning infiltration system meeting the requirements herein. The infiltration rate shall be measured at a depth equal to the proposed bottom grade of the facility.

A detention system (storage) may be used in conjunction with the infiltration system to meter flows to a rate that can be infiltrated.

Depth to seasonal high water table, bedrock, hardpan or other impermeable layer shall be no less than 3-feet below the bottom of roof downspout infiltration systems and 5 feet below the bottom of all other infiltration facilities.

To obtain the design infiltration rate, a 1.75 safety factor shall be applied to the lowest measured infiltration rate.

Infiltration facilities shall not be located: 1) within 20 feet of any structure, property line, protected area or another infiltration system; or 2) within the 1:1 plane from the bottom edge of the excavation to the finished grade at the structure foundation, whichever is greater, except as provided herein. Infiltration facilities shall be setback at least 50-feet from downhill slopes which are 15% or greater. Infiltration areas shall not be: 1) driven on or across by any vehicles or equipment, 2) used for material storage or stockpiles, or 3) used for vehicle or equipment parking, unless specifically designed for these purposes.

Approval of an infiltration system shall obligate the owner to repair, replace, or reconstruct the infiltration system if it fails to operate as designed. The operation and maintenance agreement for an infiltration system shall include such a provision. Surface storage for groundwater infiltration structures is recommended to make the Owner aware of a problem with the infiltration system.

### **Geotechnical Report Requirement**

An adequate number of test holes shall be located over the proposed site to provide representative data for the final layout of the development. At a minimum, test holes shall be located in a grid of 50 feet by 50 feet in the infiltration area. Test hole locations shall be clearly identified in the geotechnical report and labeled on the drainage plan.

Soil logs must be submitted to describe soil type and depth and a site map shall be submitted showing the location of each test hole.

Borings or test pits shall extend at least 3-feet below the bottom of roof downspout systems and 5-feet below the bottom of all other infiltration facilities. Soil logs shall include the depth to the seasonally high ground water table and impervious strata. Seasonal water table elevation measurements shall be made bi-weekly during the period when the water table elevation is expected to be at its maximum (April 15 through July 30).

The geotechnical report shall address the potential impact of the infiltration system on downgradient areas both on-site and off-site.

During the course of construction, an inspection of the soil by an engineer shall be made after the system is excavated and before the gravel backfill is placed to confirm that suitable soils are present.

### **Infiltration Test Requirement**

The design infiltration rate shall be determined using the procedure outlined in DEQ Circular 4, Appendix A.

### **Infiltration Structure Setbacks**

Underground detention structures shall not be located:

- Underneath any surface building or structure (e.g. buildings, sheds, decks, carports, retaining walls, etc.); and
- Within the 1:1 plane from the bottom edge of the vault or the bottom of the excavation at the outside diameter for tanks, to the finished grade at an adjacent structure foundation; and
- Within the 1:1 plane from the bottom edge of the vault or the bottom of the excavation at the outside diameter for tanks, to the property line when an easement is not provided on the adjacent property; and
- Where such facilities interfere with other underground utilities.

If vaults are constructed aboveground, they shall be provided with visual screening and landscaping.

### **Infiltration Maintenance Access**

Infiltration system components shall be accessible for periodic inspection and routine maintenance.

For infiltration systems which are not abutting a roadway, the minimum clear driving width shall be 12 feet.

For roof downspout infiltration systems, access allowances for maintenance and construction equipment shall be made to facilitate routine maintenance activities and potential future reconstruction.

Underground detention facilities are subject to confined space entry regulations and such facilities shall be designed to meet all OSHA safety requirements for safe inspection and maintenance.

Access structures at each end of the facility shall be required. Spacing between access openings shall not exceed 50-feet. Covers, grates, and hatches shall be bolt locking. If the vault or pipe contains cells, a minimum of one access per cell is required.

Access openings shall be at least 24-inches in diameter and centered over a ladder and/or steps. For control structures, accesses must be located so that an 8-inch rigid Vactor® tube can reach the sump directly from the top, and so that a person entering the structure can step onto the ladder or step onto the floor. The opening shall allow visual inspection of the restrictor pipe (if used), while maintaining vertical Vactor® truck access to the sump area. In order to achieve both requirements, it may be necessary to increase the control structure size to provide two 24-inch access openings or a hatched cover that conforms to the loading requirements given the proposed location.

Orifice elbows shall be located on the side of the stand pipe nearest the ladder for clear visual inspection from above.

Gates and/or removable bollards may be required to restrict access to drainage facilities. Cables and/or chains stretched across access roads are not acceptable.

### **10.15 Non-Gravity Systems (Pumps)**

In general, pump systems (includes the pumps, force mains, electrical and power supply equipment, structures and appurtenances) are not an approved method of conveying, storing, or treating storm water. The Engineer shall demonstrate that the pump system is the only feasible drainage alternative. A deviation must be approved by Butte-Silver Bow Public Works in order to pump storm water.

## **11 MISCELLANEOUS DESIGN CONSIDERATIONS**

### **11.1 Trench Plugs**

Trench plugs shall be installed in accordance with MPWSS as modified herein.

Where utility conduits may convey groundwater in the trench backfill material, trench plugs shall be installed in accordance with MPWSS, but at a frequency of no less than one per block or 500-feet, whichever is less.

Trench plugs may be constructed of low permeability clays ( $1 \times 10^{-7}$  cm/s), or flowable fill as defined by MPWSS.

### **11.2 Encasing Requirements**

Storm water pipelines shall be encased in casing pipe when crossing under the following structures, where the ability to remove and replace pipe without disturbance to the structure is needed:

- Crossing under retaining walls over five (5) feet high (measured from the bottom of the base rock to top of wall);
- Crossing under retaining wall footings over five (5) feet wide; or
- Crossing under segmental block, crib, and reinforced earth-type retaining walls.

Casings shall extend beyond the facing, footing and backfill reinforcement zone a minimum of 5 feet or a distance equal to the depth of the pipe whichever is greater. The carrier pipe shall be supported by casing spacers when the casing length exceeds 10 feet where casing spacers are not used, the carrier pipe shall be more than 10 feet in length (no pipe joints inside casing).

If the cover is less than 3-feet between the bottom of footing or base rock, a casing is required regardless of wall height.

For storm pipes greater than 24" diameter, design exceptions for encasement pipe may be permitted on a case-by-case basis by Butte Silver Bow Public Works Department. Design exceptions, if allowed, are only permitted on a pre-authorization basis, and only after fully considering other alignments, routing, and methods of conveyance.



### **11.3 Locators**

Installation of all non-linear plastic pipe, lot stubs and under-drains shall include a locator wire. The locator wire shall be installed on top of and secured to the pipe. The Contractor shall furnish and install a No. 12 AWG solid copper wire between drainage structures and extend the wire at least 1-foot into the structure.

Ends of each storm drain stub at the property line shall be capped and located with a 2-inch by 4-inch timber, embedded to the stub cap, with a copper locator wire attached, and marked permanently "STORM". The stub depth shall be indicated on the marker.

### **11.4 Abandoning Facilities**

#### **Abandoning Pipe In-Place**

The Contractor shall completely fill the pipeline to be abandoned with concrete, or controlled density fill; or remove it.

#### **Abandoning Structures**

Abandonment of ponds, infiltration basins or other detention/retention structures shall be completed only after conveyance systems have been properly abandoned. Structures within the public right -of-way, a public easement or which are part of the publicly-owned and maintained system, must be removed completely or abandoned provided no conflicts with new utilities or improvements arise.

### **11.5 Protection of Wetlands and Riparian Areas**

When storm water discharges to a wetland and there is no alternative downstream discharge location, runoff may be discharged to the wetland in accordance with the provisions in this section. In order to maintain and protect the characteristic uses of the existing wetland, storm water runoff shall be limited to:

- 1) 50 percent of the existing 2-year 24-hour design storm peak runoff rate for the area tributary to the wetland;
- 2) A rate as determined by a qualified wetlands biologist; or
- 3) A rate specified by a resource agency having jurisdiction over wetlands. Runoff in excess of the specified rate shall be bypassed around the wetland.

Wetlands may not be filled in without prior approval from the US Army Corps of Engineers and local authorities, as appropriate. In situations where a wetland is allowed to be filled, the owner must provide runoff treatment and conveyance equivalent to that provided by the existing wetland to be filled, in addition to any other runoff treatment and/or wetland mitigation required by these standards and applicable codes.

### **11.6 Emergency Land Management Practices**

No prior notification is required for emergency land management practices necessitated by fire, flood, windstorm, earthquake, structural failure or other catastrophic events. Within five days after commencement of such activity, the Owner shall notify Butte-Silver Bow Engineer of the action with an explanation of why emergency action was necessary. Reasonable care must be taken to minimize soil disturbance and erosion during the conduct of emergency land management practices.

## **12 REFERENCES**

FHWA HEC-14, Hydraulic Design of Energy Dissipators for Culverts and Channels, 2006

FHWA HEC-22 Urban Drainage Design Manual 2002

Montana DEQ Circulars DEQ 1 February 2006

Montana DEQ Circular DEQ 2 September 1999

Montana DEQ Circular DEQ 4 2004

Montana DEQ Circular DEQ 8 2002

Montana DEQ, General Permit for Storm Water Discharge Associated with Small Municipal Separate Storm Sewers (MS4), Permit Number MTR04000, January 1, 2010

Montana Public Works Standards Specifications Sixth Ed. April 2010

Montana Department of Transportation Model Drainage Manual October 1995

Montana Department of Transportation for Road and Bridge Construction, Section 613, Rip-rap and Slope and Bank Protection

NOAA Atlas 2, Volume 1 Montana Precipitation Isopluvials 1973

United States Department of Agriculture, Natural Resources Conservation Service. 2009. Soil Survey of Silver Bow County Area and Parts of Beaverhead and Jefferson Counties, Montana.

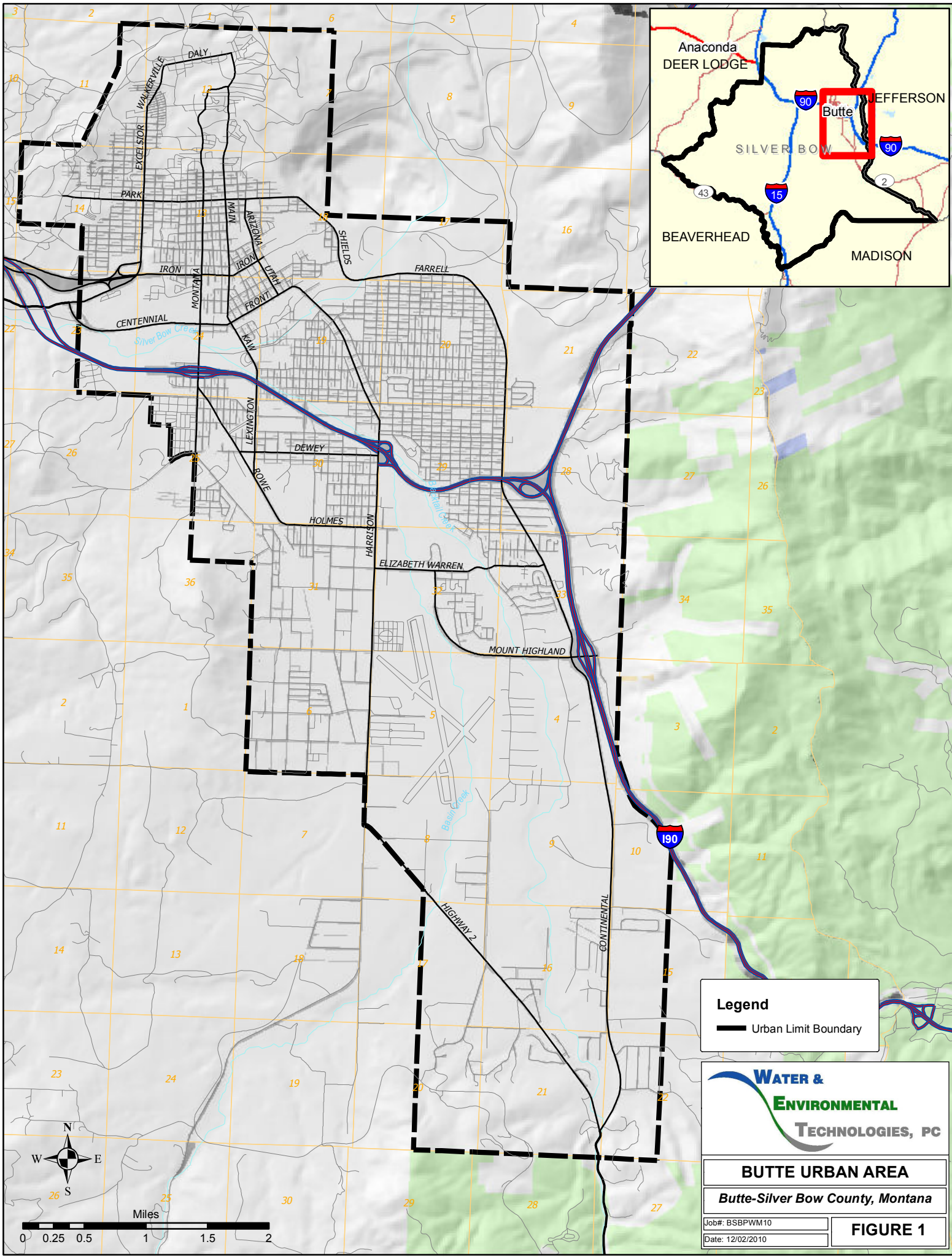
Federal Register Volume No: 64, No: 235, Page Number: 68721-68851

CFR Title: 40, Part: 9, 122, 123, 124 Published: 12/08/1999

Water and Environmental Technologies, PC March 2003. Storm Water Management Program for the Butte MS4.

## **APPENDIX A**

### **FIGURES**



**Legend**

— Urban Limit Boundary


**WATER & ENVIRONMENTAL TECHNOLOGIES, PC**

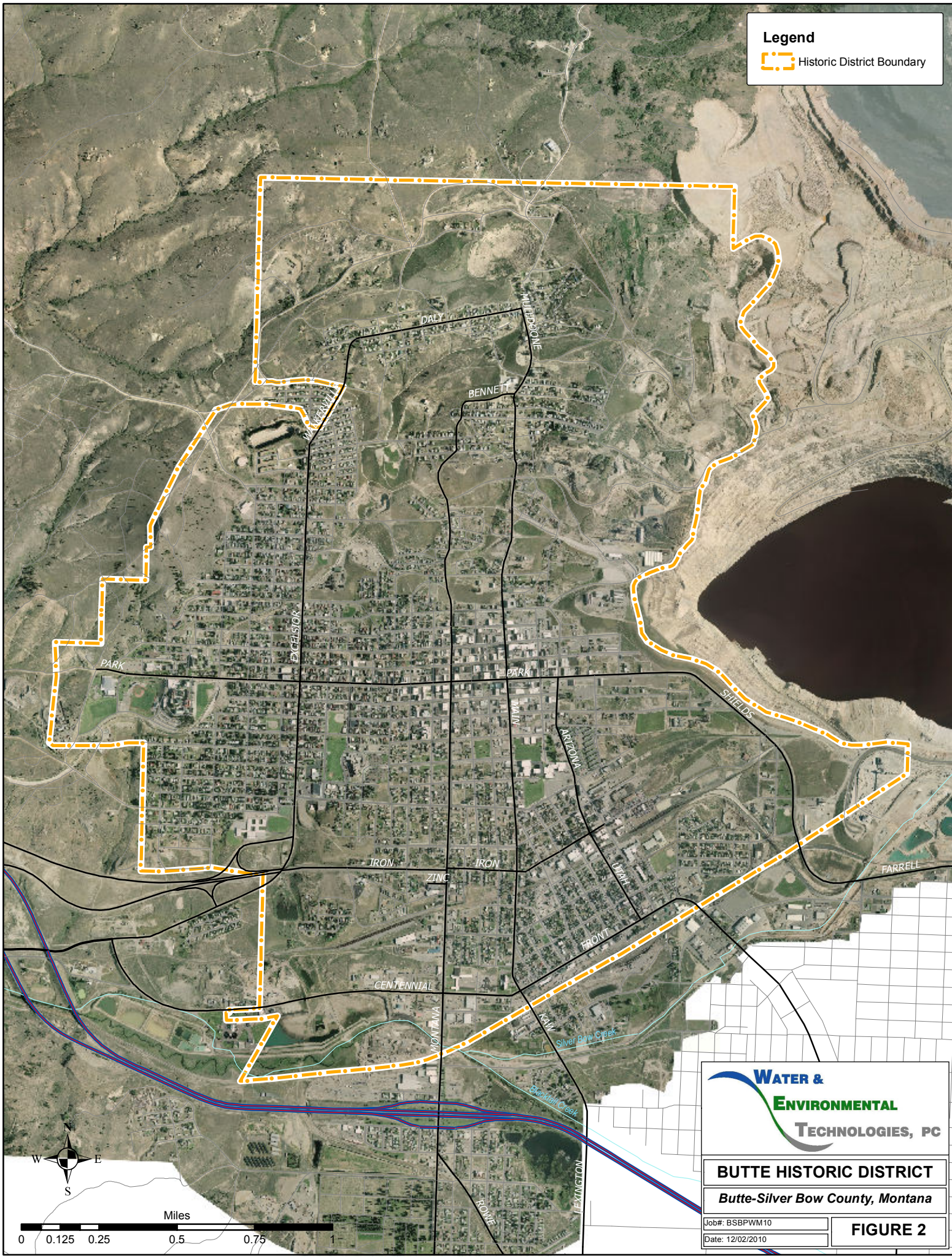
**BUTTE URBAN AREA**  
*Butte-Silver Bow County, Montana*

|                  |                 |
|------------------|-----------------|
| Job#: BSBPWM10   | <b>FIGURE 1</b> |
| Date: 12/02/2010 |                 |



**Legend**

 Historic District Boundary



**WATER & ENVIRONMENTAL TECHNOLOGIES, PC**

**BUTTE HISTORIC DISTRICT**  
*Butte-Silver Bow County, Montana*

Job#: BSBPWM10  
 Date: 12/02/2010

**FIGURE 2**



**APPENDIX B**  
**EXAMPLE MAINTENANCE AGREEMENT**



# STORM WATER MANAGEMENT/BMP MAINTENANCE AGREEMENT

BUTTE-SILVER BOW COUNTY  
Department of Public Works  
(406) 497-6515

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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 management/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  
\_\_\_\_\_

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